



**BEATTY SECONDARY SCHOOL
MID-YEAR EXAMINATION 2017**

SUBJECT: Mathematics

LEVEL: Sec 1 Express

PAPER: 1

DURATION: 1 hour 15 minutes

SETTER: Mr Alvin Lim

DATE: 11 May 2017

CLASS:	NAME:	REG NO:
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READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the spaces on the top of this page.

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions on the question paper.

If working is needed for any question, it must be shown with the answer.

Omission of essential working will result in loss of marks.

You are expected to use a scientific calculator to evaluate explicit numerical expressions.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is **50**.

For Examiner's Use
<div style="text-align: right; font-size: 2em;">50</div>

This paper consists of 7 printed pages (including this cover page).

[Turn over

For
Examiner's
UseAnswer **all** the questions.For
Examiner's
Use

1 Evaluate the following.

(a) $\$11.30 + 26¢ - \2.75

(b) $10 - 3(8 - 5)$

Answer (a) \$ [1]

(b) [1]

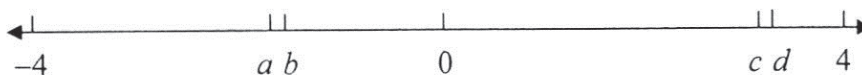
2 Evaluate $\frac{0.8562}{8.593 + 13.89}$. Give your answer correct to

(a) 3 decimal places,

(b) 3 significant figures.

Answer (a) [1]

(b) [1]

3 The numbers a , b , c and d are represented on a number line.It is given that the numbers are π , $-1\frac{2}{3}$, $3.\dot{1}\dot{4}$, $-\sqrt{3}$.Find a , b , c and d .Answer $a = \dots\dots\dots$, $b = \dots\dots\dots$, $c = \dots\dots\dots$, and $d = \dots\dots\dots$ [2]4 By writing each number correct to 1 significant place, estimate the value of $\frac{59.4 \times 0.493}{2.16}$. Show your working clearly.

Answer [2]

For
Examiner's
Use

- 5 It is given that $x = 4$ and $y = -3$. Evaluate

(a) $5y^2 - xy^3$,

(b) $\frac{x}{y} + \frac{y}{x}$.

Answer (a) [1]

(b) [1]

- 6 Factorise the following.

(a) $4m - 4n$

(b) $15ax - 20ay + 10a$

Answer (a) [1]

(b) [1]

- 7 Solve $\frac{9}{2x-5} = 3$.

Answer $x =$ [2]

- 8 (a) The number of students in Beatty Secondary School is 1300 correct to the nearest hundred. Write down the least possible number of students in the school.

- (b) Without using a calculator, estimate the value of $\frac{\sqrt{98}}{20.019}$. Show your working clearly.

Answer (a) [1]

(b) [2]

For
Examiner's
Use

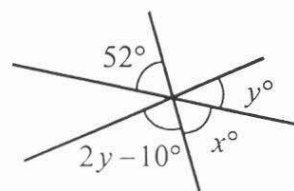
[Turn over

For
Examiner's
Use

- 9 In the figure, three straight lines intersect at a point. Giving your reasons clearly, find the values of

(a) x ,

(b) y .



For
Examiner's
Use

Answer (a) $x =$ [1]

(b) $y =$ [2]

- 10 Consider the following numbers.

$$0, \sqrt[3]{2}, 4^2, 27, 29, 0.\dot{7}, 3.21, 1\frac{1}{6}, \frac{\pi}{2}$$

List down all the

(a) irrational number(s),

(b) composite number(s).

(c) integer(s)

Answer (a) [1]

(b) [1]

(c) [2]

- 11 Express the following word statements algebraically in their **simplest** form.

(a) Subtract a from the cube of b .

(b) Divide the product of $2c$ and 3 by the square root of d .

(c) Multiply $3f$ to the sum of $4f$ and $5f$.

Answer (a) [1]

(b) [1]

(c) [2]

For
Examiner's
Use

For
Examiner's
Use

12 (a) Simplify $\frac{2x-1}{3} - \frac{x}{12}$.

(b) Expand and simplify $3(2x-3) + 4(x-1)$.

Answer (a) [2]

(b) [2]

13 (a) Express 60 and 72 as the product of their prime factors.

(b) Find the lowest common multiple of 60 and 72.

(c) Write down the smallest positive integer, m , such that $60m$ is a perfect square.

(d) Find the smallest positive integer n for which $\frac{72}{n}$ is a perfect cube.

Answer (a) $60 =$ [1]

$72 =$ [1]

(b) [1]

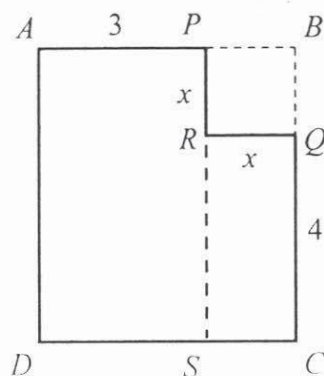
(c) $m =$ [1]

(d) $n =$ [1]

[Turn over

For
Examiner's
Use

- 14 The diagram shows a rectangle $ABCD$ with a square $PBQR$ of side x cm removed. It is given that $AP = 3$ cm and $QC = 4$ cm.



- (a) Find, in terms of x , an expression for the area of the rectangle $RQCS$.
 (b) Find, in terms of x , an expression for the area of the rectangle $APSD$.

The area of the rectangle $APSD$ is twice the area of the rectangle $RQCS$.

- (c) Form an equation in x and solve it.
 (d) Hence find the area of the rectangle $APSD$.

For
Examiner's
Use

Answer (a) cm^2 [1]

(b) cm^2 [1]

(c) $x =$ [2]

(d) cm^2 [1]

For
Examiner's
Use

- 15** (a) Construct a triangle ABC such that $AC = 8$ cm and angle $ABC = 50^\circ$. AB has already been drawn. [2]
- (b) Measure and write down the angle BCA .
- (c) Construct the angle bisector of angle BAC . [1]
- (d) Construct the perpendicular bisector of AB . [1]
- The bisectors in (c) and (d) intersect at the point X .
- (e) Label the point X . [1]
- (f) Construct a circle with centre X and which passes through A and B . [1]
- (g) Write down the radius of the circle.

For
Examiner's
Use

Answer (a), (c), (d), (e), (f)



(b) $^\circ$ [1]

(g) cm [1]

End of Paper

[Turn over



**BEATTY SECONDARY SCHOOL
MID-YEAR EXAMINATION 2017**

SUBJECT: Mathematics

LEVEL: Sec 1 Express

PAPER: 2

DURATION: 1 hour 30 minutes

SETTER: Mr Alvin Lim

DATE: 12 May 2017

CLASS:	NAME:	REG NO:
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Additional Materials: Writing paper

READ THESE INSTRUCTIONS FIRST

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three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is **50**.

For Examiner's Use
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This paper consists of **4** printed pages (including this cover page)
Answer all the questions

[Turn over

- 1 The numbers A , B and C , written as the products of their prime factors, are given below.

$$A = 2^2 \times 3^4 \times 5^2$$

$$B = 2^4 \times 3^6 \times 5^2$$

$$C = 3^7 \times 5^2 \times 7$$

Giving your answers in **index notation**, find

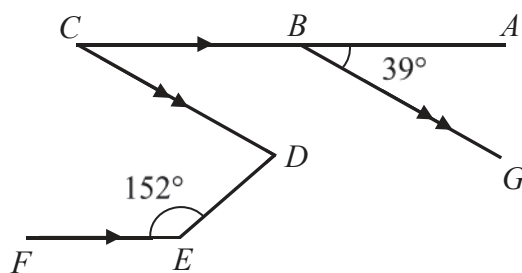
- (a) the highest common factor of A and B , [1]
- (b) the lowest common multiple of A and C , [1]
- (c) the square root of B . [1]
- 2 The local time of Rio de Janeiro in Brazil and that of Singapore is GMT -3 and GMT $+8$ respectively. The World Cup soccer final game is played at 16 00 on 13 July in Rio de Janeiro.
- (a) Find the local time and date in Singapore when the soccer game is played. [1]
- (b) It takes 30 hours to travel from Singapore to Rio de Janeiro. Mr Beatty departs from Singapore on 12 July at 17 00 to Rio de Janeiro. Find out if he is in time to watch the soccer game. [2]
- 3 At the school Sports Day, $\frac{11}{15}$ of the audience were students, $\frac{1}{4}$ of the remainder were parents and the rest were teachers, What fraction were teachers? [3]
- 4 The smallest of three consecutive odd numbers is x .
- (a) Express the sum of the three consecutive odd numbers in terms of x . [1]
- (b) Find the largest number if the sum is 321. [2]
- 5 (a) **Without using a calculator**, express $\frac{5}{18}$ as a recurring decimal. [2]
- (b) Find the fraction that is exactly halfway between $\frac{4}{5}$ and $\frac{4}{6}$. Give your answer in its simplest form. [2]

- 6 The salary of a car salesman with Company *A* includes a fixed monthly amount of \$1 250 and an additional \$650 for every car that he sells.

Another car sales salesman with Company *B* does not have a fixed component in his salary and is paid \$875 for every car that he sells.

In a particular month, both salesmen sold n cars.

- (a) Express, in terms of n , the monthly salary of the salesman with company *A*. [1]
- (b) Express, in terms of n , the monthly salary of the salesman with company *B*. [1]
- (c) If both of them sold 6 cars in a particular month, deduce which company's salary package is more attractive. [3]
- 7 In the figure, angle $ABG = 39^\circ$, angle $FED = 152^\circ$, $AC \parallel EF$ and B is a point on AC such that $BG \parallel CD$.



Giving your reasons, find

- (a) reflex angle ACD , [2]
- (b) acute angle CDE , [3]
- 8 (a) A school has both primary and secondary sections. The bell of the primary section goes off every 30 minutes while the bell of the secondary section goes off every 35 minutes. The first bell at both primary and secondary sections goes off at 07 30.
- When will the bells of both schools next go off at the same time? [3]
- (b) Amy wants to pack 56 apples, 72 bananas and 104 cherries into as many fruit Bags as possible without leaving any fruit unpacked. Every fruit bag must contain the same number of apples, bananas and cherries.
- Find
- (i) the greatest number of fruit bags that can be packed, [3]
- (ii) the number of cherries in each fruit bag. [1]

[Turn over

- 9 (a) Express $\frac{x+4}{6} + \frac{x}{9} - x$ as a single fraction. [3]
- (b) Simplify $4a - 3b + 8 - [3(a - b) + 2]$. [3]
- (c) (i) Factorise $ax - ya$. [1]
- (ii) Hence, without the use of a calculator, find the value of $321 \times 37 - 27 \times 321$ [1]
- 10 Solve
- (a) $x^3 = 661 - 4(9 + x^3)$, [3]
- (b) $\frac{2}{2x-5} = \frac{3}{5-x}$, [3]
- (c) $\frac{3x}{5} - \frac{x+1}{3} = 5$. [3]

End of Paper



**BEATTY SECONDARY SCHOOL
MID-YEAR EXAMINATION 2017**

SUBJECT: Mathematics

LEVEL: Sec 1 Express

PAPER: 1

DURATION: 1 hour 15 minutes

SETTER: Mr Alvin Lim

DATE: 11 May 2017

CLASS:	NAME:	REG NO:
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For
Examiner's
Use

Answer **all** the questions.

For
Examiner's
Use

1 Evaluate the following.

(a) $\$11.30 + 26¢ - \2.75

(b) $10 - 3(8 - 5)$

Answer (a) \$ $\$8.81$ [B1] [1]

(b) 1 [B1] [1]

2 Evaluate $\frac{0.8562}{8.593 + 13.89}$. Give your answer correct to

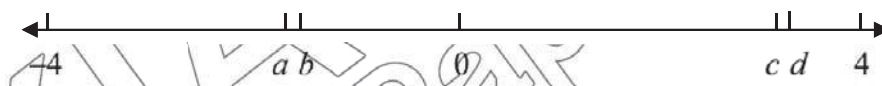
(a) 3 decimal places,

(b) 3 significant figures.

Answer (a) 0.038 [B1] [1]

(b) 0.0381 [B1] [1]

3 The numbers a , b , c and d are represented on a number line.



It is given that the numbers are π , $-1\frac{2}{3}$, $3.\dot{1}\dot{4}$, $-\sqrt{3}$.

Find a , b , c and d .

Answer $a = -\sqrt{3}$, $b = -1\frac{2}{3}$, $c = 3.\dot{1}\dot{4}$, and $d = \pi$ [B2] (2 correct, 1 mark) [2]

4 By writing each number correct to 1 significant place, estimate the value of $\frac{59.4 \times 0.493}{2.16}$. Show your working clearly.

$$\frac{59.4 \times 0.493}{2.16} = \frac{60 \times 0.5}{2} \quad [\text{M1}]$$

$$= 15 \quad [\text{A1}]$$

Answer [2]

For
Examiner's
Use

For
Examiner's
Use

- 5 It is given that $x = 4$ and $y = -3$. Evaluate

(a) $5y^2 - xy^3$,

(b) $\frac{x}{y} + \frac{y}{x}$.

(a) $5 \times (-3)^2 - 4 \times (-3)^3 = 5 \times 9 - 4 \times (-27)$
 $= 153$ [B1]

(b) $\frac{4}{-3} + \frac{-3}{4} = -\frac{4}{3} - \frac{3}{4}$
 $= -2\frac{1}{12}$ [B1]

Answer (a) [1]

(b) [1]

- 6 Factorise the following.

(a) $4m - 4n$

(b) $15ax - 20ay + 10a$

Answer (a) $4(m - n)$ [B1] [1]

(b) $5a(3x - 4y + 2)$ [B1] [1]

- 7 Solve $\frac{9}{2x-5} = 3$.

$\frac{9}{2x-5} = 3$

$9 = 3(2x - 5)$ [M1]

$9 = 6x - 15$

$6x = 24$

$x = 4$ [A1]

Answer $x =$ [2]

- 8 (a) The number of students in Beatty Secondary School is 1300 correct to the nearest hundred. Write down the least possible number of students in the school.

- (b) Without using a calculator, estimate the value of $\frac{\sqrt{98}}{20.019}$. Show your working clearly.

(a) 1250 [B1]

(b) $\frac{\sqrt{98}}{20.019} \approx \frac{\sqrt{100}}{20}$ [M1]

$= \frac{10}{20} = \frac{1}{2}$ [A1]

Answer (a) [1]

(b) [2]

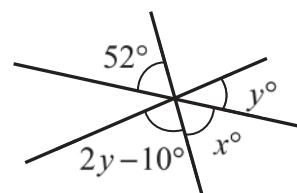
[Turn over

For
Examiner's
Use

- 9 In the figure, three straight lines intersect at a point. Giving your reasons clearly, find the values of

(a) x ,

(b) y .



(a) $x = 52^\circ$ (vert opp \angle s) [A1]

(b) $x + y + 2y - 10^\circ = 180^\circ$ (adj \angle s on a str line) [M1]

$$52^\circ + 3y - 10^\circ = 180^\circ$$

$$3y = 180^\circ - 42^\circ$$

$$= 138^\circ$$

$$y = 46^\circ$$
 [A1]

Answer (a) $x =$ [1]

(b) $y =$ [2]

For
Examiner's
Use

- 10 Consider the following numbers.

$$0, \sqrt[3]{2}, 4^2, 27, 29, 0.\dot{7}, 3.2\dot{1}, 1\frac{1}{6}, \frac{\pi}{2}$$

List down all the

(a) irrational number(s),

(b) composite number(s).

(c) integer(s)

$$\sqrt[3]{2}, \frac{\pi}{2}$$
 [B1]

Answer (a) [1]

$$27, 4^2$$
 [B1]

(b) [1]

(c) $0, 4^2, 27, 29$ [B2] [2]

- 11 Express the following word statements algebraically in their **simplest** form.

(a) Subtract a from the cube of b .

(b) Divide the product of $2c$ and 3 by the square root of d .

(c) Multiply $3f$ to the sum of $4f$ and $5f$.

(a) $b^3 - a$ [B1]

(b) $\frac{6c}{\sqrt{d}}$ [B1]

(c) $3f \times (4f + 5f)$ [M1]

$$= 3f \times 9f$$

$$= 27f^2$$

Answer (a) [1]

(b) [1]

(c) [2]

For
Examiner's
Use

For
Examiner's
Use

12 (a) Simplify $\frac{2x-1}{3} - \frac{x}{12}$.

(b) Expand and simplify $3(2x-3) + 4(x-1)$.

$$\begin{aligned} (a) \quad \frac{2x-1}{3} - \frac{x}{12} &= \frac{4(2x-1)}{12} - \frac{x}{12} \quad [\text{M1}] \\ &= \frac{8x-4}{12} - \frac{x}{12} \\ &= \frac{7x-4}{12} \quad [\text{A1}] \end{aligned}$$

$$\begin{aligned} (b) \quad 3(2x-3) + 4(x-1) &= 6x-9+4x-4 \quad [\text{M1}] \\ &= 10x-13 \quad [\text{A1}] \end{aligned}$$

Answer (a) [2]

(b) [2]

13 (a) Express 60 and 72 as the product of their prime factors.

(b) Find the lowest common multiple of 60 and 72.

(c) Write down the smallest positive integer, m , such that $60m$ is a perfect square.

(d) Find the smallest positive integer n for which $\frac{72}{n}$ is a perfect cube.

$$\begin{aligned} (a) \quad 60 &= 2^2 \times 3 \times 5 \quad [\text{B1}] \\ 72 &= 2^3 \times 3^2 \quad [\text{B1}] \end{aligned}$$

$$(b) \quad 2^3 \times 3^2 \times 5 = 360 \quad [\text{B1}]$$

$$(c) \quad 3 \times 5 = 15 \quad [\text{B1}]$$

$$(d) \quad n = 3^2 = 9 \quad [\text{B1}]$$

Answer (a) 60 = [1]

72 = [1]

(b) [1]

(c) m = [1]

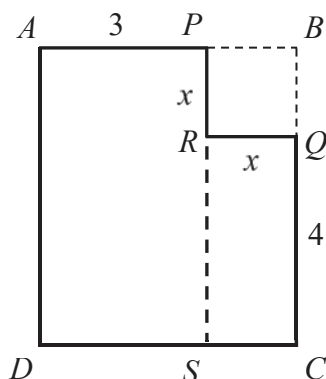
(d) n = [1]

[Turn over]

For
Examiner's
Use

- 14 The diagram shows a rectangle $ABCD$ with a square $PBQR$ of side x cm removed. It is given that $AP = 3$ cm and $QC = 4$ cm.

For
Examiner's
Use



- (a) Find, in terms of x , an expression for the area of the rectangle $RQCS$.
- (b) Find, in terms of x , an expression for the area of the rectangle $APSD$.
- The area of the rectangle $APSD$ is twice the area of the rectangle $RQCS$.
- (c) Form an equation in x and solve it.
- (d) Hence find the area of the rectangle $APSD$.

(a) Area of rectangle $RQCS = 4 \times x$
 $= 4x \text{ cm}^2$ [A1]

(b) Area of rectangle $APSD = 3 \times (4 + x)$
 $= 12 + 3x \text{ cm}^2$ [A1] o.e.

(c) Area of the $APSD = 2 \times (\text{Area of } RQCS)$
 $12 + 3x = 2 \times 4x$ [M1]
 $12 + 3x = 8x$
 $5x = 12$
 $x = 2.4$ [A1]

(d) Area of rectangle $APSD = 12 + 3(2.4)$
 $= 19.2 \text{ cm}^2$ [A1]

Answer (a) cm^2 [1]

(b) cm^2 [1]

(c) $x =$ [2]

(d) cm^2 [1]

For
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- 15 (a) Construct a triangle ABC such that $AC = 8$ cm and angle $ABC = 50^\circ$. AB has already been drawn. [2]

(b) Measure and write down the angle BCA .

(c) Construct the angle bisector of angle BAC . [1]

(d) Construct the perpendicular bisector of AB . [1]

The bisectors in (c) and (d) intersect at the point X .

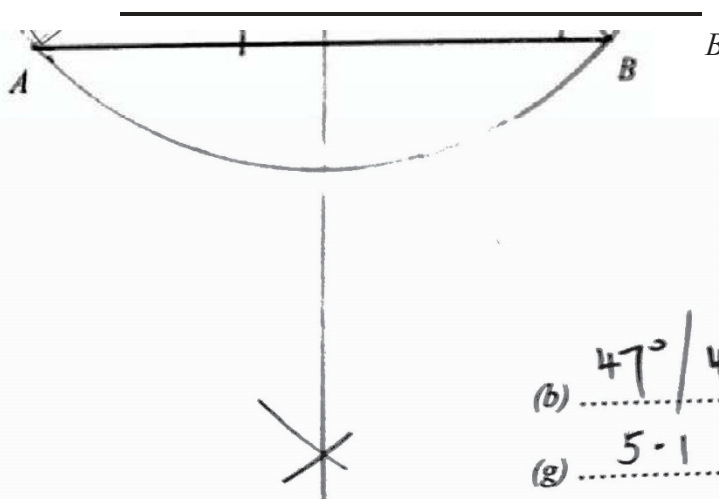
(e) Label the point X . [1]

(f) Construct a circle with centre X and which passes through A and B . [1]

(g) Write down the radius of the circle.

For
Examiner's
Use

Answer (a), (c), (d), (e), (f)



(accept 46-49°)

(b) $47^\circ / 48^\circ$ [1]

(g) 5.1 cm [1]

(accept ± 0.2)

[Turn over

Paper 2 Solutions

- 1(a) $\text{HCF} = 2^2 \times 3^4 \times 5^2$ [B1]
 (b) $\text{LCM} = 2^2 \times 3^7 \times 5^2 \times 7$ [B1]
 (c) Square root of $B = 2^2 \times 3^3 \times 5$ [B1]

- 2(a) Time difference = $8+3 = 11$ hours

Rio de Janeiro 16 00, 13 July

$$1600 + 1100 = 2700$$

$$2700 - 2400 = 0300 \text{ (+1)}$$

\therefore Singapore 0300, 14 July [A1]

- (b) Flight time = 30h = 1 day 6h

Reached Rio de Janeiro at Singapore time:

12 July at 17 00 + 1 day 6h = 13 July 2300

OR

Reached Rio de Janeiro at Rio de Janeiro time:

13 July 2300 – 1100 = 13 July 1200

\therefore he is in time to watch the soccer game. [A2]

3

Fraction that were teachers & parents = $1 - \frac{11}{15}$ [M1]

$$= \frac{4}{15}$$

Fraction that were parents = $\frac{1}{4} \times \frac{4}{15}$ [M1]

$$= \frac{1}{15}$$

Fraction that were teachers = $\frac{4}{15} - \frac{1}{15}$

$$= \frac{3}{15}$$

$$= \frac{1}{5} \quad [A1]$$

$$4(a) \quad x + (x + 2) + (x + 4) = 3x + 6 \quad [B1]$$

$$(b) \quad 3x + 6 = 321 \quad [M1]$$

$$3x = 315$$

$$x = 105$$

$$\text{Largest number} = x + 4$$

$$= 105 + 4$$

$$= 109 \quad [A1]$$

$$5(a) \quad \begin{array}{r} 0.277 \\ 18 \overline{) 50} \\ \underline{-36} \\ 140 \\ \underline{-126} \\ 140 \\ \underline{-126} \\ 14 \end{array} \quad [M1]$$

$$\frac{5}{18} = 0.2\dot{7} \quad [A1]$$

$$(b) \quad \left(\frac{4}{5} + \frac{4}{6} \right) \div 2 \quad [M1]$$

$$= \frac{11}{15} \quad [A1]$$

$$6(a) \quad \$ (1\,250 + 650n) \quad [B1]$$

$$(b) \quad \$875n \quad [B1]$$

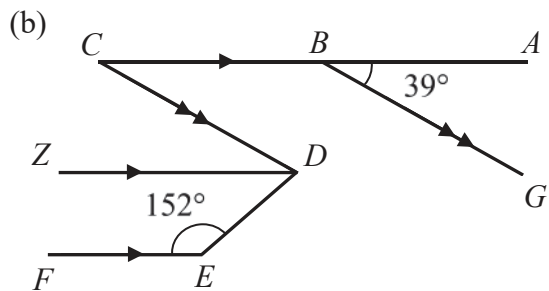
$$(c) \quad \$ (1\,250 + 650 \times 6) = \$5150 \quad [M1]$$

$$\$875 \times 6 = \$5\,250 \quad [M1]$$

$$\text{Company B, } \$5\,250 > \$5\,150 \quad [A1]$$

7(a) $\angle BCD = 39^\circ$ (corr. \angle s) [M1]

Reflex $\angle ACD = 360^\circ - 39^\circ$ (\angle s at a point)
 $= 321^\circ$ [A1]



Draw line $ZD \parallel$ to FE and CA .

$\angle CDZ = 39^\circ$ (alt. \angle s) [M1]

$\angle EDZ = 180^\circ - 152^\circ$ (int \angle s) [M1]
 $= 28^\circ$

$\angle CDE = 39^\circ + 28^\circ = 67^\circ$ [A1]

8(a)

$30 = 2 \times 3 \times 5$

$35 = 5 \times 7$

LCM $= 2 \times 3 \times 5 \times 7 = 210$ [M1]

$210 \text{ min} = 3 \text{ h } 30 \text{ min}$

$07 \text{ } 30 + 03 \text{ } 30$ [M1]

$= 11 \text{ } 00$ [A1]

(b)(i) $56 = 2^3 \times 7$

$72 = 2^3 \times 3^2$

$104 = 2^3 \times 13$ [M2]

$HCF = 2^3 = 8$ [A1]

(ii) No. of cherries $104 \div 8 = 13$ [A1]

7

9(a) $\frac{x+4}{6} + \frac{x}{9} - x$
 $= \frac{3 \times (x+4)}{18} + \frac{2 \times x}{18} - \frac{18x}{18}$ [M1]

$= \frac{3x+12+2x-18x}{18}$ [M1]

$= \frac{12-13x}{18}$ [A1]

(b) $4a - 3b + 8 - [3(a-b) + 2]$
 $= 4a - 3b + 8 - [3a - 3b + 2]$ [M1]

$= 4a - 3b + 8 - 3a + 3b - 2$ [M1]

$= a + 6$ [A1]

(c)(i) $ax - ya = a(x - y)$ [B1]

(ii) $321 \times 37 - 27 \times 321 = 321(37 - 27)$
 $= 321 \times 10$
 $= 3210$ [A1]

10(a)

$x^3 = 661 - 4(9 + x^3)$

$x^3 = 661 - 36 - 4x^3$ [M1]

$5x^3 = 625$ [M1]

$x^3 = 125$

$x = \sqrt[3]{125}$
 $= 5$ [A1]

(b)

$\frac{2}{2x-5} = \frac{3}{5-x}$

$2(5-x) = 3(2x-5)$ [M1]

$10 - 2x = 6x - 15$

$-8x = -25$ [M1]

$x = 3\frac{1}{8}$ [A1]

(c)

$\frac{3x}{5} - \frac{x+1}{3} = 5$

$\frac{3 \times 3x}{15} - \frac{5(x+1)}{15} = \frac{75}{15}$ [M1]

$\frac{9x}{15} - \frac{(5x+5)}{15} = \frac{75}{15}$

$9x - 5x - 5 = 75$ [M1]

$4x = 80$

$x = 20$ [A1]

[Turn over

Calculator Model:

Name:	Class	Class Register Number
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中正中学

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MID – YEAR EXAMINATION 2017 SECONDARY 1

Mathematics

**3 May 2017
2 hours**

Additional Materials: **Writing paper**

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write your name, class and index number on all the work you hand in.
 Write in dark blue or black pen on both sides of the paper.
 You may use a pencil for any diagrams, graphs or rough working.
 Do not use highlighters or correction fluid.

Answer **all** questions in Sections A and B.

If working is needed for any question it must be shown with the answer.
 Omission of essential working will result in loss of marks.
 The use of an approved scientific calculator is expected, where appropriate.
 If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
 For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.
 The number of marks is given in brackets [] at the end of each question or part question.
 The total number of marks for this paper is 80.

Section A : Answer the questions in the space provided.

Section B : Answer the questions on the writing paper provided.

For Examiner's Use	
Section A	/ 40
Section B	/ 40
Total	/ 80

This document consists of **11** printed pages and **1** blank page.

Section A: Answer **all** the questions.

- 1 Round 0.999 to 2 significant figures.

Answer: [1]

- 2 (a) Calculate $\frac{0.4215^3}{\sqrt[3]{645} - 3.5}$. Truncate your answer to 6 decimal places.
- (b) Write your answer to part (a), correct to 3 significant figures.

Answer: (a) [1]

(b) [1]

- 3 Find $\sqrt[3]{1728}$ by using prime factorisation.

Answer: [3]

- 4 (a) Express 90 as a product of its prime factors, giving your answer in index notation.
- (b) Find the smallest possible value of n such that $90n$ is a perfect cube.

Answer: $90 = \dots\dots\dots$ [1]

$n = \dots\dots\dots$ [1]

- 5 Consider the following numbers :

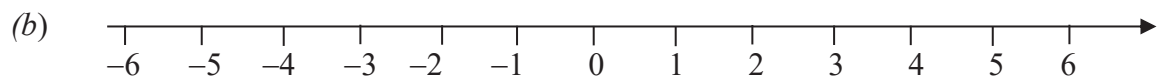
$$0, \sqrt{4}, \sqrt[3]{-27}, \frac{5}{\sqrt{3}}, 5, \frac{\pi}{4}.$$

- (a) Write down the
- (i) irrational numbers,
 - (ii) positive integers,
 - (iii) prime numbers.
- (b) Represent all the numbers on the number line below.

Answer: (a)(i)..... [1]

(a)(ii)..... [1]

(a)(iii)..... [1]



[2]

- 6 (a) Express 125 g as a percentage of 5 kg.
(b) Find the value of 4.5 % of \$8.

Answer: (a) % [2]

(b) \$ [2]

- 7 Evaluate, without the use of a calculator, $\left[8 + (-4)^3\right] - [-2(12 + 3) \div 3]$, showing all your working clearly.

Answer: [3]

8 Simplify the following

(a) $x(2x+3)-7(3x-1),$

(b) $5a \times (-2b) \times \sqrt[3]{-125a^3}.$

Answer: (a) [2]

(b) [2]

9 Factorise the following expressions

(a) $15a^2b+6ac,$

(b) $(2v-w)(p+1)+2w(p+1).$

Answer: (a) [1]

(b) [2]

10 Given that $a = 3$, $b = -2$ and $c = \frac{1}{2}$, evaluate

(a) $2a - 3c$,

(b) $\frac{ab^2 - 3a}{c}$.

Answer: (a) [2]

(b) [2]

11 A train 320 m long passes through a tunnel 5.2 km long.

The average speed of the train is 28 km/h.

(a) Convert 28 km/h into m/s.

(b) Calculate the time taken for the train to pass completely through the tunnel.

Give your answer in minutes.

Answer: (a) m/s [1]

(b) min [3]

- 12** A factory produces a type of baking powder made with baking soda, cream of tartar and cornstarch. The amount of baking soda, cream of tartar and cornstarch are in the ratio of 7 : 3 : 4 respectively.

(a) In a small bag of baking powder, there are 60g of cornstarch.

What is the weight of the baking powder in the small bag?

(b) Bags of baking powder are filled at a rate of 180g per second.

How many bags of baking powder weighing 1.5 kg each can be filled in 3.5 hours?

Answer: (a) g [2]

(b) bags [3]

End of Section A

Section B: Answer **all** the questions.

- 13 (a)** Write down an algebraic expression for each of the following statements.
- (i) Subtract $5x + 3$ from $3x^2 + 5$. [2]
- (b) Simplify the following.
- (i) $2y - 3[x + 4(x - y)]$, [2]
- (ii) $\frac{3n - m}{4} + \frac{2n - m}{5}$. [3]
- (c) If $a : b = 5 : 4$ and $b : c = 4.2 : 0.65$, find $a : c$. [2]
- 14** Joey paid \$28.80 for a pair of shoes after a discount of 25% from a departmental store. What is the original price of the shoes? [2]
- 15** Marcus wants to change 600 Singapore Dollars (S\$) to Thai Baht (THB).
The exchange rate is S\$1 = 24.72 THB.
- (a) Find the amount of Thai Baht (THB) Marcus will receive if he changes 600 Singapore Dollars (S\$). [1]
- (b) The money changer is only able to change amounts in multiples of 1000 THB.
The money changer decides to **round up** the amount in (a) to the nearest 1000 THB.
Find the amount in S\$ that Marcus needs to top up for the extra amount, giving your answer to the nearest cent. [3]

- 16** One pen costs x cents. An eraser costs 30 cents less than a pen and a ruler costs two-third of a pen.

Find a simplified expression for

(i) the cost of an eraser in cent, [1]

(ii) the total cost of an examination goodie pack consisting of 3 pens, 1 eraser and 2 rulers in cent. [2]

- 17** Solve the equations:

(a) $1 + \frac{1}{2}x = \frac{1}{5}x$, [2]

(b) $2(5y + 3) = 2y + 14$. [2]

- 18** Susan cycles from home to a coffeeshop to purchase dinner before continuing the journey to her grandmother's place.

Susan cycled at a speed of 4 m/s to the coffeeshop for 3 minutes, took another 10 minutes to buy dinner and continued the rest of the journey to her grandmother's house at a speed of 6 m/s. Given that the total distance travelled is 4500 m,

(a) find the distance between Susan's house and the coffeeshop. [1]

(b) Find the average speed for the whole journey in m/s. [3]

- 19 (a)** Mr Lee was paid a monthly basic salary of \$3 850 since January 2015. At the end of 2015, he was given a bonus of 13.5% of the value of sales that he has made during the year. If the total value of his sales in 2015 was \$300 000, calculate Mr Lee's total income in 2015. [2]

- (b)** Mr Lee has to pay income tax in January 2016 for the annual income earned in 2015. The relief amount that will not be subjected to income tax is shown in the table below.

Type of relief	Amount
Personal relief	\$1000
Child relief	\$5000 each child
CPF	\$17 340
Voluntary donation	Three times the amount donated

Mr Lee has only one child and he has been making voluntary donation of \$50 every month to an approved organization. The gross tax payable for the first \$40 000 is \$550 and the tax rate for the rest is 7%. Calculate his income tax payable for 2015 using the information given above. [3]

- (c)** In January 2016, Mr Lee's basic monthly basic salary was cut by \$200.
- (i)** Calculate the percentage decrease in the basic monthly salary from 2015 to 2016, giving your answer to three significant figures. [2]
- (ii)** In 2016, he was paid a bonus of 15.5% of the value of his sales that he has made during the year. Given that his bonus in 2016 is \$33 790, calculate the total value of his sales in 2016. [2]

- 20** Kale ordered one set meal at \$55.60 and an ice cream for \$12.90 at a restaurant. Below shows Kale's bill before payment.

1 set meal	\$55.60
Ice cream	\$12.90
SUBTOTAL	\$68.50
10% Service Charge	\$6.85
7% Goods and Services Tax (GST)	\$5.27

Currently, the restaurant is offering two discount packages that Kale can choose from.

Discount Package I:

Enjoys 10% off the subtotal of the bill, which is thereafter subjected to 10% Service Charge first and then 7% GST.

Discount Package II:

There is no service charge and the subtotal is subjected to 7% GST.

Explain, showing all necessary working, which discount package is a better option for Kale.

[5]

~ End of Paper ~

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Calculator Model:

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Name:	Class	Class Register Number
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MID – YEAR EXAMINATION 2017 SECONDARY 1

Mathematics

Wednesday, 3 May 2017

2 hours

Additional Materials: **Writing paper**

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write your name, class and index number on all the work you hand in.

Write in dark blue or black pen on both sides of the paper.

You may use a pencil for any diagrams, graphs or rough working.

Do not use highlighters or correction fluid.

Answer **all** questions in Sections A and B.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 80.

Section A : Answer the questions in the space provided.

Section B : Answer the questions on the writing paper provided.

For Examiner's Use	
Section A	/ 40
Section B	/ 40
Total	/ 80

This document consists of **9** printed pages and **1** blank page.

Section A: Answer all the questions.

- 1 Round 0.999 to 2 significant figures.

Answer: 1.0 [1]

- 2 (a) Calculate $\frac{0.4215^3}{\sqrt[3]{645} - 3.5}$. Truncate your answer to 6 decimal places.
 (b) Write your answer to part (a), correct to 3 significant figures.

(a) $\frac{0.4215^3}{\sqrt[3]{645} - 3.5} = 0.014568$ (truncated to 6 d.p.)

(b) $\frac{0.4215^3}{\sqrt[3]{645} - 3.5} = 0.014568$
 $= 0.0146$ (to 3 s.f.)

Answer: (a) 0.014568 [1]

(b) 0.0146 [1]

- 3 Find $\sqrt[3]{1728}$ by using prime factorisation.

2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

$$\begin{aligned}
 1728 &= 2^6 \times 3^3 \\
 \sqrt[3]{1728} &= \sqrt[3]{2^6 \times 3^3} \\
 &= 2^2 \times 3 \\
 &= 12
 \end{aligned}$$

Answer: 12 [3]

- 4 (a) Express 90 as a product of its prime factors, giving your answer index notation.
 (b) Find the smallest possible value of n such that $90n$ is a perfect cube.

2	90
3	45
3	15
5	5
	1

$$90 = 2 \times 3^2 \times 5$$

$$90n = 2^3 \times 3^3 \times 5^3$$

$$n = 2^2 \times 3 \times 5^2$$

$$n = 300$$

Answer: $90 = 2 \times 3^2 \times 5$ [1]

$n = 300$ [1]

5 Consider the following numbers :

$$0, \sqrt{4}, \sqrt[3]{-27}, \frac{5}{\sqrt{3}}, 5, \frac{\pi}{4}$$

(a) Write down the

(i) irrational numbers,

(ii) positive integers,

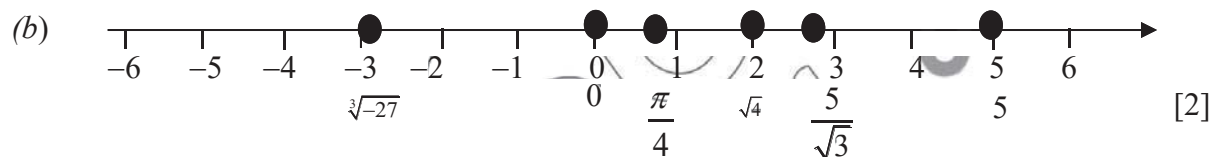
(iii) prime numbers.

(b) Represent **all** the numbers on the number line below.

~~Answer~~ (a)(i) $\frac{5}{\sqrt{3}}, \frac{\pi}{4}$ [1]

(a)(ii) $\sqrt{4}, 5$ [1]

~~(a)(iii)~~ $\sqrt{4}, 5$ [1]



6 (a) Express 125 g as a percentage of 5 kg.

(b) Find the value of 4.5% of \$8.

(a) $\frac{125}{5000} \times 100\% = 2.5\%$

(b) $\frac{4.5}{100} \times \$8 = \0.36

Answer : (a) 2.5 % [2]

(b) \$0.36 [2]

- 7 Evaluate, without the use of a calculator, $\left[8 + (-4)^3\right] - [-2(12 + 3) \div 3]$, showing all your workings clearly.

$$\begin{aligned}\left[8 + (-4)^3\right] - [-2(12 + 3) \div 3] &= [8 + (-64)] - [-2(15) \div 3] \\ &= [8 - 64] - [-30 \div 3] \\ &= -56 - (-10) \\ &= -56 + 10 \\ &= -46\end{aligned}$$

Answer : -46 [3]

- 8 Simplify

(a) $x(2x + 3) - 7(3x - 1)$,

(b) $5a \times (-2b) \times \sqrt[3]{-125a^3}$.

$$\begin{aligned}(a) \quad x(2x + 3) - 7(3x - 1) &= 2x^2 + 3x - 21x + 7 \\ &= 2x^2 - 18x + 7\end{aligned}$$

$$\begin{aligned}(b) \quad 5a \times (-2b) \times \sqrt[3]{-125a^3} &= 5a \times (-2b) \times (-5a) \\ &= 50a^2b\end{aligned}$$

Answer : (a) $2x^2 - 18x + 7$ [2]

(b) $50a^2b$ [2]

- 9 Factorise the following expressions

(a) $15a^2b + 6ac$,

(b) $(2v - w)(p + 1) + 2w(p + 1)$.

$$(a) \quad 15a^2b + 6ac = 3a(5ab + 2c)$$

$$\begin{aligned}(b) \quad (2v - w)(p + 1) + 2w(p + 1) &= (p + 1)(2v - w + 2w) \\ &= (p + 1)(2v + w)\end{aligned}$$

Answer : (a) $3a(5ab + 2c)$ [1]

(b) $(p + 1)(2v + w)$ [2]

10 Given that $a = 3$, $b = -2$ and $c = \frac{1}{2}$, evaluate

(a) $2a - 3c$,

(b) $\frac{ab^2 - 3a}{c}$.

$$\begin{aligned} (a) \quad 2a - 3c &= 2(3) - 3\left(\frac{1}{2}\right) \\ &= 6 - \frac{3}{2} \\ &= 4\frac{1}{2} \text{ or } 4.5 \end{aligned}$$

$$\begin{aligned} (b) \quad \frac{ab^2 - 3a}{c} &= \frac{3(-2)^2 - 3(3)}{\frac{1}{2}} \\ &= \frac{12 - 9}{\frac{1}{2}} \\ &= 3 \times 2 \\ &= 6 \end{aligned}$$

Answer : (a) $4\frac{1}{2}$ or 4.5 [2]

(b) 6 [2]

11 A train 320 m long passes through a tunnel 5.2 km long.
The average speed of the train is 28 km/h.

(a) Convert 28 km/h into m/s.

(b) Calculate the time taken for the train to pass completely through the tunnel.
Give your answer in minutes.

$$\begin{aligned} a) \quad \frac{28 \text{ km}}{1 \text{ h}} &= \frac{28 \times 1000 \text{ m}}{1 \times 3600 \text{ s}} \\ &= \frac{28000 \text{ m}}{3600 \text{ s}} \\ &= 7\frac{7}{9} \text{ m/s} \end{aligned}$$

b) Total length of the tunnel and train = $5.2 \text{ km} + 0.32 \text{ km}$
= 5.52 km

$$\begin{aligned}\text{Time taken} &= \frac{5.52}{28} \\ &= \frac{69}{350} h\end{aligned}$$

$$\text{Time taken in minutes} = 11.8 \text{ min (3 s.f.) or } 11\frac{29}{35} \text{ min}$$

$$\text{Answer: (a) } 7\frac{7}{9} \text{ m/s [1]}$$

$$\text{(b) } 11.8 \text{ or } 11\frac{29}{35} \text{ min [3]}$$

- 12** A factory produces a type of baking powder made with with baking soda, cream of tartar and cornstarch. The amount of baking soda, cream of tartar and cornstarch are in the ratio of 7 : 3 : 4 respectively.

- (a) In a small bag of baking powder, there are 60g of cornstarch.
What is the weight of the baking powder in the small bag?
- (b) Bags of baking powder are filled at a rate of 180g per second.
How many bags of baking powder weighing 1.5 kg each can be filled in 3.5 hours?

$$\begin{aligned}\text{(a) Weight of baking powder in the small bag} &= \frac{60}{4} \times 14 \\ &= 210\text{g}\end{aligned}$$

$$\text{(b) } 3.5 \text{ hours} = 12600 \text{ sec}$$

$$\begin{aligned}\text{Number of bags of 1.5 kg each that can be filled in 3.5 hours} &= \frac{0.18 \times 12600}{1.5} \\ &= 1512\end{aligned}$$

$$\text{Answer: (a) } 210 \text{ g [2]}$$

$$\text{(b) } 1512 \text{ bags [3]}$$

End of Section A

Section B: Answer **all** the questions.

13 (a) Write down an algebraic expression for each of the following statements.

(i) Subtract $5x+3$ from $3x^2+5$. [2]

$$\begin{aligned} 3x^2+5-(5x+3) &= 3x^2+5-5x-3 \\ &= 3x^2-5x+2 \end{aligned}$$

(b) Simplify the following:

(i) Simplify $2y-3[x+4(x-y)]$. [2]

$$\begin{aligned} 2y-3[x+4(x-y)] &= 2y-3[x+4x-4y] \\ &= 2y-3[5x-4y] \\ &= 2y-15x+12y \\ &= -15x+14y \end{aligned}$$

(ii) $\frac{3n-m}{4} + \frac{2n-m}{5}$. [3]

$$\begin{aligned} \frac{3n-m}{4} + \frac{2n-m}{5} &= \frac{5(3n-m)}{20} + \frac{4(2n-m)}{20} \\ &= \frac{15n-5m+8n-4m}{20} \\ &= \frac{23n-9m}{20} \end{aligned}$$

(c) If $a:b=5:4$ and $b:c=4.2:0.65$, find $a:c$. [2]

$$\begin{aligned} b:c &= 4.2:0.65 \\ &= 420:65 \end{aligned}$$

$$a:b=5:4 \quad b:c=420:65$$

$$a:b=525:420 \quad b:c=420:65$$

$$a:c=525:65$$

$$=105:13$$

- 14 Joey paid \$28.80 for a pair of shoes from a departmental store. If the store made a loss of 25%, what is the original price of the shoes? [2]

$$\begin{aligned}\text{Original price of shoes} &= \frac{100}{75} \times \$28.80 \\ &= \$38.40\end{aligned}$$

- 15 Marcus wants to change 600 Singapore Dollars (S\$) to Thai Baht (THB).
The exchange rate is S\$1 = 24.72 THB.

- (a) Find the amount of Thai Baht Marcus will receive if he uses S\$600. [1]

$$\begin{aligned}\text{S\$}600 &= 600 \times 24.72 \\ &= 14832 \text{ THB}\end{aligned}$$

- (b) The money changer is only able to change amounts in multiples of 1000 THB. [3]
The money changer decides to **round up** the amount in (a) to the nearest 1000 THB.

Find the amount in S\$ that Marcus needs to top up for the extra amount, giving your answer to the nearest cent.

$$\begin{aligned}\text{Amount that Marcus needs to top up in Thai Baht} &= 15000 - 14832 \\ &= 168 \text{ THB}\end{aligned}$$

$$168 \text{ THB} = \text{S\$} 6.7971$$

Amount of S\$ that Marcus needs to top up = S\$6.80 (rounded to nearest cents)

- 16 One pen costs x cents. An eraser costs 30 cents less than a pen and a ruler costs two-third of a pen.

Find a simplified expression for

- (a) the cost of an eraser in cents, [1]

$$\text{Cost of an eraser} = (x - 30) \text{ cents}$$

- (b) the total cost of an examination goodie pack consisting of 3 pens, 1 eraser and 2 rulers in cents. [2]

$$\begin{aligned}\text{Total cost of examination goodie pack} &= 3x + (x - 30) + 2\left(\frac{2}{3}x\right) \\ &= 3x + x - 30 + \frac{4}{3}x \\ &= \left(\frac{16}{3}x - 30\right) \text{ cents}\end{aligned}$$

17 Solve the equations:

(a) $1 + \frac{1}{2}x = \frac{1}{5}x$ [2]

$$1 + \frac{1}{2}x = \frac{1}{5}x$$

$$\frac{1}{2}x - \frac{1}{5}x = -1$$

$$\frac{5}{10}x - \frac{2}{10}x = -1$$

$$\frac{3}{10}x = -1$$

$$3x = -10$$

$$x = -3\frac{1}{3}$$

(b) $2(5y + 3) = 2y + 14$. [2]

$$2(5y + 3) = 2y + 14$$

$$10y + 6 = 2y + 14$$

$$8y = 8$$

$$y = 1$$

18 Susan cycles from home to a coffeeshop to purchase dinner before continuing the journey to her grandmother's place.

Susan cycled at a speed of 4 m/s to the coffeeshop for 3 minutes, took another 10 minutes to buy dinner and continued the rest of the journey to her grandmother's house at a speed of 6 m/s. Given that the total distance travelled is 4500 m,

- (a) find the distance between Susan's house and the coffeeshop. [1]

$$\begin{aligned}\text{Distance between coffeeshop and Susan house} &= 4 \times 180 \\ &= 720 \text{ m}\end{aligned}$$

- (b) Find the average speed for the whole journey in m/s. [3]

$$\begin{aligned}\text{Time taken to travel from Susan to Grandma's house} &= \frac{4500 - 720}{6} \\ &= 630 \text{ s}\end{aligned}$$

$$\begin{aligned}\text{Average speed for the whole journey} &= \frac{4500}{180 + 630 + 600} \\ &= 3.19 \text{ (3 s.f.) or } 3\frac{9}{47} \text{ m/s}\end{aligned}$$

- 19 (a) Mr Lee was paid a monthly basic salary of \$3 850 since January 2015. [2]

At the end of 2015, he was given a bonus of 13.5% of the value of sales that he has made during the year. If the total value of his sales in 2015 was \$300 000, calculate Mr Lee's total income in 2015.

$$\begin{aligned}\text{Mr Lee's total income in 2015} &= (3850 \times 12) + \left(\frac{13.5}{100} \times 300000 \right) \\ &= \$86700\end{aligned}$$

- (b) Mr Lee has to pay income tax in January 2016 for the annual income earned in 2015. The relief amount that will not be subjected to income tax is shown in the table below. [3]

Type of relief	Amount
Personal relief	\$1000
Child relief	\$5000 each child
CPF	\$17 340
Voluntary donation	Three times the amount donated

Mr Lee has only one child he has been making voluntary donation of \$50 every month to an approved organization. The gross tax payable for the first

\$40 000 is \$550 and the tax rate for the rest is 7%. Calculate his income tax payable for 2015 using the information given above.

$$\text{Amount of relief} = \$1000 + \$5000 + \$17340 + 3(50 \times 12)$$

$$= \$25140$$

$$\text{Amount taxable} = \$86700 - \$25140$$

$$= \$61\,560$$

$$\text{Amount of tax payable} = 550 + \frac{7}{100}(61560 - 40000)$$

$$= 550 + 1509.20$$

$$= \$2059.20$$

- (c) In January 2016, Mr Lee's basic monthly salary was cut by \$200.

- (i) Calculate the percentage decrease in the basic monthly salary from 2015 to 2016, giving your answer to three significant figures. [2]

$$\text{Percentage decrease} = \frac{200}{3850} \times 100\%$$

$$= 5.1948\%$$

$$= 5.19\% \text{ (3 s.f.)}$$

- (ii) In 2016, he was paid a bonus of 15.5% of the value of his sales that he has made during the year. Given that his bonus in 2016 is \$33 790, calculate the total value of his sales in 2016. [2]

$$\text{Total value of sales} = \frac{\$33790}{15.5} \times 100$$

$$= \$218000$$

- 20 Kale ordered one set meals at \$55.60 and an ice cream for \$12.90 at a restaurant. [5]
Below shows Kale's bill before payment.

1 set meal	\$55.60
Ice cream	\$12.90
SUBTOTAL	\$68.50
10% Service Charge	\$6.85
7% Goods and Services Tax (GST)	\$5.27

Currently, the restaurant is offering two discount packages that Kale can choose from.

Discount Package I:

Enjoys 10% off the subtotal of the bill, which is thereafter subjected to 10% Service Charge first and then 7% GST.

Discount Package II:

10% Service Charge is waived, which is thereafter subjected to 7% GST.

Explain, showing all necessary working, which discount package is a better option for Kale.

Discount Package I:

$$\begin{aligned}\text{Bill subjected to Service Charge and GST} &= 90\% \times \$68.50 \\ &= \$61.65.\end{aligned}$$

$$\begin{aligned}\text{Total amount paid in Discount Package I} &= (110\% \times \$61.65) \times 1.07 \\ &= \$72.56\end{aligned}$$

Discount Package II:

$$\text{Bill subjected to GST} = \$68.50$$

$$\begin{aligned}\text{Total amount paid in Discount Package II} &= \$68.50 \times 1.07 \\ &= \$73.30\end{aligned}$$

Since amount paid in Package II is more than amount paid in Package I, therefore Package I is a better option for Kale.

~ End of Paper ~



Pasir Ris Secondary School

Name	Class	Register Number
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SECONDARY 1 EXPRESS MID-YEAR EXAMINATION 2017

MATHEMATICS

03 May 2017

Wednesday 0800 – 1000

2 hours

Additional Materials: Electronic calculator

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number on all the work you hand in.

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

You are expected to use a scientific calculator to evaluate explicit numerical expressions.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

The number of marks is given in brackets [] at the end of each question or part question.

This paper consists of 2 sections, Section 1 and Section 2. The marks for each section is 40 marks.

The total number of marks for this paper is 80.

This document consists of **14** printed pages.

Setter: Mr Daniel Chng

[Turn over

Section 1 [40 marks]Answer **all** the questions.For
Examiner's
Use

- 1 (a) Rearrange the following numbers, in descending order, on the number line provided.

$$\sqrt{9}, \frac{7}{22}, \pi, -3.142, 3.\dot{1}8.$$

- (b) State the number(s) which are irrational.

(a) Answer $\leftarrow \hspace{15em} \rightarrow$ [1]

(b) [1]

- 2 (a) Write down the first 5 figures of $\frac{\sqrt[3]{-26.6 \times 19.9^2}}{49.6 - 529}$.

- (b) Use your calculator to evaluate the value of $\frac{\sqrt[3]{-26.6 \times 19.91^2}}{49.63 - 529.01}$, giving your answer correct to

- (i) 2 decimal places,
(ii) 1 significant figure.

Answer(a) [2]

(b)(i) [1]

(ii) [1]

- 3 (a) Express $100 \times 0.\dot{4}\dot{7}$ as a recurring decimal.
- (b) Find the value of $100 \times 0.\dot{4}\dot{7} - 0.\dot{4}\dot{7}$.
- (c) **Hence**, express $0.\dot{4}\dot{7}$ as a fraction in its lowest terms.

Answer (a) [1]

(b) [1]

(c) [1]

4 Factorise completely

(a) $8x^2y - 20xy^3$,

(b) $2(m - 5n) - m(m - 5n)$.

Answer (a) [1]

(b) [1]

- 5** In a particular shopping centre, the ground level is indicated by 0 and the basement levels are indicated by -1 , -2 and so on. The shopping centre has 4 basement levels.
- (a) Zhenqi parked her car at Level -2 and took the lift to the highest level. If the lift travelled up by 7 levels, find the highest level of the shopping centre.
- (b) There are two lifts located at Lift Lobby A of the shopping centre. For every two levels that Lift 1 travels, Lift 2 travels three levels. If Lift 1 is now at the highest level and Lift 2 at the lowest level, find the level that Lift 2 is at when Lift 1 is at Level -1 .

Answer (a) [1]

(b) [2]

- 6** (a) 0.068% of a number is 85. Find the number.
- (b) String P is 3.8 m long. The length of String Q is 135% of the length of String P and 95% of the length of String R . Find the length of String R .

Answer (a) [1]

(b)m [2]

- 7 The journey of a motorist from Town A to Town B took him $2\frac{1}{4}$ hours.
- (a) If the motorist travelled at an average speed of 10 m/s, calculate the distance between the two towns in kilometres.
- (b) The motorist arrived at 12 10. Calculate the time he left Town A .

Answer (a)km [2]

(b)h [1]

8 Simplify

(a) $2xy - 3yz + 5xy + 2yz$,

(b) $\frac{2g + 3h}{2} - \frac{6g - h}{4}$.

Answer (a) [1]

(b) [3]

- 9 Jazzy has a job for which the basic rate of pay is $\$C/\text{hour}$ and the overtime rate of pay is $\$24/\text{hour}$. On a particular day, she works for 12 hours, of which 4 hours are overtime.
- (a) Express her pay in terms of C .
 - (b) Find the value of C if she is paid $\$180$ for that day.
 - (c) How many hours of overtime must she work in total in order to earn $\$660$ in a 5-day work week?

Answer (a) $\$ \dots\dots\dots$ [1]

(b) $\$ \dots\dots\dots$ [2]

(c) $\dots\dots\dots$ h [2]

- 10 It is given that

$$v = u - \frac{2ab^2}{3}.$$

Find the value of v when $u = 30$, $a = 3$ and $b = -2$.

Answer $v = \dots\dots\dots$ [2]

- 11 (a)** The mass of Xueling, measured to the nearest kg, is 43kg. Find the smallest possible value of Xueling's mass.
- (b)** In the number $608R32$, R represents a digit. Given that $608R32$, correct to three significant figures is 608 000, state the smallest value of the digit R , where R is a prime number.

Answer (a)kg [1]

(b) [1]

- 12** Eunice, Megan and Shannon planned to contribute money in the ratio 3 : 2 : 4 respectively to buy a present for their friend. The cost of the present is \$270.
- (a)** Calculate Megan's contribution.
- (b) (i)** If Eunice doubles her planned contribution and Megan halves her planned contribution, find out how much must Shannon contribute for the present.
- (ii) Hence**, write down the new contribution ratio.

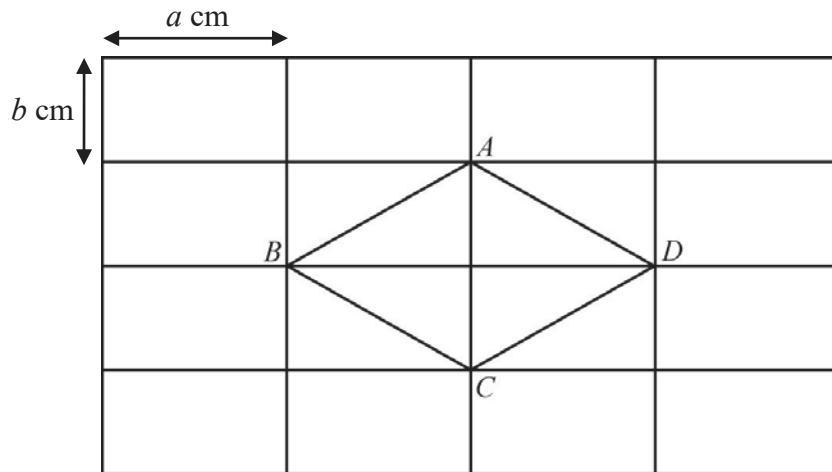
Answer (a) \$. [1]

(b)(i)\$. [2]

(ii). : : [2]

- 13 The figure below is made up of small rectangles each of length a cm and breadth b cm. Calculate in terms of a and b , the area of the region not enclosed by $ABCD$.

For
Examiner's
Use



Answercm² [2]

Section 2 [40 marks]Answer **all** the questions.*For
Examiner's
Use*

- 14 (a) Expand and simplify $3 - (4 - 12x)$.

Answer (a) [2]

- (b) Solve $\frac{5}{y-4} - \frac{2}{3y+1} = 0$.

(b) [3]

- (c) A faulty watch gains x seconds in one hour. Write down an expression for the number of minutes it would gain in y days. Give your answer in its simplest form.

(c) [2]

- 15 (a) (i)** Solve the inequality, $2(3 + x) \leq 42 - 2x$.

Answer (a)(i)..... [2]

- (ii)** Hence, write down the smallest value of x that satisfies the inequality
 $2(3 + x) \leq 42 - 2x$ such that x is a perfect square.

(ii) $x =$ [1]

- (b)** Ms Lau went shopping for groceries at the supermarket. She intends to buy two bottles of juice at \$6.15 each, 5 packets of fresh milk at \$1.67 each, 2 loaves of bread at \$2.49 each and some fruits.
- (i)** Estimate the total cost Ms Lau will spend by rounding each of the prices to the nearest ten cents.

(b)(i) \$..... [1]

- (ii)** If Ms Lau does not wish to exceed her budget of \$30, calculate how much money she should use to buy fruits.

(ii) \$..... [1]

- 16 (a) (i)** It is given that $240 = 2^4 \times 3 \times 5$.
Express 2750 as a product of its prime factors, giving your answer in index notation.

Answer (a)(i) $2750 = \dots\dots\dots$ [1]

- (ii)** Find the smallest positive integer k for which $240k$ is a multiple of 2750.

(ii)..... [1]

- (iii)** Find the smallest positive integer n for which $\sqrt[3]{2750n}$ is a whole number.

(iii)..... [1]

- (b)** Nabilah bought 2 vanguard sheets each measuring 70 cm by 90 cm. She cut out square cards of identical size from the vanguard sheets such that there was no wastage.

- (i)** Calculate the largest possible length of the side of each square card that she can cut out.

(b)(i).....cm [2]

- (ii)** Find the total number of square cards she cut out such that there was no wastage.

(ii)..... [2]

- 17 Hongxiang bought 12 boxes of apples at \$60 and each box contains x apples. 15% of the apples were rotten and could not be sold. He would make a profit of 70% if he sells each apple at 50 cents.

(a) Find in terms of x , the total number of apples Hongxiang bought.

Answer (a)apples[1]

(b) Calculate the total sales made from the apples that could be sold.

(b) \$..... [2]

(c) Express the profit, in terms of x , as a percentage of the total amount paid for all 12 boxes of apples, assuming that all the remaining apples are sold.

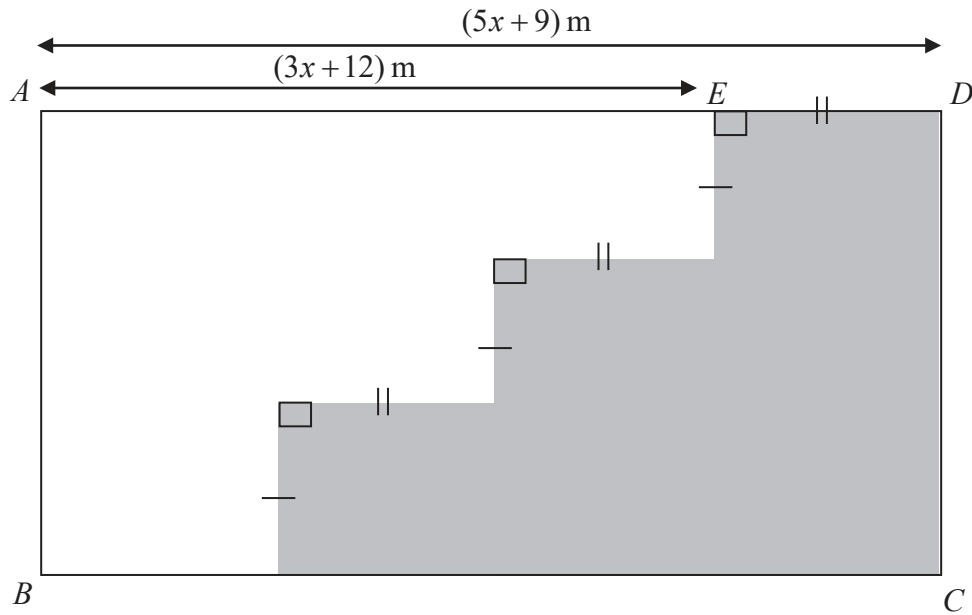
(c)% [2]

(d) Hence, find the number of apples per box.

(d)apples [2]

- 18 In the diagram, $ABCD$ is a rectangular field. $AD = (5x + 9)$ m, $AE = (3x + 12)$ m, and the perimeter of the field $ABCD$ is $(24x + 6)$ m.

For
Examiner's
Use



Find an expression in terms of x for

- (a) (i) the length of AB ,

Answer (a)(i)m [2]

- (ii) the length of DE .

(ii)m [1]

- (b) Given that $DE = \frac{3}{13} AD$, show that $11x = 66$.

(b)[2]

- (c) Solve the equation in part (b) to find the value of x .

(c)[1]

- (d) The shaded region shows the location of a flower bed. Calculate the area of the flower bed.

(d)m² [1]

- 19 Mr Ding who is an NSman is married with 2 children and his wife is not working. In 2016, he earned a gross annual income of \$85 000. The data for the tax reliefs and the tax rates available are shown in the tables below.

	Reliefs
Personal	\$3 000
Wife	\$2 000
Each child	\$4 000
CPF contributions	\$15 000
Parent/Handicapped parent	\$11 000
NSman	\$5 000

	Tax Rates
First \$40 000	\$550
Next \$40 000	7%
First \$80 000	\$3 350
Next \$40 000	11.5%

Calculate

- (a) (i) the amount of tax relief that he is entitled to,

Answer (a)(i) \$.....[2]

- (ii) his amount of taxable income,

(ii) \$..... [2]

- (b) Mr Ding told his wife he needs to pay a total income tax of \$3 350. Showing your working clearly, explain why his calculation is wrong. State a possible reason for his error.

(b)

[3]

END OF PAPER

Solutions 1Exp EM 2017 SA1 Paper

SECTION 1 (40 marks)		
1(a)	<p style="text-align: center;">[B1]</p>	2M
1(b)	π [B1]	
2(a)	$\frac{\sqrt[3]{-26.6 \times 19.9^2}}{49.6 - 529}$ $\approx 2.465861....$ [B1] $= 2.4658$ [B1/B2]	4M
2(b)(i)	2.47 [B1]	
2(b)(ii)	2 [B1]	
3(a)	$100 \times 0.\dot{4}\dot{7} = 100 \times 0.474747\ldots = 47.\dot{4}\dot{7}$ [B1]	3M
3(b)	$100 \times 0.\dot{4}\dot{7} - 0.\dot{4}\dot{7} = 47.474747\ldots - 0.474747\ldots = 47$ [B1]	
3(c)	$100 \times 0.\dot{4}\dot{7} - 0.\dot{4}\dot{7} = 47$ $99 \times 0.\dot{4}\dot{7} = 47$ $\therefore 0.\dot{4}\dot{7} = \frac{47}{99}$ [B1]	
4(a)	$8x^2y^4 - 20xy^3$ $= 4xy(2x^2y^3 - 5y^2)$ [B1]	2M
4(b)	$2(m - 5n)(2m + 5n)$ $= (m - 5n)(2m + 5n)$ [B1]	
5(a)	$-2 + 7 = 5$ \therefore the highest level is Level 5. [B1]	3M
5(b)	Number of levels Lift 1 travels = $5 - (-1) = 6$ Number of levels Lift 2 travels = $(6 \div 2) \times 3 = 9$ Level Lift 2 is at = $-4 + 9 = 5$ [A1] <p style="text-align: right;">[M1] for method to find levels that L1 and L2 will be at.</p>	
6(a)	$\frac{0.068}{100}x = 85$ $x = 125000$ [B1]	3M

6(b)	String $Q = \frac{135}{100}(3.8) = 5.13 \text{ m}$ [M1cao] String $R = \frac{5.13}{95}(100) = 5.40 \text{ m}$ [A1]	
7(a)	$10 \text{ m/s} = 10 \div 1000 \times 3600 = 36 \text{ km/h}$ [M1] to convert m/s to km/s Therefore distance $= 36 \times 2 \frac{1}{4} = 81 \text{ km}$ [A1]	3M
7(b)	$1210 - 0215 = 0955 \text{ h}$ [B1]	
8(a)	$2xy - 3yz + 5xy + 2yz = 7xy - yz$ [B1]	4M
8(b)	$\frac{2g+3h}{2} - \frac{6g-h}{4}$ $= \frac{2(2g+3h) - 6g + h}{4}$ [M1cao] $= \frac{4g+6h-6g+h}{4}$ [M1] $= \frac{7h-2g}{4}$ [A1]	
9(a)	$\$(8C + 96)$ [B1]	5M
9(b)	$8C + 96 = 180$ [M1] $8C = 84$ $C = \$10.50$ [A1]	
9(c)	$660 \div 5 = \$132$ [M1]cao $8(\$10.50) + 24(OT) = 132$ $OT = 2 \text{ or } 2 \times 5 = 10$ [A1]	
10	$v = 30 + \frac{2(3)(-2)^2}{3}$ [M1]to sub in values $= 22$ [A1]	2M
11(a)	42.5 kg [B1]	2M
11(b)	$R = 2$ [B1]	
12(a)	Megan's contribution $= \frac{2}{9} \times 270 = \60 [B1]	4M
12(b)(i)	Eunice's initial contribution $= \frac{3}{9} \times 270 = \90 [M1cao] Eunice's new contribution $= 90 \times 2 = \$180$ Megan's new contribution $= 60 \times \frac{1}{2} = \30 \therefore Shannon's contribution $= 270 - 180 - 30 = \$60$ [A1]	

12(b)(ii)	New contribution ratio = $180 : 30 : 60 = 6 : 1 : 2$ [B1]	
13	<p>Area of one small rectangle = $ab \text{ cm}^2$. [M1]</p> <p>There are 12 small rectangles and four half rectangles outside $ABCD$.</p> <p>\therefore total area = area of 14 small rectangles = $14ab \text{ cm}^2$ [A1]</p>	2M
SECTION 2 (40 marks)		
14(a)	$3 - (4 - 12x)$ $= 3 - 4 + 12x$ [M1]cao $= 12x - 1$ [A1]	
14(b)	$\frac{5}{y-4} - \frac{2}{3y+1} = 0$ $\frac{5}{y-4} = \frac{2}{3y+1}$ [M1] $5(3y+1) = 2(y-4)$ [M1] for cross multiply $15y + 5 = 2y - 8$ $13y = -13$ $y = -1$ [A1]	
14(c)	<p>1 day – 24 hours y days – $24y$ hours [M1]</p> <p>1 hour – x seconds $24y$ hours – $24xy$ seconds</p> <p>Therefore number of minutes = $\frac{24xy}{60}$ minutes [A1]</p>	
Q14 Total Marks: 7		
15(a)(i)	$2(3+x) \leq 42 - 2x$ $6 + 2x \leq 42 - 2x$ [M1] $4x \leq 36$ $x \leq 9$ [A1]	
15(a)(ii)	$x = 9$ [B1]	
15(b)(i)	<p>Total cost = $2 \times 6.15 + 5 \times 1.67 + 2 \times 2.49$ $\approx 2 \times 6.20 + 5 \times 1.70 + 2 \times 2.50$ $= 12.40 + 8.50 + 5$ $= \\$ 25.90$ [B1]</p>	
15(b)(ii)	Amount of money = $30 - 25.90 = \$ 4.10$ [B1]	
Q15 Total Marks: 5		
16(a)(i)	$2750 = 2 \times 5^3 \times 11$ [B1]	

16(a)(ii)	$LCM = 2^4 \times 3 \times 5^3 \times 11$ Therefore $k = 5^2 \times 11 = 275$ [B1]	
16(a)(iii)	$n = 2^2 \times 11^2 = 484$ [B1]	
16(b)(i)	$70 = 2 \times 5 \times 7$ $90 = 2 \times 3^2 \times 5$ [M1] to prime factorise both 70 and 90 $HCF = 2 \times 5 = 10$ \therefore largest possible length = 10 cm [A1]	
16(b)(ii)	Number of cards per sheet = $(70 \div 10) \times (90 \div 10) = 63$ [M1] \therefore total number of cards = $63 \times 2 = 126$ [A1]	
Q16 Total Marks: 7		
17(a)	Number of apples in the 12 boxes = $12x$ [B1]	
17(b)	Number of remaining apples that could be sold = $\frac{85}{100} \times 12x = \frac{51}{5}x$ [M1] Total sales made from remaining apples = $\frac{51}{5}x \times 0.5 = \$5.1x$ [A1]	
17(c)	Profit = $\$(5.1x - 60)$ [M1] $\therefore \frac{5.1x - 60}{60} \times 100$ [A1]	
17(d)	$\frac{5.1x - 60}{60} \times 100 = 70$ [M1] <u>cao</u> $5.1x = 102$ $x = 20$ \therefore there are 20 apples in a box. [A1]	
Q17 Total Marks: 7		
18(a)(i)	Length $AD + BC = 2(5x + 9) = 10x + 18$ [M1] Length $AB = \frac{24x + 6 - 10x - 18}{2}$ $= \frac{14x - 12}{2} = 7x - 6$ [A1]	
18(a)(ii)	Length $DE = 5x + 9 - 3x - 12 = 2x - 3$ [B1]	
18(b)	$DE = \frac{3}{13} AD$	

	$2x - 3 = \frac{3}{13}(5x + 9) \quad [\text{M1}]$ $2x - 3 = \frac{15}{13}x + \frac{27}{13}$ $\frac{11}{13}x = \frac{66}{13}$ $11x = 66 \quad [\text{A1}]$	
18(c)	$\frac{11}{11}x = \frac{66}{11}$ $x = 6 \quad [\text{B1}]$	
18(d)	<p>Area of 1 small rectangle = $\left[\frac{7(6) - 6}{3} \right] \times [2(6) - 3] = 108 \text{ m}$</p> <p>Area of flower bed = 6×108</p> $= 648 \text{ m}^2 \quad [\text{B1}]$	
Q19 Total Marks: 7		
19(a)	<p>Amount of tax relief = $3000 + 2000 + 2(4000) + 15000 + 5000$ [M1cao]</p> $= \$33\,000 \quad [\text{A1}]$	
19(b)	<p>Amount of taxable income = $85000 - 33000$ [M1cao]</p> $= \$52\,000 \quad [\text{A1}]$	
19(c)	<p>1st $\\$40\,000 \Rightarrow \\550</p> <p>2nd $\\$40\,000$,</p> $= \frac{7}{100} \times (52000 - 40000)$ $= \$840 \quad [\text{M1}]$ <p>Therefore, total income tax payable = $550 + 840 = \\$1390$ [A1]</p> <p>Possible reason: he assumed his taxable income was the gross annual income. [B1]</p>	
Q19 Total Marks: 7		



ST. MARGARET'S SECONDARY SCHOOL

Mid-Year Examinations 2017

CANDIDATE NAME

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CLASS

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REGISTER NUMBER

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MATHEMATICS

Section B

8 May 2017

Secondary 1 Express

2 hours

(For Sections A and B)

Additional Materials: NIL

READ THESE INSTRUCTIONS FIRST

Write your name, registration number and class on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Section B contains 9 questions.

Answer **all** the questions in the spaces provided.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place. For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π or otherwise.

You are advised to spend not more than 1 hour on this section.

The number of marks is given in brackets [] at the end of each question or part question.
The total number of marks for this section is 40.

For Examiner's Use

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Section B (40 marks)Answer **all** the questions

- 1 (a) Express 936, 252 and 132 as a product of its prime factors, leaving your answers in index notation. [3]
- (b) A rectangular block of marble has a base 936 cm by 252 cm, with height 132 cm. A stonemason needs to cut the marble up into cubes of the largest possible size.
- (i) Find the dimension of the marble cube he can cut. [1]
- (ii) Find the total number of cubes he can cut from the block of marble. [1]
- 2 Planets in our Solar System take a certain number of years to complete one orbit around the Sun. Below are the orbital duration of the planets.

Planet	Orbital Duration (years)
Earth	1
Mars	2
Jupiter	12
Saturn	30
Uranus	84

Planetary alignment is when the planets line up in a straight line towards the sun. It is considered as one of the most interesting sights in astronomy.

- (a) Express 12, 30 and 84 as the product of their prime factors, leaving your answers in index notation. [3]
- (b) If the last time Jupiter, Saturn and Uranus align themselves in a straight line was the year 1932, determine which year will Jupiter, Saturn and Uranus next align themselves? [2]

- 3 Certificate of Entitlement (COEs) is a quota system to restrict the vehicle population in Singapore. To own a vehicle, the buyer must pay the prevailing COE price together with the listed price of the car. The COE price changes every two weeks depending on how many cars are being sold for that period. The selling price of a car is as follows:

$$\text{Selling Price of Car (\$)} = \text{Listed price of car(\$)} + \text{COE price(\$)}$$

Eric is a car salesman and he earns commission based on the selling price of the car, excluding the prevailing COE prices. He sold a car to Benjamin recently. Below are the information of the car.

COE price	Car Model	Final Selling Price (\$)
\$50,101	Monda Jazz	\$98,101

If his commission is 3% of the listed price of the car,

- (a) Calculate how much commission he earned from selling the Monda Jazz. [2]
- (b) Benjamin decides to buy the car on hire purchase. He needs to pay a deposit of \$25000 and the interest rate is 2.5% per annum over 5 years. Calculate his monthly instalment. Leave your answer to the nearest dollar. [3]
- 4 Erica is x years old. Her sister is 12 years older than her while her father is twice as old as her sister. Express
- (a) her sister's age in terms of x , [1]
- (b) her father's age in terms of x , [1]
- (c) the sum of the ages of Erica, her sister and her father. [2]
- (d) If Erica is 12 years old, determine the age of her father. [2]
- 5 A recipe to bake 20 muffins states that the ratio of flour and milk needs to be 5 : 3.
- (a) If Nancy uses 200 ml of flour, calculate how much milk she needs. [2]
- (b) If baking 20 muffins require 400 ml of flour, calculate the amount of milk required if Nancy wants to bake 50 muffins. [2]

- 6 Mr Sim wanted to get a new vacuum cleaner and he chanced upon two posters shown below.

Shop A

Store wide 10% discount
NOW GSS promotion!
 Further 15%
 discount on
 discounted price!!!
 Applicable to all
 products!
 While stocks lasts!

Shop B

Great Singapore Sales is
 here!
Store wide now...
 25% discount for all
 products!!!
 Applicable to all
 products!
 While stocks lasts!

If the marked price of the vacuum cleaner for both shops is \$800,

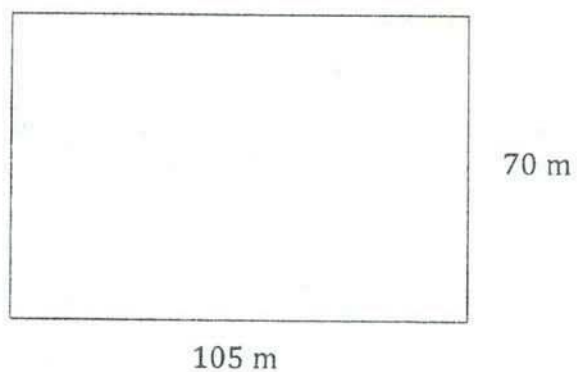
- (a) calculate the selling price of the vacuum cleaner for Shop A. [2]
 (b) Comparing offers from both shops, which shop should Mr Sim buy from to get a better deal? Give a reason for your answer. [2]

- 7 Mr Sim changed \$3600 Singapore Dollars (S\$) into US Dollars (USD) for his trip to New York City. Upon returning, he had 800 USD left. Given that the currency exchange rate is S\$1 to 0.71 USD.

- (a) Find out how much USD did Mr Sim get at first. [2]
 (b) Mr Sim wants to exchange his remaining USD back to Singapore Dollars.
 Calculate the amount of Singapore Dollars he will get back. Give your answers to the nearest Singapore Dollars. [2]

- 8 (a) A bank charges 8.5 % simple interest per annum on any bank loan. Mr Sim recently took out a loan of \$12000 from the bank. If he decides to repay the loan after 4 years, how much in total does he have to repay the bank? [2]
 (b) Mr Wong invested \$35000 in an account with the bank. If he earns a total interest of \$16800 after 8 years, calculate the bank's investment simple interest rate per annum. [2]

9



A rectangular field is estimated to be 105 m long and 70 m wide, correct to the nearest metres.

- (a) Determine the greatest possible length and breadth of the field, correct to 1 decimal place. [2]
- (b) Hence, determine the greatest possible perimeter of the field. [1]



ST. MARGARET'S SECONDARY SCHOOL

Mid-Year Examinations 2017

CANDIDATE NAME

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CLASS

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REGISTER NUMBER

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MATHEMATICS

Section A

8 May 2017

Secondary 1 Express

2 hours

(For Sections A and B)

Additional Materials: NIL

READ THESE INSTRUCTIONS FIRST

Write your name, registration number and class on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A contains **12** questions.

Answer **all** the questions in the spaces provided.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place. For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π or otherwise.

You are advised to spend not more than 1 hour on this section.

The number of marks is given in brackets [] at the end of each question or part question.
The total number of marks for this section is 40.

For Examiner's Use

This document consists of 9 printed pages and a blank page

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Answer **all** the questions

- 1 From the set of numbers below,

$$\frac{2}{7} \quad 3 \quad 0.549 \quad \frac{\sqrt{23}}{5} \quad \frac{-14}{\sqrt{2}} \quad 5.5 \quad 0 \quad \frac{\sqrt{100}}{3}$$

- (a) Write down the integers.

Answer (a)

[1]

- (b) Write down the irrational numbers.

Answer (b)

[1]

- (c) Arrange them on a number line.

Answer (c)

_____ → [2]

- 2 Given that the integers $A = 2^{11} \times 3^4 \times 11^7$ and $B = 3^{10} \times 11^8$,

Write down in index notation,

- (a) the HCF of A and B ,

Answer (a) _____ [1]

- (b) the LCM of A and B ,

Answer (b) _____ [1]

- (c) the value of x where Bx is a perfect cube.

Answer (c) $x =$ _____ [1]

- 3 Winry went to an electronic store to get a new refrigerator. She bought the refrigerator for \$535. If the selling price of the refrigerator is inclusive of 7% GST, calculate the price of the refrigerator before GST is added.

Answer \$ [2]

- 4 (a) Express 240 metres to 1.3 kilometres as a ratio, in its simplest form.

Answer (a) _____ : _____ [2]

- (b) If $A:B$ is $5:6$ and $B:C$ is $8:3$, find the ratio $A:B:C$.

Answer (b) _____ : _____ : _____ [2]

Number of fruit tarts - [1]

- 6 Calculate $\frac{\sqrt[3]{724}}{3.2^2(8.24 - 5.32)}$. Give your answer correct to 3 significant figures.

Answer [1]

- 7 During winter, a particular town experiences temperature changes throughout the day. The temperature measured at midnight is -12°C and it rises steadily to 18°C at noon.
- Find the difference in temperature between midnight and noon.
 - Find the average rate of increase of temperature.
 - Determine the time of the day when the temperature is 13°C , assuming the rate of increase of temperature was constant.

(c) [1]

8 Simplify the following algebraic expressions.

(a) $3p + 2q - 2p + 10q$

Answer (a)

[1]

(b) $a - 2b + b + c - 2(c - a)$

Answer (b)

[2]

(c) $\frac{x}{7} + \frac{5x+1}{3}$

Answer (c)

[3]

- 9 A triathlon is a race where an athlete needs to complete 3 different segments, swimming, cycling and running. Cindy took part in a triathlon and her performance for each segment is recorded below.

Race segment	Timing	Distance	Speed
Swimming	$\frac{5}{6}$ hrs	1.5 km	a km/h
Cycling	30 mins	b km	25 km/h
Running	c hrs	8 km	10 km/h

- (a) Find the values of a , b and c .

Answer (a) $a =$ [1]
 $b =$ [1]
 $c =$ [1]

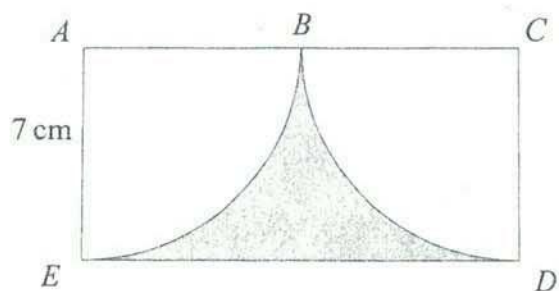
- (b) Determine Cindy's average speed for the whole race, giving your answer in km/h.

Answer (b) km/h [2]

- 10** Bonnie plans on making simple colourful pinwheels and sells them. The materials required are coloured papers, pins and plastic straws. If a packet of 50 coloured papers cost \$10, a box of 100 pins cost \$5 and a packet of 50 plastic straws costs \$5,
- (a) Calculate the cost of making a pinwheel.
 - (b) Bonnie plans on selling her pinwheels for \$0.50 each and she also wishes to make a profit of at least \$50 by the end of the day.
 - (i) How much profit does she make from selling one pinwheel?
 - (ii) What is the minimum number of pinwheels she needs to sell in order to meet the profit target?

Answer (a)	\$		[2]
(bi)	\$		[1]
(bii)		pinwheels	[1]

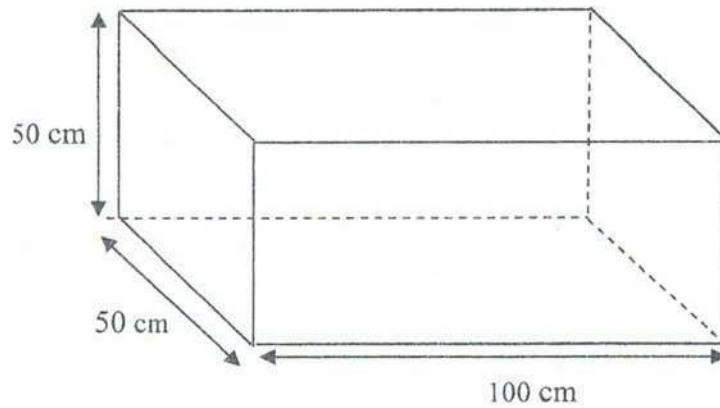
- 11 The figure below consists of 2 equal quadrants fitted within a rectangle.



Find the area of the shaded region. (Take $\pi = \frac{22}{7}$)

Answer _____ cm^2 [3]

12



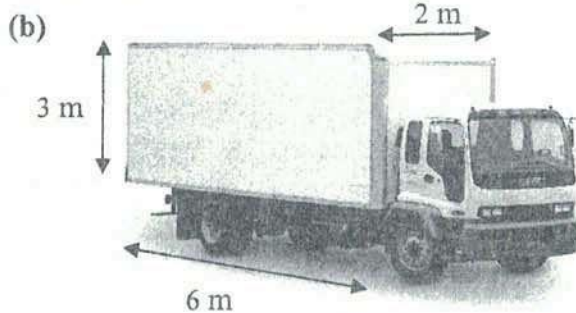
The figure shows a metallic container with a rectangular base measuring 50 cm by 100 cm with height 50 cm.

- (a) Find the volume of the tank in cm^3 .

Answer (a)

cm^3 [1]

These containers, which are used to store chemicals, are to be transported by a truck to a nearby chemical plant.

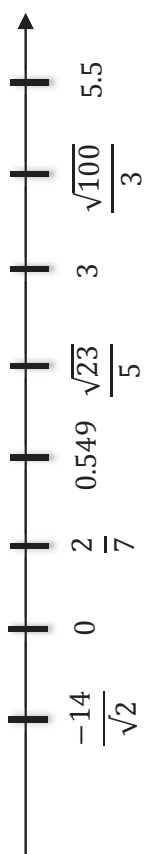


If the storage space of the truck is a cuboid of base 6 m by 2 m and height of 3 m, calculate the number of containers the truck can carry in one trip.

Answer (b)

containers [2]

Secondary 1 Express
2017 MYE Section A Marking Scheme

Qn		Solution		Marks	Guidance
1.	(a)	3, 0		B1	
	(b)	$\frac{\sqrt{23}}{5}, \frac{-14}{\sqrt{2}}$		B1	
	(c)			B2	
2.	(a)	$HCF = 3^4 \times 11^7$		B1	
	(b)	$LCM = 2^{11} \times 3^{10} \times 11^8$		B1	
	(c)	$x = 3^2 \times 11$		B1	
3		$107\% - \$535$ $1\% - \$5$ <i>Price before GST</i> – $100 \times 5 = \$500$		M1 A1	
4	(a)	$240\text{ m} : 1.3\text{ km}$ $240 : 1300$ $12 : 65$		B1	
	(b)	$A : B = 5 : 6$ $8 : 3 = B : C$ $20 : 24$ $24 : 9$ $\therefore A : B : C = 20 : 24 : 9$		M1 A1	

Secondary 1 Express
2017 MYE Section A Marking Scheme

Qn	Solution	Marks	Guidance
5	<p>13 units – Croissants 10 units – Fruit Tarts 23 units – 575 1 unit = 25 No. of Croissants = $25 \times 13 = 325$ No. of Fruit tarts = $25 \times 10 = 250$</p>		
6	$\frac{\sqrt[3]{724}}{3.2^2(8.24 - 5.32)} = 0.300305... \approx 0.300 \text{ (3 s.f.)}$	B1 B1	
7.	Temp Difference = $18 - (-12) = 30^\circ\text{C}$	B1	
(a)			
(b)	Rate of increase of Temperature = $\frac{30}{12} = 2.5^\circ\text{C/hr}$	B1	
(c)	<p>Temperature difference = $13 - (-12) = 25^\circ\text{C}$ Time taken = $\frac{25}{2.5} = 10 \text{ hrs}$ Time = 1000hrs</p>		
8			
(a)	$3p + 2q - 2p + 10q = p + 12q$	B1	
(b)	$\begin{aligned} a - 2b + b + c - 2(c - a) \\ = a - 2b + b + c - 2c + 2a \\ = 3a - b - c \end{aligned}$	M1 A1	
(b)	$\begin{aligned} \frac{x}{7} + \frac{5x + 1}{3} \\ = \frac{3x}{7(5x + 1)} + \frac{21}{3x + 35x + 7} \\ = \frac{21}{38x + 7} \end{aligned}$	M1 M1A1	

Secondary 1 Express
2017 MYE Section A Marking Scheme

Qn	Solution	Marks	Guidance
9	<p>(a)</p> $a = 1.5 \div \frac{5}{6} = 1.8 \text{ km/h}$ $b = 0.5 \text{ hrs} \times 25 = 12.5 \text{ km}$ $c = 8 \div 10 = 0.8 \text{ hrs}$	B1 B1 B1	
	<p>(b)</p> $\text{Cindy's average speed} = \frac{1.5 + 12.5 + 8}{\frac{5}{6} + 0.5 + 0.8} = \frac{22}{2\frac{2}{15}} \approx 10.3 \text{ km/h (3s.f.)}$	B1	
10	<p>(a)</p> $\text{Cost of one paper} = \frac{10}{50} = \0.20 $\text{Cost of one pin} = \frac{5}{100} = \0.05 $\text{Cost of one plastic straw} = \frac{5}{50} = \0.10 $\text{Hence, total cost of 1 pinwheel} = \$0.20 + \$0.05 + \$0.10 = \$0.35$	M1A1	Don't accept 35 cents – 1 mark for working
	<p>(bi)</p> $\text{Profit made} = \$0.50 - \$0.35 = \$0.15$	B1	Don't accept 15 cents
	<p>(bii)</p> $\text{How many pinwheels to sell} = \frac{\$50}{\$0.15} = 333\frac{1}{3}$ <p>Hence, she must sell 334 pinwheels at least.</p>	B1	Students need to show rounded answer
11	<p>Area of rectangle = $7 \times 14 = 98 \text{ cm}^2$</p> $\text{Area of quadrants} = 2 \times \frac{1}{4} \times 7^2 \times \frac{22}{7} = 77 \text{ cm}^2$ $\text{Shaded Area} = 98 - 77 = 21 \text{ cm}^2$	M1 M1A1	
12	<p>(a)</p> $\text{Volume of container} = 100 \times 50 \times 50 = 250000 \text{ cm}^3$	B1	
	<p>(b)</p> $\text{No. of containers that can fit into truck}$ $= \frac{600}{100} \times \frac{200}{50} \times \frac{300}{50} = 144 \text{ containers}$	M1A1	

Secondary 1 Express
2017 MYE Section B Marking Scheme

Qn	Solution	Marks	Guidance
1.	(a) $936 = 2^3 \times 3^2 \times 13$ $252 = 2^2 \times 3^2 \times 7$ $132 = 2^2 \times 3 \times 11$ HCF = $2^2 \times 3 = 12$ cm Hence, the largest length of each cube is 12 cm.	BI BI BI	
	(b)		
	(c) Total number of cubes can be cut = $\frac{936}{12} \times \frac{252}{12} \times \frac{132}{12}$ = 18018 cubes	BI	
2.	(a) $12 = 2^2 \times 3$ $30 = 2 \times 3 \times 5$ $84 = 2^2 \times 3 \times 7$	BI BI BI BI	
	(b) $LCM = 2^2 \times 3 \times 5 \times 7 = 420$ years Hence, the next time the planets align will be the year 2352	M1 A1	
3	(a) Selling price of Jazz (without COE) = $98101 - 50101 = \$48000$ Commission earned = $\$48000 \times 3\% = \1440	M1 A1	
	(b) Amount leftover = $\$98101 - \$25000 = \$73101$ Total interest incurred = $(2.5\% \times 73101) \times 5 = \9137.625 Monthly Instalment = $\frac{\$73101 + 9137.625}{60} = \$1370.64 \approx \$1371$	M1 M1 A1	
4	(a) Sister's age = $x + 12$	BI	
	(b) Father's age = $2(x + 12) = 2x + 24$	BI	Accept either answer
	(c) Sum of ages = $x + x + 12 + 2(x + 12)$ = $4x + 36$	M1 A1	
	(d) Erica's age = 12, let $x = 12$, $Father's\ age = 2(12) + 24$ = 48 years old	M1A1	

Secondary 1 Express
2017 MYE Section B Marking Scheme

Qn	Solution	Marks	Guidance
5	<p>(a) 5 units – 200 ml 1 unit – 40 Milk needed = $3 \times 40 = 120$ ml</p> <p>(b) 20 muffins need 400 ml of flour Hence, 50 muffins need = $\frac{400}{20} \times 50 = 1000$ ml of flour. For 1000 ml of flour, milk needed = $\frac{1000}{5} \times 3 = 600$ ml</p>	M1A1	
6	<p>(a) Selling price of the vacuum cleaner for Shop A $= \\$800 \times \frac{90}{100} \times \frac{85}{100} = \\612</p> <p>(b) Selling price of VC for Shop B $= \\$800 \times \frac{75}{100} = \\600 Since Shop B is cheaper, Mr Sim should buy from Shop B.</p>	M1 A1	
7	<p>(a) Since S\$1 to 0.71 USD $S\\$3600 = 3600 \times 0.71 = 2556$ USD Hence, Mr Sim got 2556 USD.</p> <p>(b) Leftover = 800USD Hence, amount of SGD he got back = $\frac{800}{0.71} = S\\$1126$</p>	M1 A1	
8	<p>(a) Total interest accumulated $12000 \times 8.5\% \times 4 = \\4080 Amount he have to pay back = $\\$12000 + \\$4080 = \\$16080$</p> <p>(b) Investment = \$35000 Interest earned = \$16800 Interest per year = $\frac{16800}{8} = \\$2100$ Interest rate = $\frac{2100}{35000} \times 100\% = 6\%$</p>	M1A1	

Secondary 1 Express
2017 MYE Section B Marking Scheme

Qn		Solution	Marks	Guidance
9	(a)	Greatest possible length of field = 105.4 m Greatest possible breadth of field = 70.4 m	B1 B1	
	(b)	Greatest possible perimeter = $2(105.4) + 2(70.4) = 351.6$ m	B1	

Name : _____

Register No.	Class



BENDEMEER SECONDARY SCHOOL

2017 END OF YEAR EXAMINATION

SECONDARY 1 EXPRESS

Mathematics Paper 1

DATE : 5 Oct 2017
DURATION : 1 hour
TOTAL : 50 Marks

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number on all the work you hand in.
 Write in dark blue or black pen on both sides of the paper.
 You may use a 2B pencil for any diagrams or graphs.
 Do not use staples, paper clips, highlighters, glue or correction fluid/tape.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

All the diagrams in this paper are **not** drawn to scale.

If working is needed for any question, it must be shown with the answer.

Omission of essential working will result in loss of marks.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

FOR EXAMINER'S USE
50

This document consists of **9** printed pages including this cover page.

Answer **all** the questions.

For
Examiner's
Use

- 1 Arrange the following numbers in ascending order.

$$0.\dot{4}6\dot{5}, 0.46\dot{5}, \frac{6}{13}, 0.4\dot{6}\dot{5}$$

Answer: _____ [2]

- 2 (a) Using prime factorisation, express the following two numbers as a product of its prime factors. Leave your answer in index notation.

- (i) 900
- (ii) 1500

- (b) Hence or otherwise, find the

- (i) HCF of 900 and 1500
- (ii) LCM of 900 and 1500

Answer: 2(a)(i) [2]

2(a)(ii) [2]

2(b)(i) [1]

2(b)(ii) [1]

3 Evaluate the following, and show your working clearly.

For
Examiner's
Use

(a) $3 + 4^2 \div 2 + \sqrt[3]{8} \times (2 - 8)$

(b) $\left[1\frac{2}{3} + \left(-\frac{1}{6}\right)\right] \div \frac{6}{7} \times \left(1\frac{4}{5} - 2\frac{3}{10}\right)$

Answer: 3(a) [2]

3(b) [2]

-
- 4 Nana bought 5 chocolate blocks and 3 bottles of carbonated drinks from a supermarket. The price of a chocolate block is \$3.95 and that of a bottle of carbonated drink is \$2.05. By estimating the price of each item, calculate the estimated total price of Nana's purchase.



Answer: \$ [2]

- 5 Given the formula $x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$, find the value of x when $a = -4$, $b = 8$ and $c = -3$.

Answer: [2]

- 6 Express each of the following as a single fraction in its simplest form.

(a) $\frac{4g-3}{7} - \frac{2(g-1)}{3}$

(b) $\frac{9s-4t}{5} + \frac{3s+2t}{2} + \frac{s-5t}{3}$

Answer: 6(a) [2]

6(b) [2]

- 7 (a) Expand and simplify $(2 - b)(-3a) + 5(6ab - 2a + 3)$
- (b) Factorise the following completely
- (i) $25bx + 35by$
- (ii) $8mn - 4m - 2n + 1$

Answer: 7(a) [2]

7(b)(i) [1]

7(b)(ii) [2]

-
- 8 Three numbers x, y and 36 have an average of 30.
Five numbers w, x, y, z and 36 have an average of 40.
What is the average of w and z ?

Answer: [3]

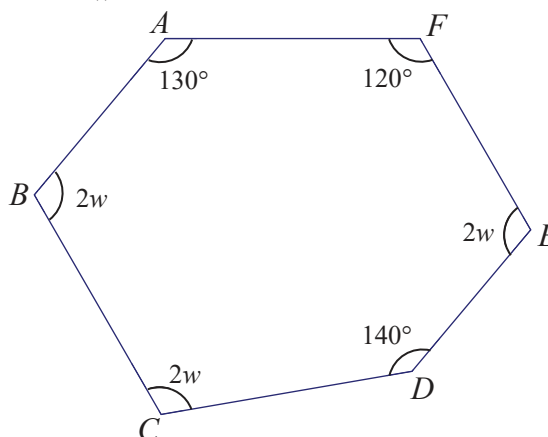
- 9 Given that $3x$ and $6y$ are complementary angles, find the value of $x + 2y$.

For
Examiner's
Use

Answer: [2]

- 10 (a) Three of the exterior angles of a polygon with n sides are 60° , 45° and 75° . The remaining exterior angles are each 30° . Calculate the value of n .

- (b) $ABCDEF$ is a hexagon. Find the value of w .



Answer: 10(a) [2]

10(b) [3]

- 11 Zilong suffered a loss of 20% when his watch was sold at \$80. How much should he have sold his watch if he wanted to make a gain of 20%?



Answer: \$..... [2]

- 12 Karrie, Layla & Miya buy a present for their friend. The present costs \$270 and it is shared by Karrie, Layla & Miya in the ratio 3: 2 : 4.

(a) Calculate the amount Karrie needs to contribute.

(b) (i) If Layla doubles the amount she needs to contribute and Karrie halves her amount, how much must Miya contribute?

(ii) Hence, write down the new ratio of the amount that Karrie, Layla & Miya need to contribute.



Answer: 12(a)\$..... [1]

12(b)(i)\$..... [2]

12(b)(ii) [1]

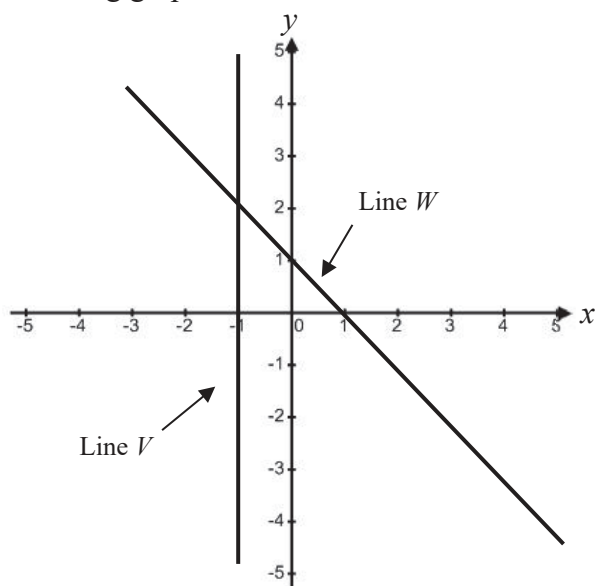
- 13 If $\frac{k}{5} < \frac{21}{4}$, find the largest possible value of k such that k is a prime number.

For
Examiner's
Use

Answer: [2]

- 14 Write down the equation of the following graphs.

- (a) Line V
(b) Line W



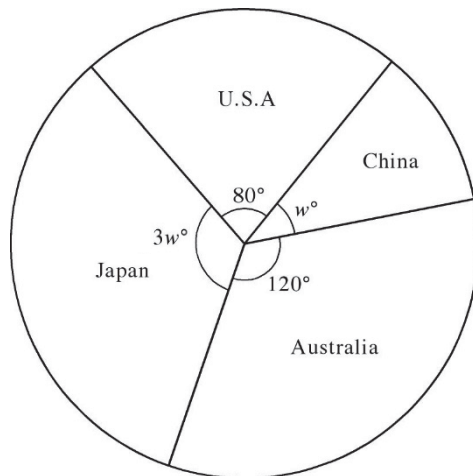
Answer: 14(a) [1]

14(b) [2]

- 15 A group of Singaporeans were surveyed to determine which countries they would like to visit the most. Their choices were represented on a pie chart as given below.

*For
Examiner's
Use*

- (a) Find the value of w .
(b) Hence, calculate the percentage of the group who would like to visit Japan most.
(c) If 40 adults would like to visit USA most, find the total number of adults surveyed.



Answer: 15(a) [2]
15(b) [1]
15(c) [1]

☺ End of Paper ☺

Name : _____

Register No.	Class



BENDEMEER SECONDARY SCHOOL

2017 END OF YEAR EXAMINATION

SECONDARY 1 EXPRESS

Mathematics Paper 2

DATE : 10 Oct 2017
DURATION : 1 hour 30 minutes
TOTAL : 50 Marks

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number on all the work you hand in.
 Write in dark blue or black pen on both sides of the paper.
 You may use a 2B pencil for any diagrams or graphs.
 Do not use staples, paper clips, highlighters, glue or correction fluid/tape.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

All the diagrams in this paper are **not** drawn to scale.

If working is needed for any question, it must be shown with the answer.

Omission of essential working will result in loss of marks.

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For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

FOR EXAMINER'S USE
50

This document consists of **9** printed pages including this cover page.

Answer **all** the questions.

For
Examiner's
Use

- 1 A sequence of patterns formed by dots is as shown.

Pattern 1



Number of dots = 1

Pattern 2



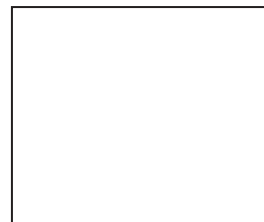
Number of dots = 5

Pattern 3



Number of dots = 9

Pattern 4



- (a) Draw the 4th pattern of the sequence in the above box. [1]
 (b) State the total number of dots required, in terms of n , to form the n^{th} pattern?
 (c) Pattern P requires 333 dots. What is the value of ' P '?

Answer: 1(b) [1]

1(c) [1]

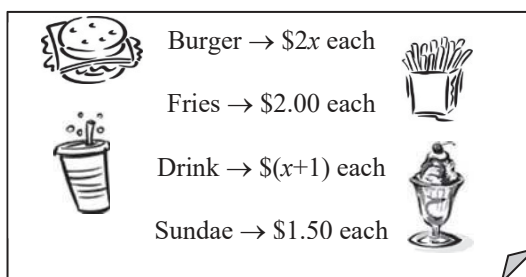
- 2 (a) Factorise $xy - yz$.
 (b) Using the answer in (a), find the exact value of the following without the use of calculator.

$$3165 \times 876543 - 876543 \times 3155$$

Answer: 2(a) [1]

2(b) [1]

- 3 Franco went to a fast-food restaurant and saw the following sign.



For
Examiner's
Use

He bought 5 burgers, $5x$ fries, 3 drinks and 6 sundaes.

- (a) Write down, in the expanded form, the amount Franco paid for the following items, in terms of x ,
- (i) burger
 - (ii) fries
 - (iii) drinks
- (b) Find the cost of each burger if Franco paid \$58 for all the items.

Answer: 3(a)(i) [1]
 3(a)(ii) [1]
 3(a)(iii) [1]
 3(b) [2]

- 4 Tigreal spent x hours per day to revise for his examinations. He spent $\frac{1}{6}$ of his revision time on Geography, $\frac{1}{5}$ of his remaining revision time on English, $\frac{1}{4}$ of the remaining revision time after English on Biology and then spent the last 40 minutes on Mathematics.

Giving each answer in its simplest form, find an expression, in terms of x , for the time Tigreal spent revising for

- (a) (i) Biology
(ii) Mathematics
- (b) Hence, find the value of x .

Answer: 4(a)(i) [1]
4(a)(ii) [1]
4(b) [1]

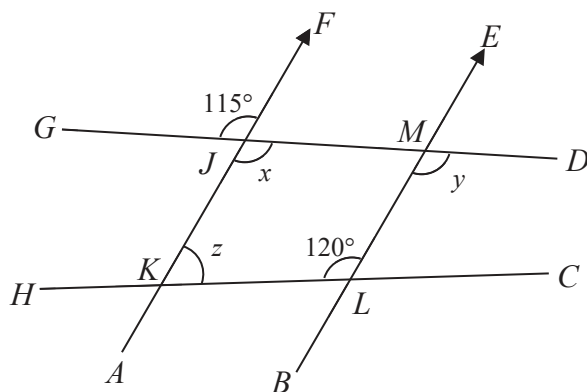
- 5 Freya drives a distance of 150 km at a speed of 90 km/h. After resting for 20 mins, she took another 2.5 h to complete the remaining 245 km of the journey. Find Freya's average speed for the whole journey.

Answer: [3]

- 6 In the figure, $AF \parallel BE$, $\angle FJG = 115^\circ$ and $\angle KLM = 120^\circ$. Find the following angles, giving reasons for each answer

For
Examiner's
Use

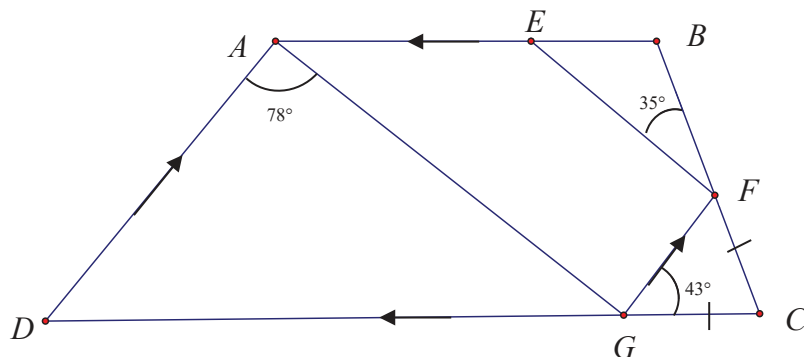
- (a) angle x
(b) angle y
(c) angle z



Answer: 6(a) [1]
6(b) [1]
6(c) [1]

- 7 In the figure, $ABCD$ is a trapezium. Given that DA is parallel to GF , BA is parallel to CD , $CG = CF$, $\angle DAG = 78^\circ$, $\angle FGC = 43^\circ$ and $\angle BFE = 35^\circ$, **show** that AG is parallel to EF . [3]

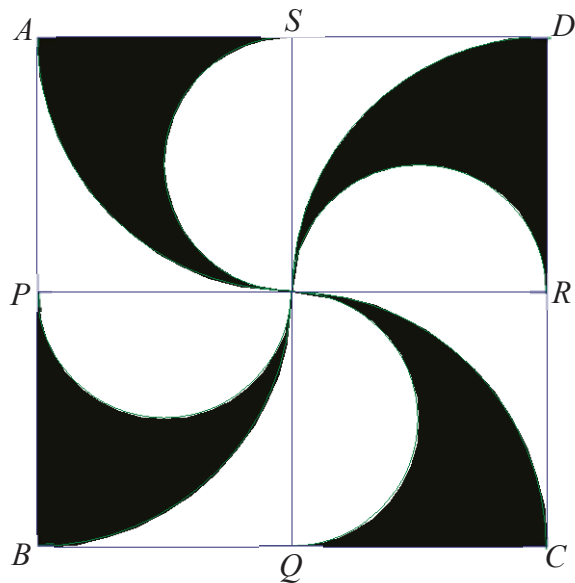
For
Examiner's
Use



- 8 $ABCD$ is a square of side 10 cm. P , Q , R and S are midpoints of AB , BC , CD and AD respectively. The figure is drawn using 4 equal semicircles and 4 equal quadrants of circles. Calculate

- (a) the area of the shaded region
(b) the perimeter of the shaded region

(Take π to be 3.14)



For
Examiner's
Use

Answer: 8(a) [4]
8(b) [4]

- 9 During the ancient days in China, the coins were used for transactions. A typical coin has a circular cross-section area with a square hole. It has an uniform thickness of 2 mm and its outermost diameter is 25 mm. The square hole is 5 mm by 5 mm. Find its

- (a) volume
(b) total surface area

(Take π to be 3.14, and round off your answers to the nearest integer)



Answer: 9(a) [4]
9(b) [4]

- 10 The marked price, inclusive of 7% GST, of a LCD television was \$2675. Harley bought the television during the recent COMEX exhibition and received a 5% discount.

- (a) Calculate the marked price before GST.
- (b) Find the original GST amount.
- (c) Find the selling price, before GST, of the LCD television.
- (d) Find the GST amount after the discount.

Answer: 10(a) [1]
 10(b) [1]
 10(c) [1]
 10(d) [1]

- 11 **Answer the WHOLE of this question on a graph paper**

- (a) Given that $y = 1 - 3x$, copy and complete the following table. [2]

x	-3	-2	-1	1	2	3
y	10			-2		

- (b) Using a scale of 2 cm to represent 1 unit on the x -axis and 2 cm to represent 2 units on the y -axis, draw the graph of $y = 1 - 3x$ for values of x from -3 to 3. [3]
- (c) Using your graph, find the value of
- (i) y when $x = 1.5$ [1]
 - (ii) x when $y = 1$ [1]
- (d) Hence, or otherwise, find the gradient of the graph. [1]

☺ End of Paper ☺

Answer **all** the questions.

*For
Examiner's
Use*

- 1 Arrange the following numbers in ascending order.

$$0.\dot{4}\dot{6}\dot{5}, 0.4\dot{6}\dot{5}, \frac{6}{13}, 0.4\dot{6}\ddot{5}$$

[B2] – 0.5 for each correct order

Answer: $\frac{6}{13}, 0.\dot{4}\dot{6}\dot{5}, 0.4\dot{6}\dot{5}, 0.4\dot{6}\ddot{5}$ [2]

- 2 (a) Using prime factorisation, express the following two numbers as a product of its prime factors. Leave your answer in index notation.

- (i) 900
(ii) 1500

- (b) Hence or otherwise, find the

- (i) HCF of 900 and 1500
(ii) LCM of 900 and 1500

Prime factorization for 900 [M]
Prime factorization for 1500 [M] } factor tree or division method

$$900 = 2^2 \times 3^2 \times 5^2 \quad [A]$$

$$1500 = 2^2 \times 3 \times 5^3 \quad [A]$$

$$\text{HCF of } 900 \text{ \& } 1500 = 2^2 \times 3 \times 5^2 = 300 \quad [A]$$

$$\text{LCM of } 900 \text{ \& } 1500 = 2^2 \times 3^2 \times 5^3 = 4500 \quad [A]$$

Answer: 2(a)(i) $2^2 \times 3^2 \times 5^2$ [2]

2(a)(ii) $2^2 \times 3 \times 5^3$ [2]

2(b)(i) 300 [1]

2(b)(ii) 4500 [1]

3 Evaluate the following, and show your working clearly.

(a) $3 + 4^2 \div 2 + \sqrt[3]{8} \times (2 - 8)$

(b) $\left[1\frac{2}{3} + \left(-\frac{1}{6}\right)\right] \div \frac{6}{7} \times \left(1\frac{4}{5} - 2\frac{3}{10}\right)$

$$\begin{aligned} & 3 + 4^2 \div 2 + \sqrt[3]{8} \times (2 - 8) \\ &= 3 + 16 \div 2 + 2 \times (-6) \\ &= 3 + 8 + (-12) \quad [\text{M}] \\ &= -1 \quad [\text{A}] \end{aligned}$$

$$\begin{aligned} & \left[1\frac{2}{3} + \left(-\frac{1}{6}\right)\right] \div \frac{6}{7} \times \left(1\frac{4}{5} - 2\frac{3}{10}\right) \\ &= \frac{3}{2} \div \frac{6}{7} \times \left(-\frac{1}{2}\right) \\ &= \frac{7}{4} \times \left(-\frac{1}{2}\right) \quad [\text{M}] \\ &= -\frac{7}{8} \quad [\text{A}] \end{aligned}$$

Answer: 3(a) $-\frac{1}{7}$ [2]
3(b) $-\frac{7}{8}$ [2]

4 Nana bought 5 chocolate blocks and 3 bottles of carbonated drinks from a supermarket. The price of a chocolate block is \$3.95 and that of a bottle of carbonated drink is \$2.05. By estimating the price of each item, calculate the estimated total price of Nana's purchase.

Estimated cost of chocolate block \approx \$4.00
Estimated cost of carbonated drink \approx \$2.00 } [M]
Total price \approx \$4.00 \times 5 + \$2.00 \times 3
= \$26.00 [A]



Answer: \$ 26 [2]

- 5 Given the formula $x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$, find the value of x when $a = -4$, $b = 8$ and $c = -3$.

$$x = \frac{-8 + \sqrt{8^2 - 4(-4)(-3)}}{2(-4)} \quad [\text{M1}]$$

$$= \frac{-8 + \sqrt{64 - 48}}{-8}$$

$$= \frac{-8 + \sqrt{16}}{-8}$$

$$= \frac{-8 + 4}{-8} = \frac{1}{2} \quad [\text{A1}]$$

Answer: $\frac{1}{2}$ [2]

- 6 Express each of the following as a single fraction in its simplest form.

(a) $\frac{4g-3}{7} - \frac{2(g-1)}{3}$

(b) $\frac{9s-4t}{5} + \frac{3s+2t}{2} + \frac{s-5t}{3}$

$$\begin{aligned} \frac{4g-3}{7} - \frac{2(g-1)}{3} &= \frac{3(4g-3) - 14(g-1)}{21} \\ &= \frac{12g - 9 - 14g + 14}{21} \end{aligned} \quad [\text{M1}]$$

$$= \frac{-2g+5}{21} \quad [\text{A1}]$$

$$\begin{aligned} \frac{9s-4t}{5} + \frac{3s+2t}{2} + \frac{s-5t}{3} &= \frac{6(9s-4t) + 15(3s+2t) + 10(s-5t)}{30} \\ &= \frac{54s - 24t + 45s + 30t + 10s - 50t}{30} \end{aligned} \quad [\text{M1}]$$

$$= \frac{109s - 44t}{30} \quad [\text{A1}]$$

Answer: 6(a) $\frac{-2g+5}{21}$ [2]

6(b) $\frac{109s - 44t}{30}$ [2]

7 (a) Expand and simplify $(2 - b)(-3a) + 5(6ab - 2a + 3)$

(b) Factorise the following completely

(i) $25bx + 35by$

(ii) $8mn - 4m - 2n + 1$

$$\begin{aligned}(2 - b)(-3a) + 5(6ab - 2a + 3) &= -6a + 3ab + 30ab - 10a + 15 \\ &= 33ab - 16a + 15\end{aligned}$$

[M1]

[A1]

$$25bx + 35by = 5b(5x + 7y)$$

[A1]

$$\begin{aligned}8mn - 4m - 2n + 1 &= 4m(2n - 1) - (2n - 1) \\ &= (2n - 1)(4m - 1)\end{aligned}$$

[M1]

[A1]

Answer: \ 7(a) ... $33ab - 16a + 15$ [2]

7(b)(i) ... $5b(5x + 7y)$ [1]

7(b)(ii) ... $(2n - 1)(4m - 1)$ [2]

8 Three numbers x , y and 36 have an average of 30.
Five numbers w , x , y , z and 36 have an average of 40.
What is the average of w and z ?

$$x + y + 36 = 30 \times 3 = 90$$

$$x + y = 90 - 36$$

$$x + y = 54$$

[B1]

$$w + x + y + z + 36 = 40 \times 5$$

$$w + x + y + z = 200 - 36$$

$$w + 54 + z = 164$$

$$w + z = 164 - 54$$

$$w + z = 110$$

[B1]

$$\text{Average of } w \text{ \& } z = 110 \div 2 = 55$$

[B1]

Answer: 55 [3]

- 9 Given that $3x$ and $6y$ are complementary angles, find the value of $x + 2y$.

$$3x + 6y = 90 \quad [\text{M1}]$$

$$3(x + 2y) = 90$$

$$x + 2y = 30 \quad [\text{A1}]$$

Answer: $x + 2y = 30$ [2]

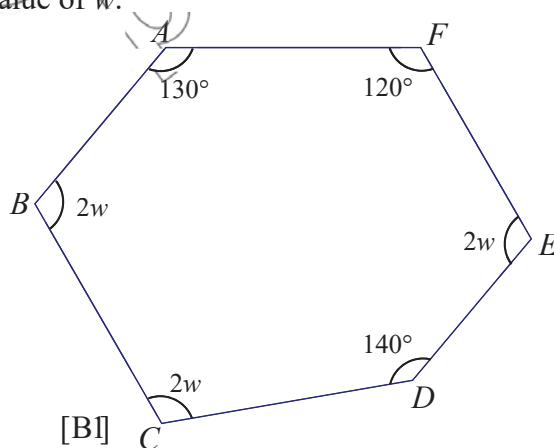
- 10 (a) Three of the exterior angles of a polygon with n sides are 60° , 45° and 75° . The remaining exterior angles are each 30° . Calculate the value of n .

$$\text{Sum of all ext. } \angle s = 360^\circ$$

$$\begin{aligned} \text{Sum of remaining ext. } \angle s &= 360^\circ - 60^\circ - 45^\circ - 75^\circ \\ &= 180^\circ \quad [\text{B1}] \end{aligned}$$

$$\begin{aligned} \text{No. of remaining ext. } \angle s &= 180^\circ \div 30^\circ = 6 \\ n &= 6 + 3 = 9 \quad [\text{B1}] \end{aligned}$$

- (b) $ABCDEF$ is a hexagon. Find the value of w .



$$\text{Sum of all int. } \angle s = (6 - 2) \times 180^\circ = 720^\circ$$

$$130^\circ + 120^\circ + 2w + 140^\circ + 2w + 2w = 720^\circ$$

$$390^\circ + 6w = 720^\circ$$

$$w = 55^\circ$$

[B1]

[B1]

[B1]

Answer: 10(a) 9 [2]

10(b) 55° [3]

- 11 Zilong suffered a loss of 20% when his watch was sold at \$80. How much should he have sold his watch if he wanted to make a gain of 20%?



80% → \$80 [B]
1% → \$1
120% → \$120 [B]

Answer: \$ 120 [2]

- 12 Karrie, Layla & Miya buy a present for their friend. The present costs \$270 and it is shared by Karrie, Layla & Miya in the ratio 3 : 2 : 4.

- (a) Calculate the amount Karrie needs to contribute.
- (b) (i) If Layla doubles the amount she needs to contribute and Karrie halves her amount, how much must Miya contribute?
(ii) Hence, write down the new ratio of the amount that Karrie, Layla & Miya need to contribute.

Total parts = 3 + 2 + 4 = 9 parts

9 parts = \$270

1 part = \$30

3 parts = \$90 [A]

Layla's original contribution : 2 parts → \$60

Layla's new contribution = \$60 × 2 = \$120

Karrie's new contribution = \$90 ÷ 2 = \$45 [B]

Miya's new contribution = \$270 - \$120 - \$45
= \$105 [B]

Karrie : Layla : Miya

45 : 120 : 105

3 : 8 : 7 [A]

Answer: 12(a) \$ 90 [1]

12(b)(i) \$ 105 [2]

12(b)(ii) 3 : 8 : 7 [1]

- 13 If $\frac{k}{5} < \frac{21}{4}$, find the largest possible value of k such that k is a prime number.

$$k < \frac{21}{4} \times 5 \quad [\text{B1}]$$

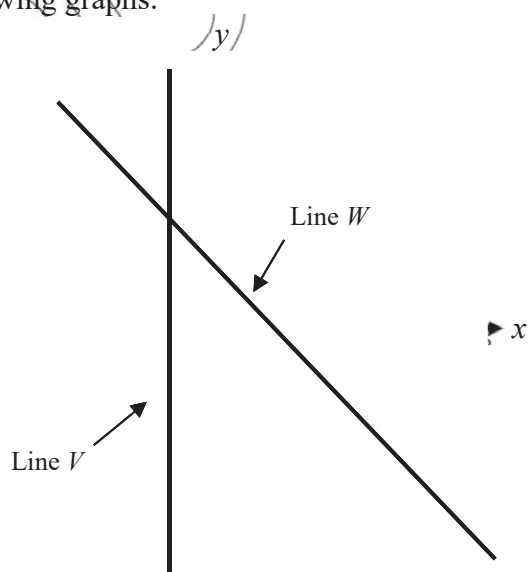
$$k < 26.25$$

largest possible value of k , such that k is a prime number = 23 [B1]

Answer: 23 [2]

- 14 Write down the equation of the following graphs.

- (a) Line V
(b) Line W



Line W:

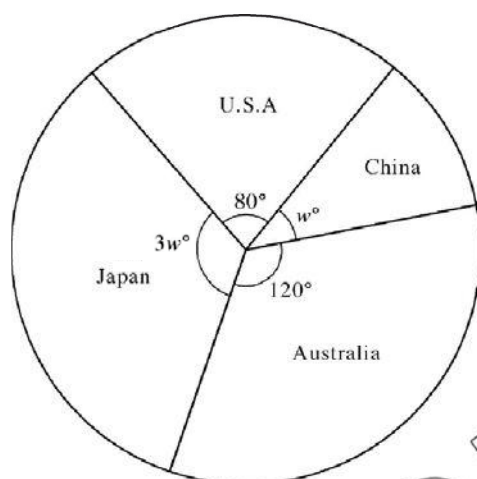
Gradient = -1
y-intercept = 1 [B1]

equation: $y = -x + 1$ [B1]

Answer: 14(a) $x = -1$ [1]
14(b) $y = -x + 1$ [2]

- 15 A group of Singaporeans were surveyed to determine which countries they would like to visit the most. Their choices were represented on a pie chart as given below.

- (a) Find the value of w .
 (b) Hence, calculate the percentage of the group who would like to visit Japan most.
 (c) If 40 adults would like to visit USA most, find the total number of adults surveyed.



$$3w + 80^\circ + w + 120^\circ = 360^\circ \quad [\text{B1}]$$

$$4w + 200^\circ = 360^\circ$$

$$w = 40^\circ \quad [\text{B1}]$$

$$3w = 3 \times 40^\circ = 120^\circ$$

$$\left(\frac{120}{360}\right) \times 100\% = 33.3\% \quad [\text{A1}]$$

$$80^\circ \rightarrow 40$$

$$10^\circ \rightarrow 5$$

$$360^\circ \rightarrow 5 \times 36 = 180 \text{ adults} \quad [\text{A1}]$$

Answer: 15(a) 40° [2]
 15(b) 33.3% [1]
 15(c) 180 [1]

☺ End of Paper ☺

Answer **all** the questions.

For
Examiner's
Use

- 1 A sequence of patterns formed by dots is as shown.

Pattern 1



Number of dots = 1

Pattern 2



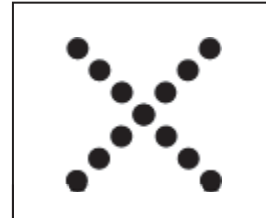
Number of dots = 5

Pattern 3



Number of dots = 9

Pattern 4



- (a) Draw the 4th pattern of the sequence in the above box. [1]
 (b) State the total number of dots required, in terms of n , to form the n^{th} pattern?
 (c) Pattern P requires 333 dots. What is the value of ' P '?

The difference between each pattern is 4 dots.

$$\begin{array}{lcl} T_1 & = 1 & = 4(1) - 3 \\ T_2 & = 5 & = 4(2) - 3 \\ T_3 & = 9 & = 4(3) - 3 \\ T_4 & = 13 & = 4(4) - 3 \\ T_n & & = 4n - 3 \end{array} \quad [A]$$

$$\begin{array}{lcl} T_p = 4p - 3 & = 333 \\ 4p & = 336 \\ p & = 84 \end{array} \quad [A]$$

Answer: 1(b) $4n - 3$ [1]
 1(c) 84 [1]

- 2 (a) Factorise $xy - yz$.

- (b) Using the answer in (a), find the exact value of the following without the use of calculator.

$$3165 \times 876543 - 876543 \times 3155$$

$$xy - yz = y(x - z) \quad [A]$$

$$x = 3165, y = 876543, z = 3155$$

$$3165 \times 876543 - 876543 \times 3155$$

$$= 876543 (3165 - 3155)$$

$$= 876543 (10)$$

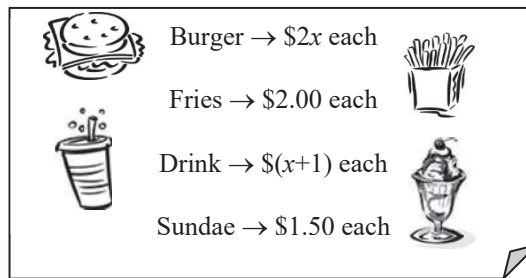
$$= 8765430$$

[A]

Answer: 2(a) $y(x - z)$ [1]

2(b) 8 765 430 [1]

- 3 Franco went to a fast-food restaurant and saw the following sign.



For
Examiner's
Use

He bought 5 burgers, $5x$ fries, 3 drinks and 6 sundaes.

- (a) Write down, in the expanded form, the amount Franco paid for the following items, in terms of x ,
- (i) burger
 - (ii) fries
 - (iii) drinks
- (b) Find the cost of each burger if Franco paid \$58 for all the items.

Burger: $5 \times 2x = 10x$ [A]

Fries: $5x \times 2 = 10x$ [A]

Drinks: $3 \times (x+1) = 3x+3$ [A]

$10x + 10x + 3x + 3 + 6 \times 1.50 = 58$ [B]

$23x + 12 = 58$

$23x = 46$

$x = 2$

Each burger costs $= 2x = 2 \times 2 = \$4$ [B]

Answer: 3(a)(i) $10x$ [1]

3(a)(ii) $10x$ [1]

3(a)(iii) $3x+3$ [1]

3(b) $\$4$ [2]

- 4 Tigreal spent x hours per day to revise for his examinations. He spent $\frac{1}{6}$ of his revision time on Geography, $\frac{1}{5}$ of his remaining revision time on English, $\frac{1}{4}$ of the remaining revision time after English on Biology and then spent the last 40 minutes on Mathematics.

Giving each answer in its simplest form, find an expression, in terms of x , for the time Tigreal spent revising for

- (a) (i) Biology
(ii) Mathematics
- (b) Hence, find the value of x .

Let x be the total time spent for the study period.

$$\text{Time spent on Geography} = \frac{x}{6} \text{ h}$$

$$\text{Time spent on English} = \frac{1}{5} \left(x - \frac{x}{6} \right) = \frac{x}{6} \text{ h}$$

$$\text{Time spent on Biology} = \frac{1}{4} \left(x - \frac{x}{6} - \frac{x}{6} \right) = \frac{x}{6} \text{ h} \quad [\text{A1}]$$

$$\text{Time spent on Mathematics} = x - \frac{x}{6} - \frac{x}{6} - \frac{x}{6} = \frac{x}{2} \text{ h} \quad [\text{A1}]$$

Given $\frac{x}{2} = \frac{40}{60}$	Answer: /	4(a)(i) $\frac{x}{6} \text{ h}$ [1]
$x = 1\frac{1}{3} \text{ h} \quad [\text{A1}]$		4(a)(ii) $\frac{x}{2} \text{ h}$ [1]
		4(b) $1\frac{1}{3} \text{ h}$ [1]

- 5 Freya drives a distance of 150 km at a speed of 90 km/h. After resting for 20 mins, she took another 2.5 h to complete the remaining 245 km of the journey. Find Freya's average speed for the whole journey.

$$\text{Total distance travelled} = 150 + 245 = 395 \text{ km}$$

$$\text{Time taken for first part of journey} = \frac{150}{90} = \frac{5}{3} \text{ h} \quad [\text{B1}]$$

$$\text{Time spent on resting} = \frac{20}{60} = \frac{1}{3} \text{ h}$$

$$\text{Total time taken} = \frac{5}{3} + \frac{1}{3} + 2.5 = \frac{9}{2} \text{ h} \quad [\text{B1}]$$

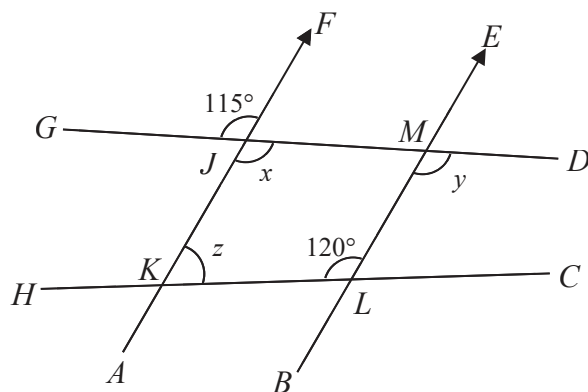
$$\text{Average speed for the whole journey} = \frac{395}{\frac{9}{2}} = 87\frac{7}{9} \text{ km/h} \quad [\text{B1}]$$

Answer: $87\frac{7}{9} \text{ km/h}$ [3]

- 6 In the figure, $AF \parallel BE$, $\angle FJG = 115^\circ$ and $\angle KLM = 120^\circ$. Find the following angles, giving reasons for each answer

For
Examiner's
Use

- (a) angle x
(b) angle y
(c) angle z



$$x = 115^\circ \quad [A1]$$

(vert. opp. \angle s)

$$y = x = 115^\circ \quad [A1]$$

(corr. \angle s, \parallel lines)

$$z = 180^\circ - 120^\circ \quad [A1]$$

(int. \angle s, \parallel lines)

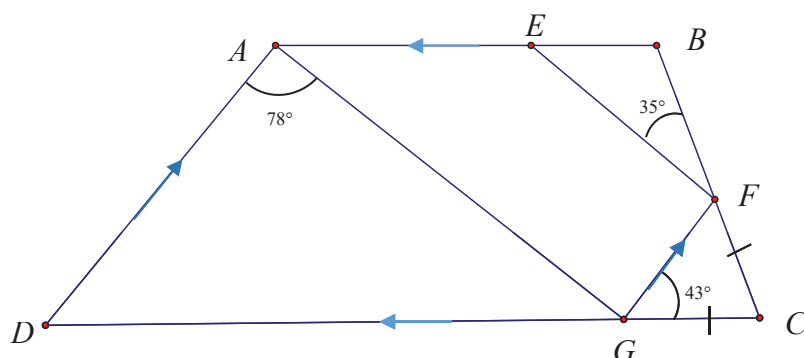
$$z = 60^\circ$$

Minus 1m for not stating properties used

Answer: 6(a) 115° [1]
6(b) 115° [1]
6(c) 60° [1]

- 7 In the figure, $ABCD$ is a trapezium. Given that DA is parallel to GF , BA is parallel to CD , $CG = CF$, $\angle DAG = 78^\circ$, $\angle FGC = 43^\circ$ and $\angle BFE = 35^\circ$, **show** that AG is parallel to EF . [3]

For
Examiner's
Use



$$\angle AGF = \angle DAG = 78^\circ \quad (\text{alt. } \angle\text{s, } // \text{ lines})$$

$$\angle CFG = \angle CGF = 43^\circ \quad (\text{base angles of isosceles triangle})$$

$$\angle BFE + \angle EFG + \angle CFG = 180^\circ \quad (\angle\text{s on a st. line})$$

$$35^\circ + \angle EFG + 43^\circ = 180^\circ$$

$$\angle EFG = 102^\circ$$

$$\angle AGF + \angle EFG = 78^\circ + 102^\circ = 180^\circ$$

[M2]

Therefore, $\angle AGF$ & $\angle EFG$ must be interior angles of parallel lines, and the parallel lines are AG and EF .

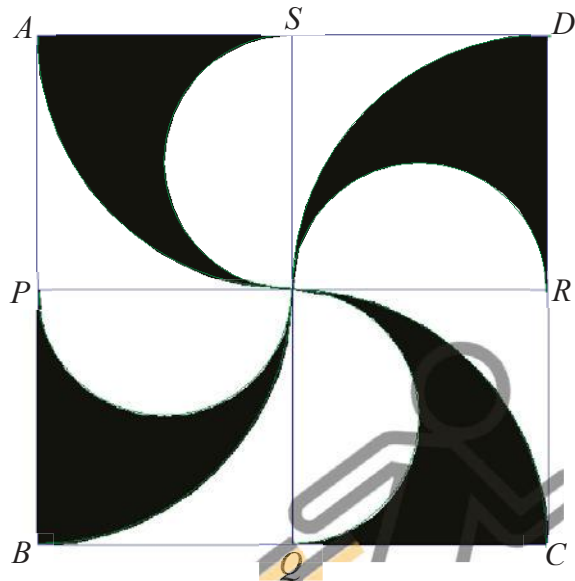
[A1]

- 8 $ABCD$ is a square of side 10 cm. P , Q , R and S are midpoints of AB , BC , CD and AD respectively. The figure is drawn using 4 equal semicircles and 4 equal quadrants of circles. Calculate

For
Examiner's
Use

- (a) the area of the shaded region
(b) the perimeter of the shaded region

(Take π to be 3.14)



Area of shaded region

$$= \text{area of 4 quadrants} - \text{area of 4 semi-circles} \quad [\text{B1}]$$

$$= [(3.14 \times 5^2) \div 4] \times 4 - [(3.14 \times 2.5^2) \div 2] \times 4 \quad [\text{B2}]$$

$$= 78.5 - 39.25$$

$$= 39.25 \text{ cm}^2 \quad [\text{B1}]$$

Perimeter of shaded region

$$= \text{circumference of 4 quadrants} + \text{circumference of 4 semi-circles} \quad [\text{B1}]$$

$$+ 4 \times 5 \text{ cm}$$

$$= [(3.14 \times 10) \div 4] \times 4 + [(3.14 \times 5) \div 2] \times 4 + 20 \quad [\text{B2}]$$

$$= 31.4 + 31.4 + 20$$

$$= 82.8 \text{ cm} \quad [\text{B1}]$$

Answer: 8(a) 39.25 cm² [4]

8(b) 82.8 cm [4]

- 9 During the ancient days in China, the coins were used for transactions. A typical coin has a circular cross-section area with a square hole. It has an uniform thickness of 2 mm and its outermost diameter is 25 mm. The square hole is 5 mm by 5 mm. Find its

- (a) volume
(b) total surface area

(Take π to be 3.14, and round off your answers to the nearest integer)



$$\begin{aligned}
 \text{Volume of coin} &= \text{volume of cylinder} - \text{volume of cuboid} & [B1] \\
 &= 3.14 \times (25 \div 2)^2 \times 2 - 5 \times 5 \times 2 & [B2] \\
 &= 981.25 - 50 \\
 &= 931.25 \text{ mm}^3 \\
 &\approx 931 \text{ mm}^3 \text{ (rounding off to nearest integer)} & [B1]
 \end{aligned}$$

$$\begin{aligned}
 \text{Total surface area of coin} &= \text{surface area of cylinder} - \text{area of two squares} & [B1] \\
 &\quad + \text{area of sides of cuboid} \\
 &= 3.14 \times (25 \div 2)^2 \times 2 + 3.14 \times 25 \times 2 - 5 \times 5 \times 2 & [B2] \\
 &\quad + 5 \times 4 \times 2 \\
 &= (981.25 + 157) - 50 + 40 \\
 &= 1128.25 \text{ mm}^2 \\
 &\approx 1128 \text{ mm}^2 \text{ (rounding off to nearest integer)} & [B1]
 \end{aligned}$$

Answer: 9(a) 931 mm^3 [4]
9(b) 1128 mm^2 [4]

- 10 The marked price, inclusive of 7% GST, of a LCD television was \$2675. Harley bought the television during the recent COMEX exhibition and received a 5% discount.

- Calculate the marked price before GST.
- Find the original GST amount.
- Find the selling price, before GST, of the LCD television.
- Find the GST amount after the discount.

$$\begin{aligned} 107\% &\rightarrow \$2675 \\ 100\% &\rightarrow \$2500 \end{aligned} \quad [A1]$$

$$\text{GST} = \$2675 - \$2500 = \$175 \quad [A1]$$

$$\begin{aligned} 100\% &\rightarrow \$2500 \\ 95\% &\rightarrow \$2375 \end{aligned} \quad [A1]$$

$$\begin{aligned} \text{GST} &= 7\% \times \$2375 \\ &= \$166.25 \end{aligned} \quad [A1]$$

Answer:

10(a)	.....	\$2500	.....	[1]
10(b)	.....	\$175	.....	[1]
10(c)	.....	\$2375	.....	[1]
10(d)	.....	\$166.25	.....	[1]

- 11 **Answer the WHOLE of this question on a graph paper**

- (a) Given that $y = 1 - 3x$, copy and complete the following table. [2]

x	-3	-2	-1	1	2	3
y	10			-2		

- Using a scale of 2 cm to represent 1 unit on the x -axis and 2 cm to represent 2 units on the y -axis, draw the graph of $y = 1 - 3x$ for values of x from -3 to 3. [3]
- Using your graph, find the value of
 - y when $x = 1.5$ [1]
 - x when $y = 1$ [1]
- Hence, or otherwise, find the gradient of the graph. [1]

☺ End of Paper ☺

Class	Index Number	Name
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BUKIT MERAH SECONDARY SCHOOL



END OF YEAR EXAMINATION 2017 SECONDARY 1 EXPRESS

MATHEMATICS

Paper 1

4048/01

5 October 2017

1 hour 15 minutes

Candidates answer on the Question Paper.
No additional material is required.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.

Write in dark blue or black pen on both sides of the paper.

You may use a pencil for any diagram or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

Calculators should be used where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give the answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 50.

Calculator Model:

For Examiner's Use	
Part A (Algebra Component)	
Part B	
Total	

This document consists of **12** printed pages, including this cover page.
Setter: Yvonne Lee

[Turn over

1 Simplify

(a) $(a) \times (3b) - a$,

(b) $x - 2(y - 2x)$,

(c) $\frac{4z}{3} - \frac{3(2 - 5z)}{4}$.

Answer (a) [1]

(b) [2]

(c) [2]

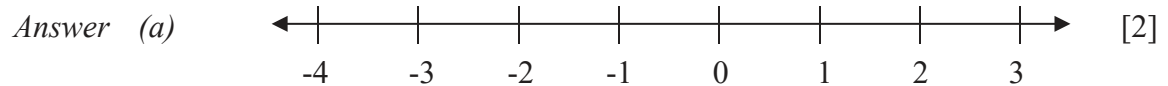
2 Factorise

(a) $3p^2q - 12pq + 6pq^2$,

(b) $(v+w) - v(w+v)$.

Answer (a) [1]

(b) [1]

3 (a) Solve the inequality $-4x > 8$ and illustrate your solution on the number line below.(b) Hence, write down the largest integer value of x which satisfies $-4x > 8$.Answer (b) $x =$ [1]

4 Solve

(a) $2(3c - 1) - 3(2 + c) = 0$

(b) $\frac{f + 2}{5} + 1 = \frac{f + 1}{2}$

Answer (a) $c = \dots\dots\dots$ [2]

(b) $f = \dots\dots\dots$ [3]

- 5 (a) Express 0.28 as a fraction in its simplest form.

Answer (a) [1]

- (b) Evaluate $\sqrt{\frac{13.6 - 1.48^2}{\pi}}$, correct your answer to

(i) 2 significant figures,

(ii) 3 decimal places.

Answer (b) (i) [1]

(ii) [1]

- 6 Without using a calculator, evaluate $\left(1\frac{1}{2}\right)^2 \div \frac{3}{7} + \left(-\frac{2}{3}\right)$. Show your workings clearly.

Answer [3]

7 When written as a product of their prime factors,

$$p = 2^3 \times 3^9,$$

$$q = 2 \times 3^2 \times 5,$$

$$r = 2^2 \times 3 \times 7.$$

Find

- (a) the value of the cube root of p ,
- (b) the LCM of p , q and r , giving your answer as the product of its prime factors,
- (c) the greatest number that will divide p , q and r exactly.

Answer (a) [1]

(b) LCM = [1]

(c) [1]

- 8 (a)** Apple juice, peach juice and lemonade were used to make a fruit punch in the ratio 5:3:7 respectively. Ali used 2.8 litres of lemonade.

(i) How much apple juice did he use?

Answer (a) (i) l [1]

(ii) How much fruit punch did he make altogether?

Answer (a) (ii) l [1]

- (b)** Baba makes a fruit punch using mango juice, orange juice and lemonade.

The ratio of mango juice : orange juice is 2:3.

The ratio of orange juice : lemonade is 4:3.

Find the ratio of mango juice : orange juice : lemonade.

Answer (b) : : [1]

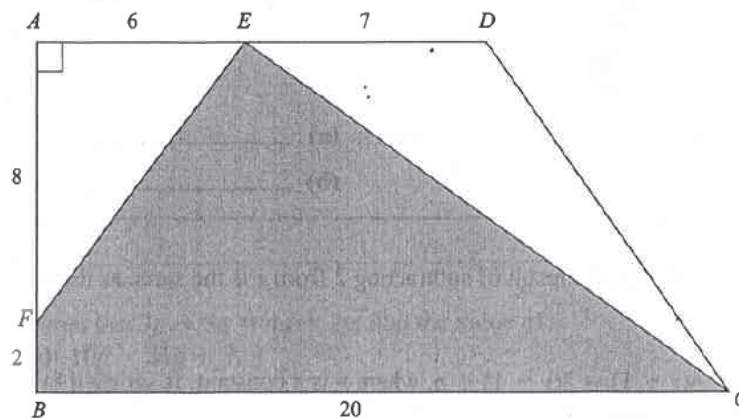
- 9 (a) Express 3 centimetres as a percentage of 6 metres.

Answer (a) % [1]

- (b) Express 24 m/s into km/h.

Answer (b) km/h [1]


- 10 In the diagram, $ABCD$ is a trapezium in which $AD = 13$ cm, $AB = 10$ cm, $BC = 20$ cm and $\angle DAB = 90^\circ$. E and F are points on AD and AB respectively such that $AE = 6$ cm and $AF = 8$ cm. Find the area of the shaded region $EFBC$.



Answer cm^2 [3]

11 Mrs Lee bought 2 books during a sale.

BOOK SALE!



\$18 each (inclusive of 7% GST)

BUY ONE AND GET
THE NEXT ONE AT A
DISCOUNT OF 30%

Calculate

- (a) the total amount she paid for both books,
- (b) the total amount of GST.

Answer (a) \$ [2]
 (b) \$ [2]

12 Given the following sequence,

$$\frac{1}{6} + \frac{1}{3} = \frac{1}{2}$$

$$\frac{1}{12} + \frac{1}{4} = \frac{1}{3}$$

$$\frac{1}{20} + \frac{1}{5} = \frac{1}{4}$$

$$\frac{1}{30} + \frac{1}{6} = \frac{1}{5}$$

\vdots

$$\frac{1}{p} + \frac{1}{12} = \frac{1}{11}$$

find

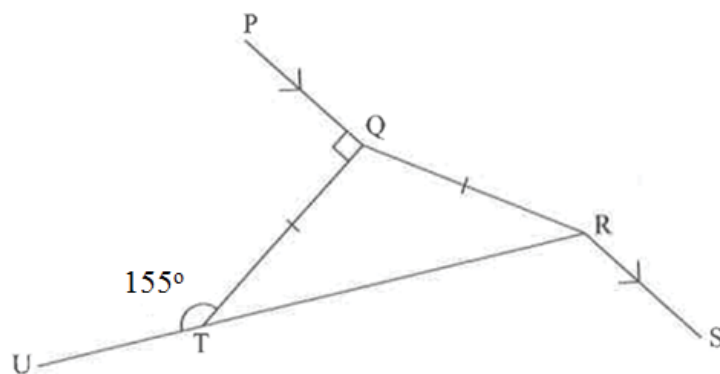
- (a) the 5th line of sequence,
- (b) the value of p ,
- (c) the value of $\frac{1}{98} - \frac{1}{99}$, showing your workings clearly.

Answer (a) [1]

(b) $p =$ [1]

(c) [2]

- 13 In the diagram, UTR is a straight line and TQR is an isosceles triangle such that $QT = QR$. Given that $PQ \parallel RS$, $\angle UTQ = 155^\circ$ and $\angle PQT = 90^\circ$, find



- (a) $\angle TQR$,
 (b) $\angle TRS$.

Answer (a) $\angle TQR = \dots\dots\dots^\circ$ [2]

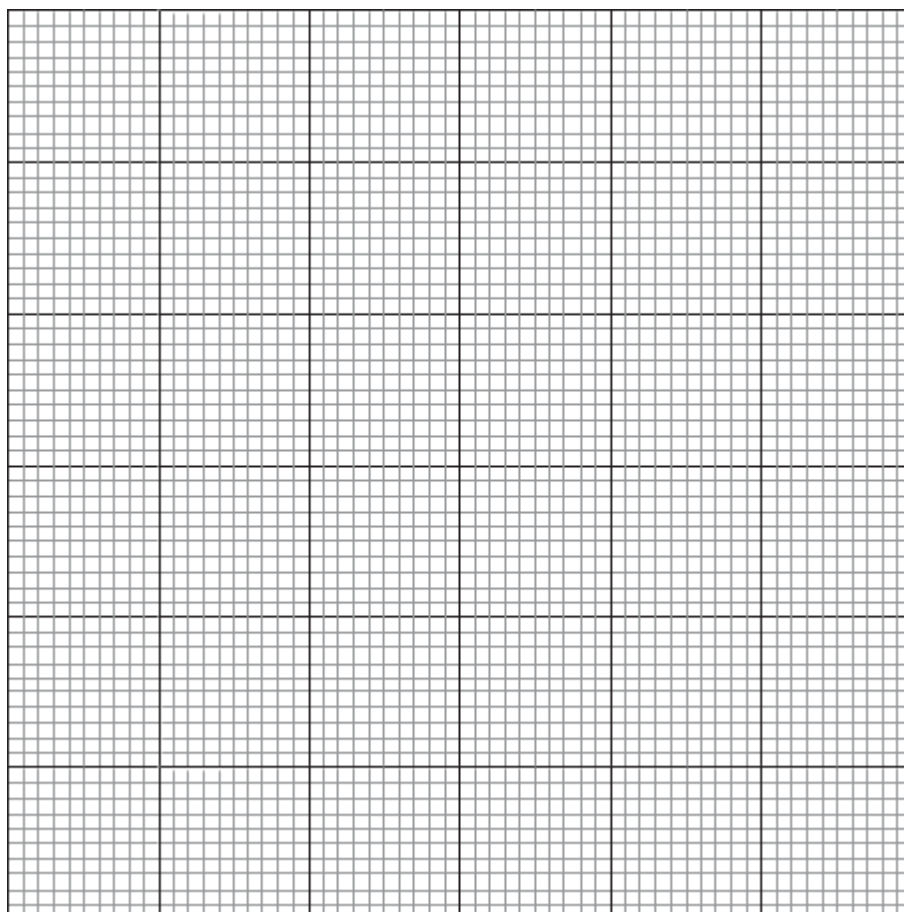
(b) $\angle TRS = \dots\dots\dots^\circ$ [2]

- 14 (a) Complete the following table for the equation $y = 4 - \frac{1}{2}x$.

x	0	4	8
y			

[2]

- (b) Draw the graph of $y = 4 - \frac{1}{2}x$ for $0 \leq x \leq 8$ on the grid provided below.



[2]

- (c) Draw a straight line $y = 3$ on the same grid. [1]
- (d) Write down the coordinates of the point of intersection of the two lines.

Answer (d) (..... ,) [1]

End of paper

Class	Index Number	Name
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BUKIT MERAH SECONDARY SCHOOL



END OF YEAR EXAMINATION 2017 SECONDARY 1 EXPRESS

MATHEMATICS

Paper 2

4048/02

**10 October 2017
1 hour 30 minutes**

Additional Materials: Writing paper (5 sheets)
Cover Page (1 sheet)

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.

Write in dark blue or black pen on both sides of the paper.

You may use a pencil for any diagram or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

Calculators should be used where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give the answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 60.

Calculator Model:

For Examiner's Use	
Part A (Algebra Component)	
Part B	
Total	

This document consists of **7** printed pages, including this cover page.

Setter: Yvonne Lee

[Turn over

1 (a) Solve $\frac{x+3}{4} - \frac{2x-4}{5} = 1$. [3]

(b) If $a = 3$, $b = -2$ and $c = 5$, evaluate

(i) $a - 4(b - 2c)$, [1]

(ii) $ac^2 - b^3$. [1]

(c) Soil costs x cents per kilogram.

Peter paid y dollars for some soil.

Find an expression, in terms of x and y , for the number of kilograms of soil that Peter bought. [2]

2 (a) Find the interior angle of a regular 15-sided polygon. [2]

(b) An n -sided polygon has 2 interior angles measuring 100° each and the remaining interior angles are q° each.

Find an expression for q in terms of n . [2]

- 3 In a sewing kit, there are blue, green and red buttons. $\frac{1}{5}$ of the buttons are blue and $\frac{4}{7}$ of the remainder are green. The rest are red buttons.

Find

- (a) the fraction of red buttons in the sewing kit, [2]
 (b) the ratio of blue buttons to green buttons to red buttons, [1]
 (c) the total number of buttons if there are 80 green buttons in the sewing kit. [2]

- 4 (a) The cash price of a new car is \$90 500.

David buys the car under the hire purchase scheme as shown below.

Hire Purchase Scheme

- a deposit of 20% of cash price
- simple interest of 2% per year over 3 years
- repayment to be made monthly

Calculate

- (i) the total amount of interest payable, [3]
 (ii) the monthly instalment paid by David. [2]
- (b) A bag costs 1 850 000 Korean Won (KRW). The conversion rate between Singapore dollars and Korean Won is SGD1 = KRW815.79.

Calculate the price of the bag in Singapore dollars. [2]

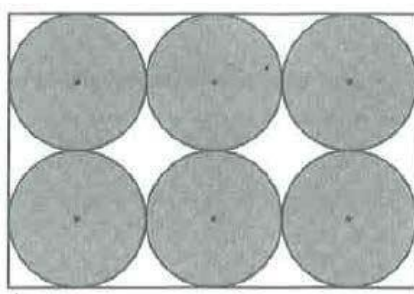
- 5 A cylindrical block of metal has radius 10 cm and height 30 cm.

(a) Calculate its volume, leaving your answer in terms of π . [1]

The block of metal is then melted and recast into 6 similar rods of height 15 cm.

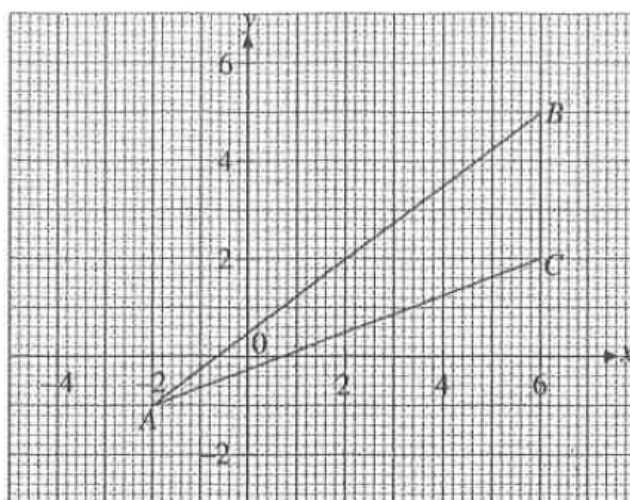
(b) Show that the radius of the base area of one such rod is 5.77 cm, correct to 3 significant figures. [2]

The diagram shows the cross-sectional view of a box holding the 6 rods. The box is in the shape of a cuboid and the rods just fit into the box.



(c) Calculate the volume of empty space in the box. [3]

6 (a)



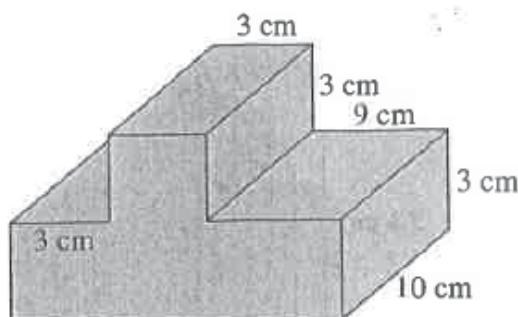
- (i) Calculate the gradient of AB . [1]
- (ii) Write down the equation of BC . [1]
- (iii) Find the area of $\triangle ABC$. [2]

(b) The equation of a function is $y = -\frac{1}{3}x + 2$. Find

- (i) the value of y when $x = \frac{3}{4}$, [1]
- (ii) the value of x when $y = -1$. [2]

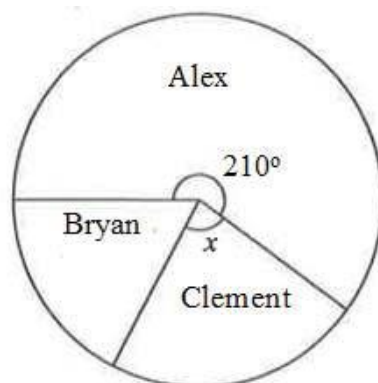
Hence, explain why $(7, -1)$ does not lie on the line. [2]

7 (a) Calculate the total surface area of the prism below. [3]



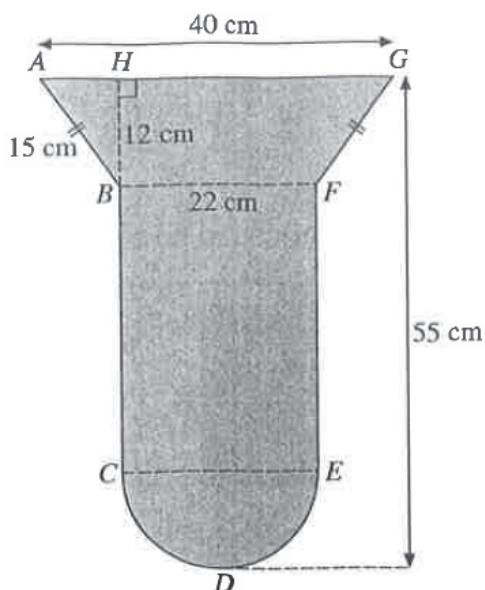
- (b) Mr Lee took 30 mins to drive from Jurong to Changi at an average speed of 72 km/h. He took the same route (but in the opposite direction) at an average speed of 5 km/h faster for his return trip. Find his average speed for the round trip correct to the nearest km/h. [4]

- 8 The pie chart shows how a box of sweets was shared among Alex, Bryan and Clement.



- (a) Find the fraction of the sweets that Alex received. [1]
 (b) If Clement received 22.5% of the sweets, find x . [1]
 (c) If Bryan received 345 sweets, how many sweets were there in the box? [2]

- 9 In the diagram, the shape is made up of trapezium $ABFG$, rectangle $BCEF$ and semicircle CDE .



Find

- (a) its perimeter, [3]
 (b) its area. [4]

- 10** Mrs Lee would like to dine at the Big Signboard Thai Restaurant. Below shows the pricing of the food items she would like to order. There is a service charge of 10% and GST of 7% but no service charge is imposed for takeout.

Big Signboard Thai Restaurant	
Pineapple rice	\$13.50
Green papaya salad	\$7.90
Green curry	\$10.90
Thai fish cake	\$6.70
Chendol	\$4.30

- (a) How much more must Mrs Lee pay if she were to dine in instead of takeout? [4]
- (b) If Mrs Lee has only \$50, suggest on which is a better option for her. Support your answer with relevant workings. [2]

End of paper

BMSS 1Exp End-Of-Year Examination 2017
(Mathematics P1) – Marking Scheme

Qn	Solution	Marks	Remarks
1	a $3ab - a$	B1	
	b $x - 2y + 4x$ $= 5x - 2y$	M1 A1	
	c $\frac{4z}{3} - \frac{3(2-5z)}{4}$ $= \frac{16z - 9(2-5z)}{12}$ $= \frac{16z - 18 + 45z}{12}$ $= \frac{61z - 18}{12}$	M1 A1	common denominator
2	a $3pq(p - 4 + 2q)$	B1	
	b $(v + w)(1 - v)$	B1	
3	a	B1, B1	B1 for correct inequality B1 for correct illustration on number line
	b $x = -3$	B1	
4	a $2(3c - 1) - 3(2 + c) = 0$ $6c - 2 - 6 - 3c = 0$ $c = 2\frac{2}{3} \text{ or } \frac{8}{3}$	M1 A1	correct expansion
	b $\frac{x+2}{5} + 1 = \frac{f+1}{2}$ $\frac{x+7}{5} = \frac{f+1}{2}$ $2(f+7) = 5(f+1)$ $2f + 14 = 5f + 5$ $f = 3$	M1 M1 A1	fraction=fraction cross-multiply
5	a $\frac{7}{25}$	B1	
	bi 1.9 (2 s.f.)	B1	
	bii 1.906 (3 decimal places)	B1	


6		$\left(1\frac{1}{2}\right)^2 \div \frac{3}{7} + \left(-\frac{2}{3}\right)$ $= \frac{9}{4} \div \frac{3}{7} - \frac{2}{3}$ $= \frac{9}{4} \times \frac{7}{3} - \frac{2}{3}$ $= \frac{21}{4} - \frac{2}{3}$ $= \frac{63-8}{12}$ $= 4\frac{7}{12} \text{ or } \frac{55}{12}$	M1 M1 A1	removing the brackets \div to \times
7	a	$\sqrt[3]{p} = 2 \times 3^3$ $= 54$	B1	
	b	LCM = $2^3 \times 3^9 \times 5 \times 7$	B1	
	c	HCF = 2×3 $= 6$	B1	
8	ai	7 parts $\rightarrow 2.8l$ 1 part $\rightarrow 0.4l$ 5 parts $\rightarrow 2l$	B1	
	aii	15 parts $\rightarrow 6l$	B1	
	b	mango : orange 2 : 3 8 : 12 orange : lemonade 4 : 3 12 : 9 \therefore mango : orange : lemonade = 8 : 12 : 9	B1	
9	a	$\frac{3}{600} \times 100\% = 0.5\%$	B1	
	b	24m \rightarrow 1 s 1440m \rightarrow 60 s 86400 m \rightarrow 1 h 86.4 km \rightarrow 1 h \therefore 86.4 km/h or $86\frac{2}{5}$ km/h	B1	

10		<p>Divide shaded diagram into 2 parts by drawing a line perpendicular to BC through E.</p> <p>area of shaded trapezium $= \frac{1}{2}(2+10)6 = 36 \text{ cm}^2$</p> <p>area of shaded triangle $= \frac{1}{2} \times 14 \times 10 = 70 \text{ cm}^2$</p> <p>area of shaded region $EFBC = 36 + 70$ $= 106 \text{ cm}^2$</p>	<p>M1</p> <p>M1</p> <p>A1</p>	<p>accept alternative method:</p> <p>area of trapezium $ABCD = 165 \text{ cm}^2$ [M1]</p> <p>area of $\triangle AEF = 24 \text{ cm}^2$</p> <p>area of $\triangle EDC = 35 \text{ cm}^2$ [M1]</p> <p>area of shaded region $EFBC = 165 - 24 - 35 = 106 \text{ cm}^2$ [A1]</p>
11	a	<p>total amount paid $= \frac{70}{100} \times 18 + 18$ $= \\$30.60$</p>	<p>M1</p> <p>A1</p>	
	b	<p>$\text{GST} = \frac{7}{107} \times 30.60$ $= \\$2$</p>	<p>M1</p> <p>A1</p>	
12	a	$\frac{1}{42} + \frac{1}{7} = \frac{1}{6}$	A1	
	b	$p = 132$	A1	
	c	<p>$\frac{1}{99 \times 98} + \frac{1}{99} = \frac{1}{98}$</p> <p>$\frac{1}{98} - \frac{1}{99} = \frac{1}{99 \times 98}$</p> <p>$= \frac{1}{9702}$</p>	<p>M1</p> <p>A1</p>	
13	a	<p>$\angle QTR = 180^\circ - 155^\circ$ (adj \angles on a str. line) $= 25^\circ$</p> <p>$\angle QRT = \angle QTR = 25^\circ$ (base \angles of isos. tri)</p> <p>$\angle TQR + 25^\circ + 25^\circ = 180^\circ$ (\angle sum of tri) $\angle TQR = 130^\circ$</p>	<p>M1</p> <p>A1</p>	
	b	<p>$\angle PQR + 90^\circ + 130^\circ = 360^\circ$ (\angles at a pt) $\angle PQR = 140^\circ$</p> <p>$\angle QRS = \angle PQR = 140^\circ$ (alt \angles, $PQ \parallel RS$)</p> <p>$\angle TRS = 140^\circ - 25^\circ$ $= 115^\circ$</p>	<p>M1</p> <p>A1</p>	

14	a	<table><tr><td>x</td><td>0</td><td>4</td><td>8</td></tr><tr><td>y</td><td>4</td><td>2</td><td>0</td></tr></table>	x	0	4	8	y	4	2	0	B2	minus 1m for every wrong / missing answer
	x	0	4	8								
	y	4	2	0								
	b											
c	Refer to b	B1										
d	(2, 3)	B1										

BMSS 1Exp End-Of-Year Examination 2017
(Mathematics P2) – Marking Scheme

Qn	Solution	Marks	Remarks
1	a $\frac{x+3}{4} - \frac{2x-4}{5} = 1$ $\frac{5(x+3) - 4(2x-4)}{20} = 1$ $\frac{-3x+31}{20} = 1$ $-3x+31 = 20$ $x = 3\frac{2}{3} \text{ or } \frac{11}{3}$	M1 M1 A1	LHS into a single fraction cross-multiply
	bi $3 - 4[-2 - 2(5)] = 51$	A1	
	bii $3(5)^2 - (-2)^3 = 83$	A1	
	c $\$y = 100y \text{ cents}$ $x \text{ cents} \rightarrow 1 \text{ kg}$ $1 \text{ cent} \rightarrow \left(\frac{1}{x}\right) \text{ kg}$ $100y \text{ cents} \rightarrow \left(\frac{100y}{x}\right) \text{ kg}$	M1 A1	
2	a $\text{interior angle} = \frac{(15-2) \times 180^\circ}{15}$ $= 156^\circ$	M1 A1	
	b $(n-2) \times q + 100 + 100 = (n-2) \times 180$ $(n-2)q + 200 = 180n - 360$ $q = \frac{180n - 560}{n-2}$	M1 A1	
3	a $\text{fraction of green buttons} = \frac{4}{7} \times \frac{4}{5}$ $= \frac{16}{35}$ $\text{fraction of red buttons} = 1 - \frac{4}{5} - \frac{16}{35}$ $= \frac{12}{35}$	M1 A1	
	b $\frac{1}{5} : \frac{16}{35} : \frac{12}{35} = 7 : 16 : 12$	A1	
	c $16 \text{ parts} \rightarrow 80$ $1 \text{ part} \rightarrow 5$ $35 \text{ parts} \rightarrow 175$	M1 A1	
4	ai $\text{amount borrowed} = \frac{80}{100} \times 90500$		

		$= \$72400$	M1	
		total interest $= 72400 \times \frac{2}{100} \times 3$ $= \$4344$	M1 A1	
	aii	total amount payable $= 72400 + 4344$ $= \$76744$ monthly instalment $= \frac{76744}{36}$ $= \$2131.78$	M1 A1	
	b	price in SGD $= \frac{1850000}{815.79}$ $= \$2267.74$	M1 A1	
5	a	volume $= \pi(10^2)(30)$ $= 3000\pi \text{ cm}^3$	B1	
	b	$6 \times \pi r^2(15) = 3000\pi$ $r = 5.7735 \text{ cm}$ rej. -5.7735 $= 5.77 \text{ (shown)}$	M1 A1	
	c	length $= 5.7735 \times 6 = 34.641 \text{ cm}$ breadth $= 5.7735 \times 4 = 23.094 \text{ cm}$ empty space (cross sectional) $= (34.641)(23.094) - 6[\pi(5.7735)^2]$ $= 171.681 \text{ cm}^2$ empty space in box $= 171.681 \times 15$ $= 2575.220$ $= 2580 \text{ cm}^3 \text{ (3 s.f.)}$	M1 M1 A1	 accept alternative method: vol. of box $= 34.641 \times 23.094$ $\times 15$ $= 11999.99 \text{ cm}^3$ [M1] empty space $= 11999.99$ $- 3000\pi$ $= 2580 \text{ cm}^3$ [A1]
6	ai	gradient $= \frac{3}{4}$	B1	
	aii	$x = 6$	B1	
	a iii	area $= \frac{1}{2} \times 3 \times 8$ $= 12 \text{ units}^2$	M1 A1	
	bi	$y = -\frac{1}{3}\left(\frac{3}{4}\right) + 2 = 1\frac{3}{4}$	B1	

	bii	$-1 = -\frac{1}{3}x + 2$ $x = 9$ <p>when $y = -1$, $x = 9$ and not 7.</p>	B1 B1	
7	a	<p>base area = $15 \times 3 + 3 \times 3$ $= 54 \text{ cm}^2$</p> <p>perimeter of base = $3 + 3 + 3 + 3 + 9 + 3 + 15 + 3$ $= 42 \text{ cm}$</p> <p>area of lateral faces = 42×10 $= 420 \text{ cm}^2$</p> <p>S.A. = $420 + 2 \times 54$ $= 528 \text{ cm}^2$</p>	M1 M1 A1	
	b	<p>distance from Jurong to Changi = $72 \times \frac{1}{2}$ $= 36 \text{ km}$</p> <p>time taken for return trip = $\frac{36}{77}$</p> <p>average speed for the round trip = $\frac{36 + 36}{\frac{1}{2} + \frac{36}{77}}$ $= 74.416 \text{ km/h}$ $= 74 \text{ km/h}$ (nearest km/h)</p>	M1 M1 A1	
8	a	$\frac{210}{360} = \frac{7}{12}$	B1	
	b	$x = \frac{22.5}{100} \times 360$ $\neq 81^\circ$	B1	
	c	<p>fraction of sweets Bryan received $= \frac{360 - 210 - 81}{360}$ $= \frac{23}{120}$</p> <p>no. of sweets in a box = $\frac{120}{23} \times 345$ $= 1800$</p>	M1 A1	
9	a	$BC = FE = 55 - 12 - 11$ $= 32 \text{ cm}$	M1	

		$\text{length of arc CE} = \frac{1}{2} \times 2\pi(11)$ $= 34.558 \text{ cm}$ $\text{perimeter} = 40 + 15 + 32 + 34.558 + 32 + 15$ $= 169 \text{ cm (3 s.f.)}$	M1 A1	
	b	$\text{area of trapezium} = \frac{1}{2}(40 + 22)(12) = 372 \text{ cm}^2$ $\text{area of rectangle} = 22 \times 32 = 704 \text{ cm}^2$ $\text{area of semicircle} = \frac{1}{2} \times \pi(11)^2 = 190.07 \text{ cm}^2$ $\text{area} = 372 + 704 + 190.07 = 1270 \text{ cm}^2 \text{ (3 s.f.)}$	M1 M1 M1 A1	
10	a	<u>Dine in</u> $\text{cost of food} = 13.50 + 7.90 + 10.90 + 6.70 + 4.30$ $= \$43.30$ $\text{cost of food including service charge} = 1.1 \times 43.30$ $= \$47.63$ $\text{cost of food including service charge and GST}$ $= 1.07 \times 47.63$ $= \$50.96$ <u>Takeout</u> $\text{cost of food including GST} = 1.07 \times 43.30$ $= \$46.33$ $\text{amount} = 50.96 - 46.33$ $= \$4.63$	M1 M1 M1 A1	
	b	Since $\$50 - \$50.96 = -\$0.96$, Mrs Lee does not have enough money to dine in with the purchase of the food items. I would suggest that she takeout her purchase.	M1 A1	



Name : _____ ()

Class : Sec 1-____

Second Semester Examination 2017
Secondary 1 Express

Mathematics

4016/1

Paper 1

Monday 9th Oct 2017

1 hour
7.45 am – 8.45 am

Additional materials:

Nil

INSTRUCTIONS TO CANDIDATES

Write your name, class and register number in the spaces provided on the paper/answer booklet.

Answer **All** questions.

All necessary working must be shown.

Omission of essential working will result in loss of marks.

ELECTRONIC CALCULATORS CAN BE USED IN THIS PAPER.

INFORMATION FOR CANDIDATES

The number of mark is given in brackets [] at the end of each question or part question.

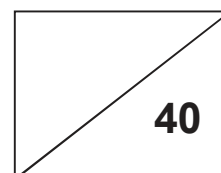
You should not spend too much time on any one question.

The total marks for this paper is **40**.

If the degree of accuracy is not specified in the question and if the answer is not exact, the answer should be given to three significant figures. Answers in degrees should be given to one decimal place.

For π , use either your calculator value or 3.142 unless the question requires the answer in terms of π .

MARKS:



This question paper consists of 8 printed pages including the cover page.



Mathematical Formulae

Compound Interest

$$\text{Total amount} = P \left(1 + \frac{r}{100} \right)^n$$

Mensuration

$$\text{Curve surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

$$\text{Volume of a cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3$$

$$\text{Volume of triangle ABC} = \frac{1}{2} ab \sin C$$

$$\text{Arc length} = r\theta, \text{ where } \theta \text{ is in radians}$$

$$\text{Area of sector} = \frac{1}{2} r^2 \theta \text{ where } \theta \text{ is in radians}$$

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Statistics

$$\text{Mean} = \frac{\sum fx}{\sum f}$$

$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$



Answer **all** questions.

1. Without using a calculator, estimate each of the following.

(a) 998×72

(b) $\sqrt[3]{995} + \sqrt{50}$

Ans: (a) _____ [2]

(b) _____ [2]

2. Use your calculator to find the value of $\frac{\sqrt[3]{1798 \times 0.045}}{6.31 - 5.5}$. Give your answer correct to 4 significant figures.

Ans: _____ [2]

3. Express each of the following in the respective units.

(a) 72 km/h to m/s

(b) 2 400 000 cm³ to m³

Ans: (a) _____ m/s [2]

(b) _____ m³ [2]



4. Consider the following number sequence.

$$-6, -1, 4, 9, 14, \dots$$

- (a) Write down the next two terms for the following sequence.
- (b) Express T_n in terms of n .
- (c) Find the 100th term.

Ans: (a) _____ [1]
(b) _____ [1]
(c) _____ [2]

5. 3 drones can deliver 9 packages in 2 hours. Assuming that the packages are identical and the drones work at the same rate, how long will it take 5 drones to deliver 30 packages?

Ans: _____ hours [2]



6. Clare needs to pack 108 chocolate chip cookies, 162 oatmeal cookies and 54 macadamia nut cookies into identical boxes so that each type of cookies is equally distributed. Find
- (a) the largest number of boxes that can be packed,
 - (b) the total number of cookies in each box.

Ans: (a) _____ boxes [2]

(b) _____ cookies [1]

7. Expand and simplify each of the following.

(a) $2a - \frac{3}{5}(15b - 10a)$

(b) $4(c + 3d) + 7(2c - d)$

Ans: (a) _____ [2]

(b) _____ [2]



8. Factorise each of the following expressions completely.

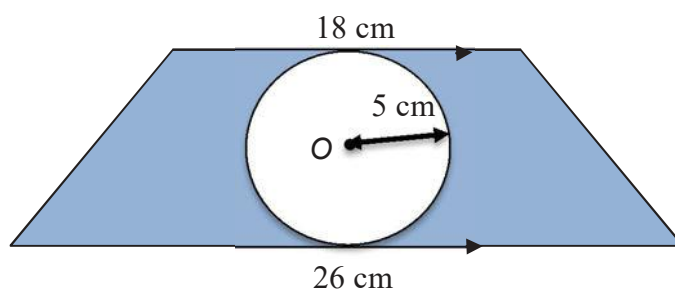
(a) $24x - 34xy$

(b) $12ab - 15a + 24ac$

Ans: (a) _____ [1]

(b) _____ [1]

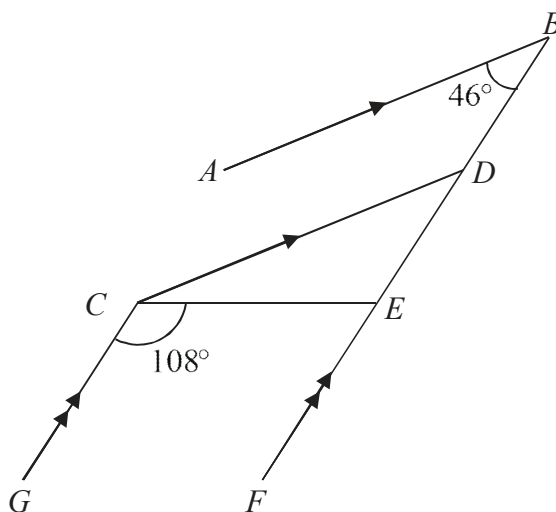
9. For the following figure, consisting of a trapezium and a circle, find the area of the shaded region, where O is the centre of the circle.



Ans: _____ cm^2 [3]



10. In the given diagram, AB is parallel to CD and CG is parallel to BF ,
 $\angle ABF = 46^\circ$ and $\angle GCE = 108^\circ$.



State with reasons clearly, find the value of the following.

- (a) $\angle CED$
- (b) $\angle CDB$
- (c) reflex $\angle DCG$

Ans: (a) _____ $^\circ$ [2]
(b) _____ $^\circ$ [2]
(c) _____ $^\circ$ [3]



11. The sum of the interior angles of a regular polygon is 1080° . Find the size of one exterior angle.

Ans: _____ [3]

12. Emma and Rupert each conduct a survey among 100 people to find out their most commonly used form of transportation. The information they gathered is shown in the table below.

	Emma	Rupert
Car	67	9
Public Transport	26	71
Walking	7	20

Give two reasons to account for the differences in their results.

Ans: Reason 1: _____ [2]

Reason 2:

– End of paper –



Name : _____ ()

Class : Sec 1-____

Second Semester Examination 2017
Secondary 1 Express

Mathematics
Paper 2

4016/2

Monday 2nd October 2017

1 hour 15 minutes
10.05 am – 11.20 am

Additional materials:

3 sheets of writing paper , 1 sheet of blank paper and 1 sheet of graph paper

READ THESE INSTRUCTIONS FIRST

Write your Name and Index Number on all the work you hand in.

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question, it must be shown with the answer.

Omission of essential working will result in loss of marks.

You are expected to use an electronic calculator to evaluate explicit numerical expressions. If the degree of accuracy is not specified in the question, and if the answer is not, give the exact answer to three significant figures. Give answers in degrees to one decimal place.

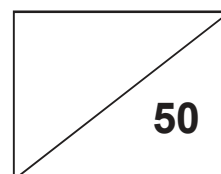
For π , use either your calculator value or 3.142, unless the question requires the answer in term of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is **50**.

MARKS:



This question paper consists of **6** printed pages including the cover page.



Mathematical Formulae

Compound interest

$$\text{Total amount} = P \left(1 + \frac{r}{100} \right)^n$$

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$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$



1. (a) Solve the following equations.

(i) $-13x - 3 + 5x = 5$ [2]

(ii) $\frac{5x}{2} - \frac{x+2}{3} = 5$ [3]

- (b) (i) Solve the inequality $32 + 3x \leq 23$. [2]

- (ii) Hence, find the biggest possible value of x if x is an even number. [1]

2. Nathiel walks from home at a speed of 60 m/min to school at 0630 in the morning to school. After walking for 12 minutes he stopped by 7-eleven for 5 minutes to buy some snacks. Nathiel then continues to walk at the same speed for another 8 minutes before reaching school.

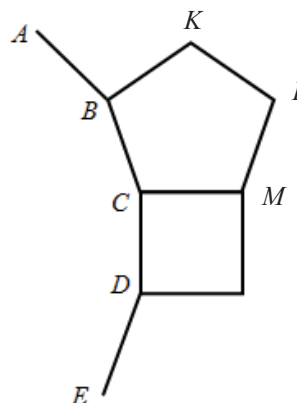
- (a) Express Nathiel's walking speed in km/h. [2]

- (b) What is the distance, in metres, of the school from his home? [1]

- (c) What is the average speed, in m/min, of the whole journey? [2]

- (d) Allen cycles at a speed of 12 km/h from home which is 4 km away from school. He leaves home at 0640 in the morning. Who will reach school first, Nathiel or Allen? [2]

3. The diagram below is made up of a square, a regular pentagon and a regular polygon of n sides. ABCDE shows part of the n -sided polygon.



Find

- (a) $\angle BCM$ [2]

- (b) the interior angle of n -sided polygon $\angle BCD$ [2]

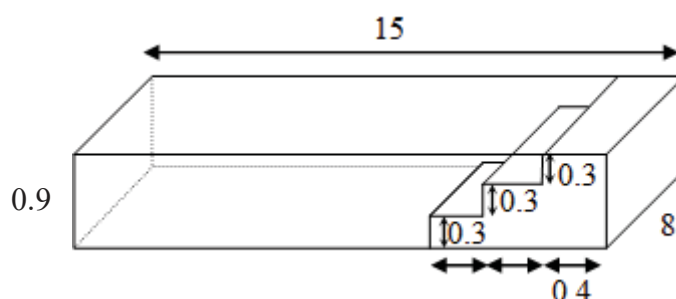
- (c) the number of sides n [2]



4. (a) The tickets to *Thomas & Friends the Musical* were sold at \$30, \$50 and \$100. The number of \$30-tickets sold was thrice the number of \$50-tickets. The number of \$100-tickets sold was 100 less than the number of \$50-tickets. The number of \$50-tickets sold was x . The total number of the tickets sold were 2605.
- (i) Write down an expression, in terms of x , for the total number of tickets sold. [1]
- (ii) Hence, find the value of x . [1]
- (iii) The following year, the tickets to *Thomas & Friends the Musical* were sold at \$33, \$55 and \$110. Find the percentage increase in price for each ticket. [2]
- (b) Selina Kyle, a cat burglar broke into Wayne Enterprise and stole a diamond pendant worth 12 million dollars. She then sells the diamond pendant at 240% of the original value on the black market. Find the price of the diamond pendant on the black market. [2]
- (c) The price of *My Melody* figurine toy in the month of October was \$ m . [2]
During a toy fair in November, the price increased by 25%. After the toy fair, the sales of the figurine dropped by 25% in March. After the sales, did the price of the figurine dropped back to its original price? Explain your answer.



5. The figure below shows a rectangular children's swimming pool that is 15 m long, 8 m wide and 0.9 m deep. On one end of the pool, along the width, a flight of three steps is built. Each step is 0.3 m in height and 0.4 m in width.



Find the

- (a) depth of the swimming pool, [1]
 - (b) volume of water needed to fill the pool [3]
 - (c) total surface area of the water in contact with the sides of the pool. [2]
6. **Answer the whole of this question on the graph paper provided.**

Given the equation $y = 2x$,

x	0	4	8
y	0	a	16

- (a) Find the value of a . [1]
- (b) Using a scale of 2 cm to represent 1 unit on the x-axis and 1 cm to represent 1 unit on the y-axis, draw the graph of $y = 2x$ for $0 \leq x \leq 8$. [3]
- (c) From the graph, find the value of x when $y = 5$. [1]
- (d) Find the gradient of the graph. [1]



7. **Answer the whole of this question on the blank paper provided.**

Indiana Jeromes was looking for a treasure chest buried in a field $ABCD$. His father Benry decided to help him map out the dimensions of the field $ABCD$. The dimensions are as follow. $AB = 9$ cm, $BC = 4$ cm, $AD = 7$ cm, $\angle ABC = 60^\circ$ and $\angle BAD = 90^\circ$

- (a) Construct the quadrilateral field $ABCD$ on your writing paper [4]
- (b) (i) Draw the angle bisector of $\angle BAD$, [2]
 - (ii) Draw the perpendicular bisector of AB . [2]
- (iii) The treasure chest is located at the intersection of the 2 [1]
bisectors. Label the location of the treasure chest as T and
measure the length of BT .

– END OF PAPER –

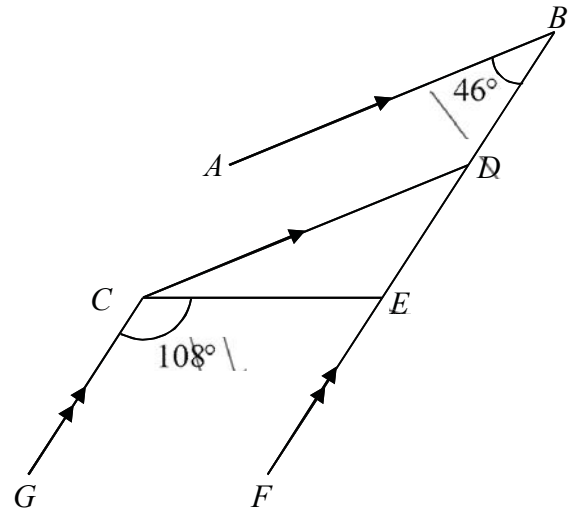
Please check your work.



MARK SCHEME

1(a)	$998 \times 72 \approx 1000 \times 72 \text{ or } \approx 1000 \times 70$ $= 72000 \qquad \qquad \qquad = 70000$	M1 A1																				
(b)	$\sqrt[3]{995} + \sqrt{50} = \sqrt[3]{1000} + \sqrt{49}$ $= 10 + 7 = 17$	M1 A1																				
2	$\frac{\sqrt[3]{1798 \times 0.045}}{6.31 - 5.5} = 5.3396859...$ $= 5.340$	M1 A1																				
3(a)	$72 \text{ km/h} = \frac{72 \text{ km}}{1 \text{ h}} = \frac{72 \times 1000 \text{ m}}{1 \times 60 \times 60 \text{ s}}$ $= 20 \text{ m/s}$	M1 A1																				
(b)	$2400000 \text{ cm}^3 = 2400000 \div 100 \div 100 \div 100$ $= 2.4 \text{ m}^3$	M1 A1																				
4(a)	19, 24	B1																				
(b)	$T_1 = 5(1) - 11 = -6$ $T_2 = 5(2) - 11 = -1$ \vdots $T_n = 5n - 11$	B1																				
(c)	$T_{100} = 5(100) - 11$ $= 489$	M1 A1 ECF																				
5	<table><thead><tr><th>Drones</th><th>Packages</th><th>Hours</th></tr></thead><tbody><tr><td>3</td><td>9</td><td>2</td></tr><tr><td>5</td><td>15</td><td>2</td></tr><tr><td>5</td><td>30</td><td>4</td></tr></tbody></table> Answer : 4	Drones	Packages	Hours	3	9	2	5	15	2	5	30	4	M1 A1								
Drones	Packages	Hours																				
3	9	2																				
5	15	2																				
5	30	4																				
6(a)	<table><tbody><tr><td>2</td><td>108</td><td>162</td><td>54</td></tr><tr><td>3</td><td>54</td><td>81</td><td>27</td></tr><tr><td>3</td><td>18</td><td>27</td><td>9</td></tr><tr><td>3</td><td>6</td><td>9</td><td>3</td></tr><tr><td></td><td>2</td><td>3</td><td>1</td></tr></tbody></table> HCF = 54	2	108	162	54	3	54	81	27	3	18	27	9	3	6	9	3		2	3	1	M1 A1
2	108	162	54																			
3	54	81	27																			
3	18	27	9																			
3	6	9	3																			
	2	3	1																			
(b)	Total number of cookies in each box = $2 + 3 + 1 = 6$	B1																				



7(a)	$2a - \frac{3}{5}(15b - 10a)$ $= 2a - 9b + 6a$ $= 8a - 9b$	M1 A1
(b)	$4(c + 3d) + 7(2c - d)$ $= 4c + 12d + 14c - 7d$ $= 18c + 5d$	M1 A1
8(a)	$24x - 34xy = 2x(12 - 17y)$	B1
(b)	$12ab - 15a + 24ac = 3a(4b - 5 + 8c)$	B1
9	<p>Area of Circle = $\pi r^2 = \pi(5)^2 = 78.54 \text{ cm}^2$</p> <p>Area of trapezium = $\frac{18+26}{2} \times 10 = 220 \text{ cm}^2$</p> <p>Area of shaded region = $220 - 78.54 \approx 141 \text{ cm}^2$</p>	M1 M1 A1
10	 <p>(a) $\angle CED = \angle GCE$ (alt \angles, $GC \parallel FB$) $= 108^\circ$</p> <p>(b) $\angle CDB = 180^\circ - \angle DBA$ (int \angles, $CD \parallel AB$) $= 180^\circ - 46^\circ$ $= 134^\circ$</p> <p>(c) $\angle DCG = \angle CDB$ (alt \angles, $GC \parallel FB$) $= 134^\circ$ reflex $\angle DCG = 360^\circ - 134^\circ$ (\angles at a pt) $= 226^\circ$</p>	<p>Deduct one mark overall if no reasons given.</p> <p>M1 A1</p> <p>M1 A1</p> <p>M1 M1 A1</p>
11	<p>Sum of int. angles = $(n - 2) \times 180^\circ$</p> <p>$1080^\circ = (n - 2) \times 180^\circ$</p> <p>$n - 2 = \frac{1080^\circ}{180^\circ}$</p> <p>$n = 6 + 2$</p> <p>$n = 8$</p>	M1 M1



	1 ext. angle = $\frac{360^\circ}{8}$ = 45°	A1
12	Location: Emma conducted her survey near an office while Rupert was near a school/interchange. People surveyed: Emma chose mostly working adults to survey while Rupert chose students.	B1 for each correct reason, up to B2



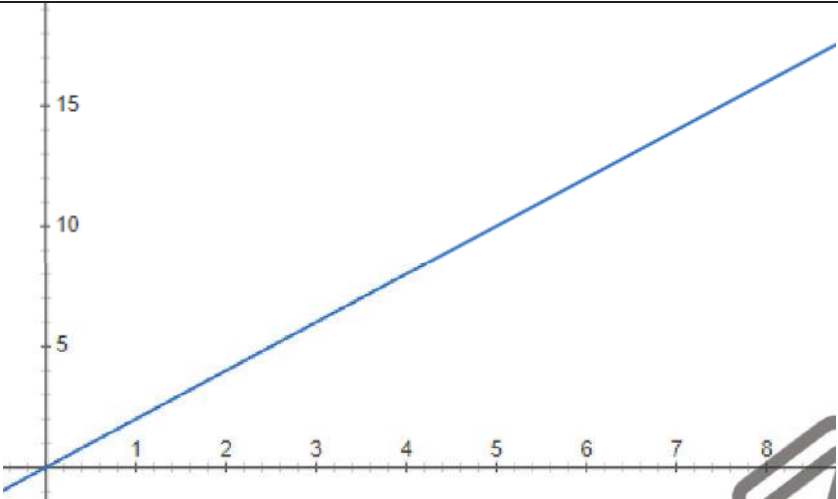
MARK SCHEME

1(a)(i)	$-8x = 8$ $x = -1$	M1 A1
(a)(ii)	$\frac{15x}{6} - \frac{2x+4}{6} = 5$ $\frac{15x-2x-4}{6} = 5$ $13x - 4 = 30$ $13x = 34$ $x = 2\frac{8}{13}$ (or 2.62)	M1 M1 A1
(b)(i)	$3x \leq -9$ $x \leq -3$	M1 A1
(b)(ii)	-4	B1
2(a)	60m/min 3600m/hr 3.6 km/hr	M1 A1
(b)	$12 \div 8 = 20$ 20×60 $= 1200\text{m}$	B1
(c)	$\frac{1200}{12 \div 5 + 8}$ $= 48\text{m/min}$	M1 A1
(d)	$60 \times \frac{4}{12}$ $= 20\text{min}$ $0640 + 20 = 0700$ Nathiel reached first	M1 A1
3	$(5-2)180$ $= 540$ $540/5$ $= 108$	M1 A1



(b)	$360 - 108 - 90$ $= 162$	M1 A1
(c)	$180 - 162$ $= 18$ $360/18$ $= 20$	M1 A1
4(a)	$3x + x + x - 100$ $5x - 100$	B1
(ii)	$5x - 100 = 2605$ $x = 541$	B1
(iii)	$\frac{3}{30} \times 100\%$ $= 10\%$ 10% same throughout	M1 A1
b)	$\frac{240}{100} \times 12$ $= 28.8 \text{ million}$ or 28800000	M1 A1
(c)	Nov toy price = ₹1.25m After discount $= 0.75$ (₹1.25m) 0.9375m It became cheaper	M1 A1
5(a)	0.9m	B1
(ii)	Volume of steps in water $= 0.3 \times 0.4 \times 3 \times 8$ 2.88 Volume of water $(13.8 \times 8 \times 0.9) - 2.88$ $= 102.24$ Accept other ways: 1m for calculation of water above steps 1m for calculation of cuboid pool excluding steps 1m for final ans	M1 M1 A1
iii)	Surface area $(14.6 \times 8) + 2(14.6 \times 0.9 - 0.3 \times 0.4 \times 3) + 2(0.9 \times 8)$ $= 157$ (3sf)	M1 A1



6a)	$a = 8$	B1
(b)	 <p>1m for correct plot with label 1m for correct scale x axis 1m for correct scale y axis</p>	
(c)	$x = 2.5$	B1
d)	2	B1
7(a)		



**EAST VIEW SECONDARY SCHOOL
SECOND SEMESTRAL EXAMINATION 2017
SECONDARY ONE EXPRESS**

CANDIDATE NAME				
CLASS		INDEX NUMBER		

MATHEMATICS

4048/02

Paper 2

11 October 2017

Total Marks: 50

1 Hours 15 Minutes

Additional Materials: Writing Paper (4 sheets) and Graph Paper (1 sheet)

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all your answer sheets to be handed in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

Calculators should be used where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use

50

This paper consists of **6** printed pages (including the cover page)

Setter: Mdm Humairah

Mathematical Formulae*Compound interest*

$$\text{Total amount} = P \left(1 + \frac{r}{100} \right)^n$$

Mensuration

$$\text{Curved surface area of a cone} = \pi r l$$

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$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$

Answer **all** the questions.

1 The cash price of a new car is \$175 000.

- (a) Sarah buys the car on hire purchase. She pays a deposit of one fifth of the cash price. She then pays \$1300 monthly for 10 years. What is the total amount that Sarah pays for the car? [3]
- (b) The original value of the car is its cash price of \$175 000. Each year the value of the car decreases by 10% of its value at the start of the year. At the end of three years, Sarah decides to sell the car. Calculate the overall percentage reduction in the value of the car compared with its original value. [3]
-

2 Marcus, Ali and Tan shared a sum of money in the ratio 11 : 4 : 1.

- (a) Given that Ali received \$4.80 more than Tan, find the sum of money shared by the three of them. [2]
- (b) Marcus distributed part of his money equally to Ali and Tan and was left with \$2.60. Find the new ratio of Marcus's money to Ali's money to Tan's money. [3]
-

- 3 There are 16 adults and 10 children going to the Singapore Flyer. You are required to book taxis for them. Below is the taxi seating capacity given to you. At least one adult must accompany the children.

Our Products & Services > Seating Capacity



For Hyundai Sonatas, Hyundai i40s, Toyota Prius and LimoCab Taxis (4-seater)

Four adults



Three adults + Two children



Two adults + Three children



One adult + Four children



Six children



Source: https://www.cdgtaxi.com.sg/commuters_seating_capacity.mvn?cid=256

- (a) What is the minimum number of taxis you need? Show all your working clearly. [3]
- (b) There is a change of number of people going to the Singapore Flyer. An additional 4 adults and 2 children would like to go too. How many more taxis do you need to book? [2]

- 4 Two different sizes of cylindrical fruit cans are shown below. The small can has a diameter of 12 cm and a height of 13 cm. The prices of the fruit cans are given on the respective cans.



- (a) Find the volume of the small can. [2]
- (b) Which size of canned fruit gives the better value? Show all the working clearly of can. [3]
- (c) What is the maximum number of small cans that can fit into a rectangular packaging of size 72 cm by 24 cm and height of 39 cm? [3]

- 5 There are $2(k - 3)$ peaches in a box. There are 3 more apples than peaches and twice as many oranges as peaches in the same box.
- (a) Express the number of apples in term of k . [1]
 - (b) Express the number of oranges in term of k . [1]
 - (c) If there are a total of 35 fruits in the box, how many peaches are there in the box? [3]
 - (d) If the cost of a peach, an apple and an orange is \$1.10, \$0.20 and \$0.50 respectively, what is the cost of one box of fruits? [3]
 - (e) How many numbers of boxes of fruits can May purchase with \$42? [2]
-
- 6 An aeroplane travelled a distance of 1130 km from Singapore to Jakarta. For the first x hour of its journey, the aeroplane travelled at a constant speed of 350 km/h. The speed of the aeroplane was increased by 80 km/h for the remaining $\frac{x}{2}$ hour of its journey.
- (a) Write down the total distance travelled for the first x hour of its journey, in terms of x . [1]
 - (b) Write down the distance travelled by the aeroplane in the remaining $\frac{x}{2}$ hour of its journey, in terms of x . [2]
 - (c) Find the value of x . Hence, find the total time, in hours, taken for the whole journey. [3]
 - (d) Find the average speed, in km/h, for the whole journey, correct to 2 decimal places. [2]
-

7 Answer the whole of this question on a sheet of graph paper.

The variables x and y are connected by the equation

$$y = 2 - 2x.$$

Some corresponding values of x and y , are given in the table below.

x	-2	-1	0	1	2
y	p	4	2	q	-2

- (a) Calculate the value of p and of q . [2]
- (b) Using a scale of 2 cm to 1 unit for the y -axis and 4 cm to 1 unit for the x -axis, draw the graph $y = 2 - 2x$ for $-2 \leq x \leq 2$. [3]
- (c) Using your graph, find the value of x when $y = 3.5$. [1]
- (d) On the same axes, draw the line $x = -1.5$. Find the coordinates of the point of intersection of the two lines. [2]

--- End of Paper ---

Answer **all** the questions.

- 1 (a) Consider the following numbers.

$$\sqrt{64}, \quad \frac{2}{5}, \quad 121, \quad -1.2, \quad 79, \quad \sqrt{2}$$

Write down the prime number.

Answer (a) **79** [1]

- (b) By rounding each number to 1 significant figure, estimate the value of $\frac{251.76}{2.65 + 3.295}$.

You must show your working clearly.

$$\frac{300}{3 + 3} \quad [M1]$$

Answer (b) **50** [2]

- 2 The first four terms of a sequence are 12, 15, 18, 21

- (a) Write down the 6th term.

Answer (a) 6th term = **27** [1]

- (b) Write down the general term, T_n for the sequence.

Answer (b) $T_n =$ **$3n + 9$** [1]

- 3 When written as the product of their prime factors,

$$p = 2^3 \times 3^n,$$

$$q = 5^2 \times 13^3,$$

$$r = 2^3 \times 5 \times 7^2.$$

Find

- (a) the value of the n if the cube root of p is 2×3^2 ,

Answer (a) $n = \dots\dots\dots 6 \dots\dots\dots$ [1]

- (b) the LCM of q and r , giving your answer as the product of its prime factors,

Answer (b) $2^3 \times 5^2 \times 7^2 \times 13^3$
 $\dots\dots\dots$ [1]

- (c) the greatest number that will divide q and r exactly.

Answer (c) $\dots\dots\dots 5 \dots\dots\dots$ [1]

- 4 (a) Jordan took two tests.

In a second test, Jordan scored 18 marks.

The second test mark is an improvement of 20% of the first test mark.

Find Jordan's first test mark.

$$\frac{18}{1.2} \quad [M1]$$

Answer (a)15..... marks [2]

- (b) Convert 56 m/s to km/h.

Answer (b)201.6..... km/h [1]

- (c) Given that the rate of exchange between Euro and Singapore dollars is €1 = S\$1.59.

Find the amount of Euro dollars one can receive from S\$300.

Give your answer to 2 decimal places.

Answer (c)188.70..... Euros [1]

5 Given that $x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$,

find the value of x when $a = 4$, $b = -2$ and $c = -3$. Give your answer to 3 decimal places.

$$x = \frac{-(-2) + \sqrt{(-2)^2 - 4(4)(-3)}}{2(4)} \quad [M1]$$

$$= \dots \text{Answer } x = \underline{\quad 1.151 \quad} \quad [2]$$

6 In the diagram below, $AB \parallel CD \parallel EF$. $\angle ABC = 42^\circ$ and $\angle CEF = 136^\circ$.

Find

(a) $\angle BCD$,

$$\text{Answer (a)} \quad \angle BCD = \underline{\quad 42^\circ \quad} \quad [1]$$

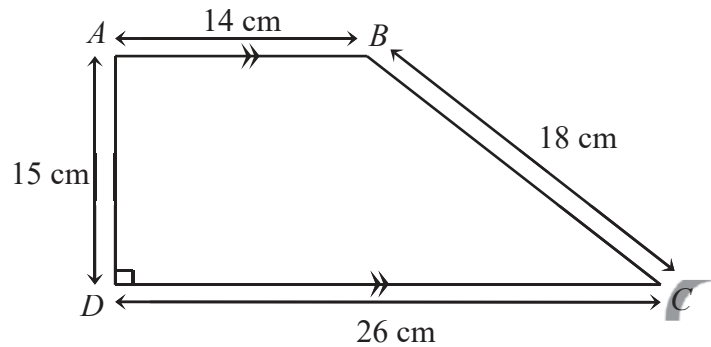
(b) $\angle DCE$,

$$\text{Answer (b)} \quad \angle DCE = \underline{\quad 44^\circ \quad} \quad [1]$$

(c) the reflex $\angle BCE$.

$$\text{Answer (c)} \quad \text{reflex } \angle BCE = \underline{\quad 274^\circ \quad} \quad [1]$$

- 7 In the trapezium $ABCD$, $AB \parallel DC$, AD is perpendicular to DC , $AB = 14$ cm, $BC = 18$ cm, $CD = 26$ cm and $AD = 15$ cm.



Find the area of trapezium $ABCD$.

$$\frac{1}{2}(14+26)(15) \quad [M1]$$

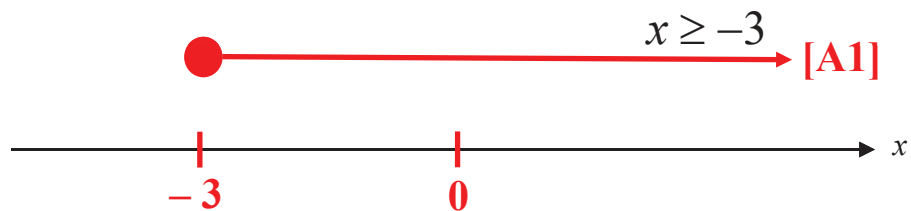
Answer **300** cm^2 [2]

- 8 Solve $-2x - 10 \leq -4$ and show the solution on a number line.

$$-2x \leq 6$$

$$-x \leq 3 \quad [M1]$$

$$x \geq -3 \quad [M1]$$



[3]

- 9 (a) Using the line segment given below, AC , construct a triangle ABC , such that $BC = 10$ cm and $\angle BAC = 40^\circ$.



On the same diagram,

- (b) construct the angle bisector of $\angle ACB$. [1]
- (c) construct the perpendicular bisector of AC . [1]

- 10 (a) Factorise $8cd - 2cd^2$ completely.

Answer (a) $2cd(4 - d)$ [1]

- (b) Simplify $3 - 3(2x - 3)$.

$$3 - 6x + 9 \quad [M1]$$

Answer (b) $12 - 6x$ [2]

- (c) Simplify $\frac{2x-1}{3} - \frac{x+3}{2}$.

$$\frac{4x - 2 - 3x - 9}{6} \quad [M1]$$

Answer (c) $\frac{x-11}{6}$ [2]

- 11 (a) Simplify $\frac{(x-2)(x+5)}{2x^2(x-4)} \times \frac{4(x-4)^2}{(x+5)^2}$ completely.

$$\frac{(x-2)}{x^2} \times \frac{2(x-4)}{(x+5)} \quad [M1]$$

Answer (a) $\frac{2(x-2)(x-4)}{x^2(x+5)}$ [2]

- (b) Simplify $\frac{8x^2}{5(x-7)} \div \frac{2x^2}{(x-7)^2(x+7)}$ completely.

$$\frac{8x^2}{5(x-7)} \times \frac{(x-7)^2(x+7)}{2x^2} \quad [M1]$$

$$\frac{4(x-7)(x+7)}{5}$$

Answer (b) 5 [2]

- 12 (a) Express 35 m^2 in cm^2 .

Answer (a) 350 000 cm^2 [1]

- (b) The ratios of $a : b$ and $a : c$ are given below.

$$a : b = 2 : 3$$

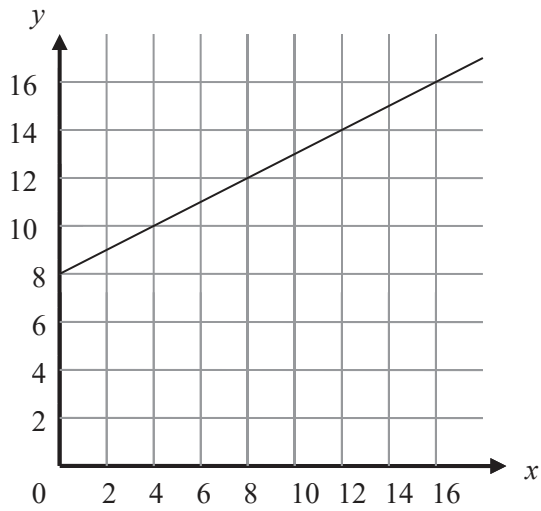
$$a : c = 3 : 5$$

Find the ratio of $a : b : c$.

$$6 : 9 : 10 \quad [B2]$$

Answer (b) : : [2]

13 The diagram below shows a straight line.



(a) Find the gradient of this straight line.

Answer (a) gradient = **0.5** [1]

(b) Write down the equation of this straight line in the form $y = mx + c$, where m is the gradient of the line, and c is its y -intercept.

Answer (b) $y =$ **$0.5x + 8$** [1]

End of Paper



**EAST VIEW SECONDARY SCHOOL
SECOND SEMESTRAL EXAMINATION 2017
SECONDARY ONE EXPRESS**

CANDIDATE NAME	MARKING SCHEME			
CLASS		INDEX NUMBER		

MATHEMATICS

4048/02

Paper 2

13 October 2017

Total Marks: 50

1 Hours 15 Minutes

Additional Materials: Writing Paper (4 sheets) and Graph Paper (1 sheet)

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all your answer sheets to be handed in.
Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

Calculators should be used where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use

50

This paper consists of **6** printed pages (including the cover page)

Setter: Mdm Humairah

Mathematical Formulae

Compound interest

$$\text{Total amount} = P \left(1 + \frac{r}{100} \right)^n$$

Mensuration

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

$$\text{Volume of a cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3$$

$$\text{Area of triangle } ABC = \frac{1}{2} ab \sin C$$

$$\text{Arc length} = r\theta, \text{ where } \theta \text{ is in radians}$$

$$\text{Sector area} = \frac{1}{2} r^2 \theta, \text{ where } \theta \text{ is in radians}$$

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Statistics

$$\text{Mean} = \frac{\sum fx}{\sum f}$$

$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$

Answer **all** the questions.

1 The cash price of a new car is \$175 000.

- (a) Sarah buys the car on hire purchase. She pays a deposit of one fifth of the cash price. She then pays \$1300 monthly for 10 years. What is the total amount that Sarah pays for the car? [3]
- (b) The original value of the car is its cash price of \$175 000. Each year the value of the car decreases by 10% of its value at the start of the year. At the end of three years, Sarah decides to sell the car. Calculate the overall percentage reduction in the value of the car compared with its original value. [3]

S/N	Answer	Mark	Marker Report
1(a)	Deposit = $\$175000 \times \frac{1}{5} = \35000	[M1]	
	Total monthly for 10 years = $\$1300 \times 12 \times 10 = \156000	[M1]	
	Total amount that Sarah pays for the car $\$35000 + \$156000 = \$191000$	[A1]	
1(b)	At first year = \$175000 At second year = $\$175000 \times 0.9 = \157500 At third year = $\$157500 \times 0.9 = \141750	[M1]	
	Reduction price = $\$175000 - \$141750 = \$33250$	[M1]	
	Percentage reduction = $\frac{33250}{175000} \times 100\% = 19\%$	[A1]	

2 Marcus, Ali and Tan shared a sum of money in the ratio 11 : 4 : 1.

(a) Given that Ali received \$4.80 more than Tan, find the sum of money shared by the three of them. [2]

(b) Marcus distributed part of his money equally to Ali and Tan and was left with \$2.60. Find the new ratio of Marcus's money to Ali's money to Tan's money. [3]

S/N	Answer	Mark	Marker Report
2(a)	<p>Marcus : Ali : Tan 11 : 4 : 1</p> <p>4-1 = 3 3 units = \$4.80 1 unit = $\\$4.80 \div 3 = \\1.60 11+4+1 = 16 16 units = $\\$1.60 \times 16 = \\25.60</p> <p>The sum of money shared by the three of them is \$25.60</p>	<p>[M1]</p> <p>[A1]</p>	
2(b)	<p>At first,</p> <p>Marcus = $\\$1.60 \times 11 = \\17.60 $\\$17.60 - \\$2.60 = \\$15.00$ $\\$15.00 \div 2 = \\7.50</p> <p>Ali and Tan received \$7.50 each.</p>	[M1]	
	<p>Ali = $(\\$1.60 \times 4) + \\$7.50 = \\$13.90$ Tan = $\\$1.60 + \\$7.50 = \\$9.10$</p>	[M1]	
	<p>Marcus : Ali : Tan 2.60 : 13.90 : 9.10 26 : 139 : 91</p>	[A1]	

- 3 There are 16 adults and 10 children going to the Singapore Flyer. You are required to book taxis for them. Below is the taxi seating capacity given to you. At least one adult must accompany the children.

- (a) What is the minimum number of taxis you need? Show all your working clearly. [3]
- (b) There is a change of number of people going to the Singapore Flyer. 4 adults and 2 children would like to go too. How many more taxis do you need to book? [2]

S/N	Answer	Mark	Marker Report																								
3(a)	Note: We cannot take one child only as we do not know how the seating capacity for one child to how many adults. Child cannot go alone must be accompany by an adult.																										
	<table><tr><th>Child</th><th>Adult</th><th>Taxi</th></tr><tr><td>4</td><td>1</td><td>1</td></tr><tr><td>4</td><td>1</td><td>1</td></tr><tr><td>2</td><td>3</td><td>1</td></tr><tr><td>0</td><td>4</td><td>1</td></tr><tr><td>0</td><td>4</td><td>1</td></tr><tr><td>0</td><td>3</td><td>1</td></tr><tr><td>10</td><td>16</td><td>6</td></tr></table> <p>or</p> <p>6 is the minimum number of taxi needed.</p>	Child	Adult	Taxi	4	1	1	4	1	1	2	3	1	0	4	1	0	4	1	0	3	1	10	16	6	[B3]	
Child	Adult	Taxi																									
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	or				
	Child	Adult	Taxi		
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	2	3	1		
	2	3	1		
	2	3	1		
	2	3	1		
	2	3	1		
	0	2	1		
	12	20	7		
	7 – 6 = 1				
	1 more taxi needed.				

- 4 Two different sizes of cylindrical fruit cans are shown below. The small can has a diameter of 12 cm and a height of 13 cm. The prices of the fruit cans are given on the respective cans.



- (a) Find the volume of the small can. [2]
- (b) Which size of canned fruit gives the better value? Show all the working clearly of can. [3]
- (c) What is the maximum number of small cans that can fit into a rectangular packaging of size 72 cm by 24 cm and height of 39 cm? [3]

S/N	Answer	Mark	Marker Report
4(a)	$\text{Volume of the small can} = \pi \times r^2 \times h$ $= \pi \times (6)^2 \times 13$ $= 1470.265 \text{ cm}^3$ $= 1470 \text{ cm}^3$	[M1] [A1]	
4(b)	$\text{Small can per cm}^3 = \$4.80 \div 1470.265 = \$0.003264717$ $\text{Large can per cm}^3 = \$18.80 \div 11310 = \$0.001662245$ <p>Large can gives the better value based on per cm³.</p>	[M1] [M1] [A1]	
4(c)	$72 \div 12 = 6$ $24 \div 12 = 2$ $39 \div 13 = 3$ $6 \times 2 \times 3 = 36$ <p>36 cans is the maximum number to fit into a rectangular packaging.</p>	[B2] [A1]	

- 5 There are $2(k - 3)$ peaches in a box. There are 3 more apples than peaches and twice as many oranges as peaches in the same box.

- (a) Express the number of apples in term of k . [1]
- (b) Express the number of oranges in term of k . [1]
- (c) If there are a total of 35 fruits in the box, how many peaches are there in the box? [3]
- (d) If the cost of a peach, an apple and an orange is \$1.10, \$0.20 and \$0.50 respectively, what is the cost of one box of fruits? [3]
- (e) How many numbers of boxes of fruits can May purchase with \$42? [2]

S/N	Answer	Mark	Marker Report
5(a)	$\text{peaches} = 2(k - 3) = 2k - 6$ $\text{apples} = 2(k - 3) + 3 = 2k - 6 + 3 = 2k - 3$	[B1]	
5(b)	$\text{oranges} = 2(2k - 6) = 4k - 12$	[B1]	
5(c)	$(2k - 6) + (2k - 3) + (4k - 12) = 35$ $2k - 6 + 2k - 3 + 4k - 12 = 35$ $8k - 21 = 35$ $8k = 35 + 21$ $8k = 56$ $k = 56 \div 8$ $k = 7$ $\text{peaches} = 2k - 6 = 2(7) - 6 = 8$	[M1] [M1] [A1]	
5(d)	$\text{apples} = 2k - 3 = 2(7) - 3 = 11$ $\text{oranges} = 4k - 12 = 4(7) - 12 = 16$ $\text{total cost for one box}$ $= 8(1.10) + 11(0.20) + 16(0.50) = \19.00	[M1] [M1] [A1]	
5(e)	$\$42.00 \div \$19.00 = 2 \frac{4}{19}$ 2 number of boxes that May is able to purchase with \$42.	[M1] [A1]	

- 6 An aeroplane travelled a distance of 1130 km from Singapore to Jakarta. For the first x hour of its journey, the aeroplane travelled at a constant speed of 350 km/h. The speed of the aeroplane was increased by 80 km/h for the remaining $\frac{x}{2}$ hour of its journey.

- (a) Write down the total distance travelled for the first x hour of its journey, in terms of x . [1]
- (b) Write down the distance travelled by the aeroplane in the $\frac{x}{2}$ hour of its journey, in terms of x . [2]
- (c) Find the value of x . Hence, find the total time, in hours, taken for the whole journey. [3]
- (d) Find the average speed, in km/h, for the whole journey, correct to 2 decimal places. [2]

S/N	Answer	Mark	Marker Report
6(a)	First part of journey Speed = 350 km/h Time taken = x hour Total distance travelled = $350x$ km	[B1]	
6(b)	Second part of journey Speed = 350 + 80 = 430 km/h Time taken = $x/2$ hour Total distance travelled = 430 $\times \frac{1}{2}x = 215x$ km	[M1] [A1]	
6(c)	$350x + 215x = 1130$ $565x = 1130$ $x = 2$ $x + \frac{1}{2}x = 2 + \frac{1}{2}(2) = 3$ Total time taken for the whole journey = 3 hours	[M1] [M1] [A1]	
6(d)	Average speed for the whole journey $= \frac{1130}{3}$ $= 376\frac{2}{3}$ km/h $= 376.67$ km/h	[M1] [A1]	

7 Answer the whole of this question on a sheet of graph paper.

The variables x and y are connected by the equation

$$y = 2 - 2x.$$

Some corresponding values of x and y , are given in the table below.

x	-2	-1	0	1	2
y	p	4	2	q	-2

- (a) Calculate the value of p and of q . [2]
- (b) Using a scale of 2 cm to 1 unit for the y -axis and 4 cm to 1 unit for the x -axis, draw the graph $y = 2 - 2x$ for $-2 \leq x \leq 2$. [3]
- (c) Using your graph, find the value of x when $y = 3.5$. [1]
- (d) On the same axes, draw the line $x = -1.5$. Find the coordinates of the point of intersection of the two lines. [2]

--- End of Paper ---



**JUNYUAN SECONDARY SCHOOL
END OF YEAR EXAMINATION 2017
SECONDARY ONE EXPRESS**

CANDIDATE NAME

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CLASS

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INDEX NUMBER

--	--

MATHEMATICS

4048/01

Paper 1

9 October 2017

1 hour

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

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The use of calculator is not allowed for this paper.

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The number of marks is given in brackets [] at the end of each question or part question.
The total of the marks for this paper is 50.

For Examiner's Use

This document consists of **12** printed pages (including the Cover Sheet).

[Turn over

Mathematical Formulae*Compound interest*

$$\text{Total amount} = P \left(1 + \frac{r}{100} \right)^n$$

Mensuration

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

$$\text{Volume of a cone} = \frac{1}{3} \pi r^2 h$$

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$$\text{Area of triangle } ABC = \frac{1}{2} ab \sin C$$

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Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Statistics

$$\text{Mean} = \frac{\sum fx}{\sum f}$$

$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$

- 1 The numbers 540 and 7056, written as a product of their prime factors, are

$$540 = 2^2 \times 3^a \times 5 \quad \text{and} \quad 7056 = 2^4 \times 3^2 \times 7^2.$$

Find

- (a) the value of a ,

Answer $a = \dots\dots\dots$ [1]

- (b) $\sqrt[3]{7056}$.

Answer $\dots\dots\dots$ [1]

- 2 Factorise completely $4ax + 12by - 16ay - 3bx$.

Answer $\dots\dots\dots$ [2]

- 3 (a) Express $\frac{23}{100}\%$ as a decimal.

Answer [1]

- (b) Arrange the following in ascending order.

$$0.\dot{4} \quad \frac{1}{4} \quad 44\% \quad 0.4^2$$

Answer , [2]
smallest largest

- 4 A Singapore twenty-cent coin has a diameter of 21 mm.
A British five-pence coin has a diameter of 18 mm.
Shannon placed one row of twenty-cent coins and one row of five-pence coins on the table as shown below.



Finding the minimum number of coins in each row such that the two rows are of the same length.

Answer twenty-cent coins
..... five-pence coins [3]

- 5 Keith keeps track of his monthly business profits and losses over a period of five months given in the table below.

Month	Profit
April	−\$2800
May	−\$1200
June	\$900
July	\$1500
August	\$1000

- (a) Find his total losses from April to August.

Answer \$.....[1]

- (b) If he makes a total profit of \$2000 from April to September, what is his profit for September?

Answer \$.....[2]

- 6 Mr Tan is presently 4 times as old as his son Kenneth.

- (a) If Kenneth is x years old now, write down Mr Tan's age in terms of x .

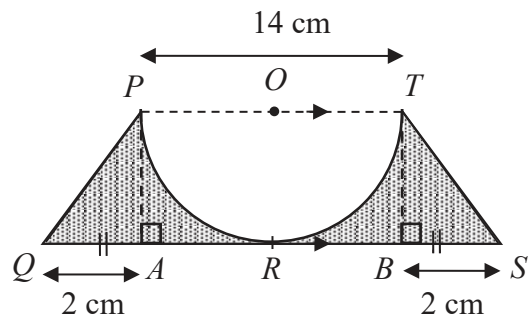
Answer years old [1]

- (b) In 20 years' time, Mr Tan will be 2 times as old as Kenneth.

Form an equation in x , and hence find Mr Tan's age in 20 years' time?

Answer years old [2]

- 7 The figure below shows a trapezium $PQST$.



PT is the diameter of a circle with centre O .
 $PT = 14$ cm, $QA = BS = 2$ cm.

Find the area of the shaded region. Take $\pi = \frac{22}{7}$.

Answer cm^2 [3]

- 8 Emilia took $\frac{1}{3}$ h to cycle from her house to the library at a speed of 12 km/h.
Upon reaching the library, she suddenly remembered that she has forgotten to feed her cat. She rushed home at double the speed which she cycled from her house to the library.

(a) Find the distance between Emilia's house and the library.

Answer km [1]

(b) Find the average speed for Emilia's entire journey.

Answer km/h [2]

- 9 (a) Solve the inequality $3x + 16 \geq -5x + 24$.

Answer [2]

(b) Hence, write down

(i) the smallest odd number,

Answer [1]

(ii) the smallest prime number.

Answer [1]

10 At a bakery, the prices of a plain waffle and a peanut butter waffle are in the ratio 5 : 6.

- (a)** Given that the prices of a plain waffle and a chocolate waffle are in the ratio 3 : 4, find the ratio of the price of a peanut butter waffle to the price of a chocolate waffle.
Give your answer in the simplest form.

Answer : [2]

- (b)** The difference in price between the plain waffle and the peanut butter waffle is \$0.30.

Find the price of a peanut butter waffle.

Answer \$..... [2]

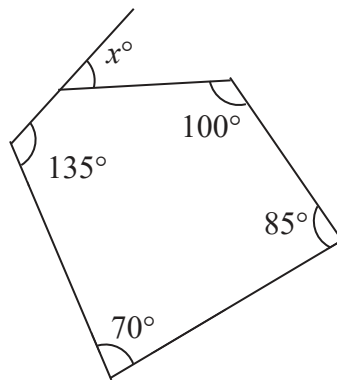
- 11 (a) Solve the equation $4x - 5 = 3(3 + 2x)$.

Answer $x = \dots\dots\dots$ [2]

- (b) Simplify $\frac{3n - m}{4} - \frac{2n - m}{3}$.

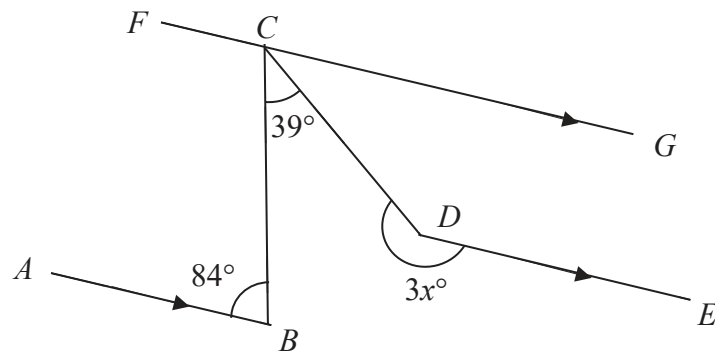
Answer $\dots\dots\dots$ [2]

- 12 (a) Find the value of x in the diagram shown below.



Answer $x = \dots\dots\dots$ [2]

- (b) In the diagram, lines AB , DE and FCG are parallel.
 $\angle ABC = 84^\circ$ and $\angle BCD = 39^\circ$.



Find the value of x , stating all reasons clearly.

Answer $x = \dots\dots\dots$ [3]

- 13** The birth weight of a newborn baby girl is 2 800 g.
During the first year, her weight increases by 480 g every month.

(a) Write down her weight when she is

(i) 1 month old,

Answer g[1]

(ii) 2 months old.

Answer g[1]

(b) Find an expression for her weight when she is n months old.

Answer [1]

(c) If the girl weighs 8.0 kg when she is m months old, find the value of m .

Answer $m =$ [1]

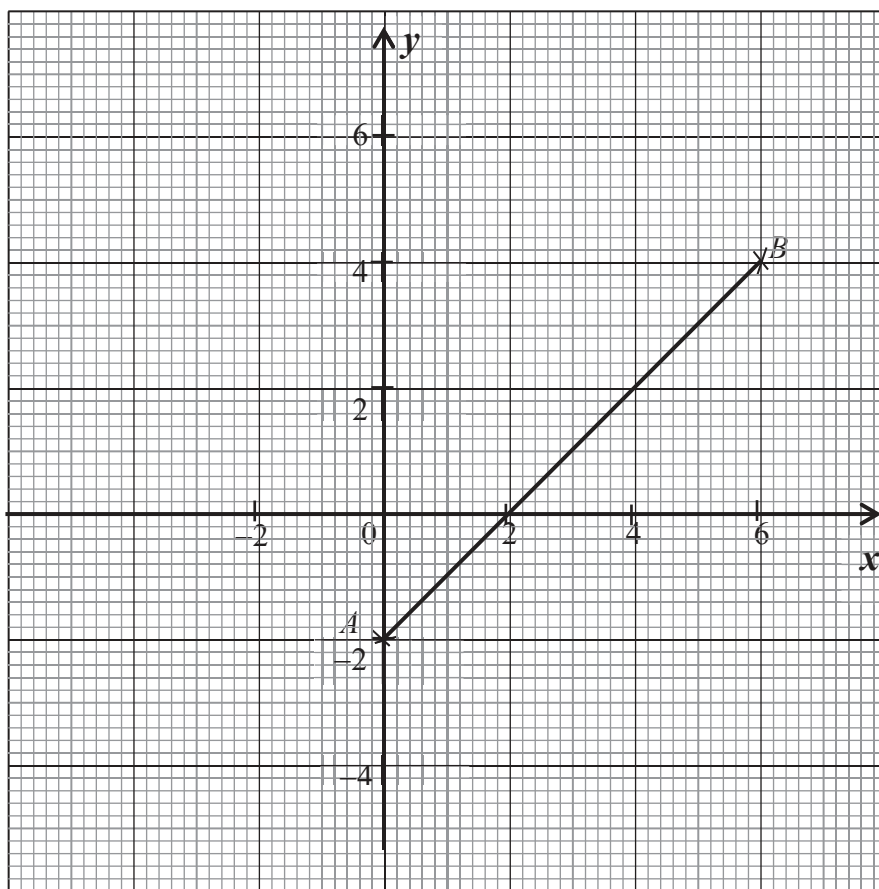
(d) Explain why the expression in **(b)** is not used to find the weight of the girl when she is 10 years old.

Answer.....

..... [1]

- 14 In the diagram below, the points A and B are $(0, -2)$ and $(6, 4)$ respectively.

Answer (b) and (c)



- (a) Find the gradient of the line AB .

Answer [1]

- (b) On the same diagram, draw the lines $y = -2$ and $x = 6$. [2]

- (c) Point C is the point of intersection between the lines $y = -2$ and $x = 6$.

Mark and label point C on the diagram. [1]

- (d) Hence, calculate the area of triangle ABC .

Answer unit^2 [2]

End of Paper



**JUNYUAN SECONDARY SCHOOL
END OF YEAR EXAMINATION 2017
SECONDARY ONE EXPRESS**

CANDIDATE NAME

--

CLASS

--	--	--

INDEX NUMBER

--	--

MATHEMATICS

4048/02

Paper 2

13 October 2017

1 hour 30 minutes

Additional Materials: Writing paper (6 sheets)
Graph paper (1 sheet)
1 String

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use an HB pencil for any diagrams or graphs.
Do not use paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 50.

Hand in your question paper and answer scripts **SEPARATELY**.

Mathematical Formulae*Compound interest*

$$\text{Total amount} = P \left(1 + \frac{r}{100} \right)^n$$

Mensuration

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

$$\text{Volume of a cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3$$

$$\text{Area of triangle } ABC = \frac{1}{2} ab \sin C$$

$$\text{Arc length} = r\theta, \text{ where } \theta \text{ is in radians}$$

$$\text{Sector area} = \frac{1}{2} r^2 \theta, \text{ where } \theta \text{ is in radians}$$

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Statistics

$$\text{Mean} = \frac{\sum fx}{\sum f}$$

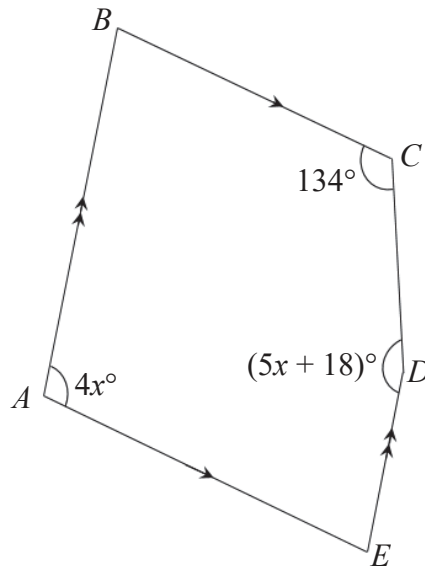
$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$

- 1 (a) Express 1296 as a product of its prime factors. [1]
- (b) Find the largest integer, which is both a factor of 1296 and 672. [2]
-

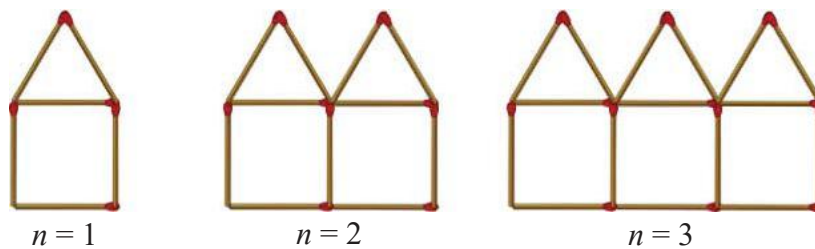
- 2 The diagram below shows a 5-sided polygon.
 AB is parallel to DE , and AE is parallel to BC .
 $\angle BAE = 4x^\circ$, $\angle BCD = 134^\circ$ and $\angle CDE = (5x + 18)^\circ$.

Find the value of x .

[3]



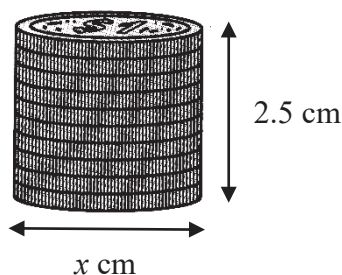
- 3 The diagram shows a sequence of figures formed by matchsticks, where n is the figure number.



- (a) Draw the figure for $n = 4$. [1]
- (b) If T_n is the number of matchsticks in the n th figure, state T_1 , T_2 , T_3 and T_4 . [2]
- (c) Hence, or otherwise, find the general term T_n in terms of n . [1]
- (d) Explain why 99 could not be a possible number for T_n . [1]

- 4 (a) Given that $a = -2$, $b = -\frac{1}{2}$ and $c = \frac{27}{64}$, evaluate $b^2 - 3a^3 + \sqrt[3]{c}$. [1]
- (b) (i) Solve the inequality $3x + 1 \leq \frac{3x - 7}{2}$. [3]
- (ii) Illustrate your solution in (b)(i) on a number line. [1]
- (iii) Find the smallest value of x^2 . [1]
-

- 5 A stack of ten \$1 coins forms a cylinder of base diameter x cm and height 2.5 cm.



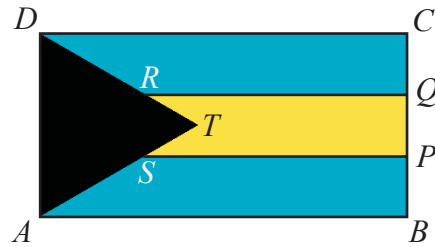
- (a) If the volume of the stack is 11.9 cm^3 , find x . [2]
- (b) Find the total surface area of the stack. [2]
- (c) If six more of the identical \$1 coins are added to the stack, find the percentage increase of the total surface area of the stack. [3]
-

- 6 In a chemical reaction, the volume $V \text{ cm}^3$ of a crystal at time t minutes is given by the function $4V = 3t + 8$ for $0 \leq t \leq 8$.
The table below shows some corresponding values of t and V .

t / min	0	1	2	3	4	5	6	7	8
V / cm^3	2	2.75	3.5	4.25	5	5.75	6.5	7.25	8

- (a) Using a scale of 2 cm to 1 unit on both t - and V -axes, draw the graph of $4V = 3t + 8$ for $0 \leq t \leq 8$. [2]
- (b) Using your graph, find the time that the volume of the crystal is 5.5 cm^3 . [1]
- (c) (i) Find the gradient of the graph. [2]
- (ii) Suggest a physical meaning of the gradient in this graph. [1]
- (d) Suggest what the V -intercept represents in this graph. [1]
-

- 7 The picture below shows the national flag of Bahamas.
 $ABCD$ is a rectangle, $CDRQ$ and $ABPS$ are identical trapeziums and ADT is an equilateral triangle.



The ratio of AB to BC is $3 : 2$, $BP = \frac{1}{3}BC$ and $QR = \frac{4}{5}CD$.

It is given that $AB = 54$ cm.

- (a) Find the lengths of BC , BP and QR . [3]
- (b) Find the area of $CDRQ$. [1]
- (c) Find the ratio of the area of $CDRQ$ to the area of the flag. [2]
- (d) If the area of $PQRTS$ is 216 cm^2 , find the height of the triangle ADT . [2]

- 8 The table below shows the pricing of three taxi companies in Singapore.

GrabCar Economy	Basic fare: \$3.00 Every kilometer or less: \$0.80
Uber X	Basic fare: \$3.00 Every kilometer or less: \$0.45 Per minute: \$0.20
ComfortDelGro	1km or less: \$3.20 Every 400 m thereafter or less up to 10 km: \$0.22 Every 300 m thereafter or less up to 10 km: \$0.22 Every 45 seconds of waiting or less: \$0.22

- (a) Mrs Lim travels from home to work every morning. The distance between her home and work is 6.4 km.

Find how much Mrs Lim pays every morning if she were to travel by GrabCar Economy. [1]

- (b) Michael leaves his house at 0837 and travels by Uber X to Changi Airport, which is 15.5 km away from his house.

- (i) If he arrives at the airport at 0902, find the average speed at which Michael travels, in km/h. [2]

- (ii) Find how much Michael has to pay for his trip. [1]

- (c) ComfortDelGro imposes peak period surcharges as follows.

Monday to Friday 0600 – 0929	25 % of metered fare
Monday to Sunday & Public Holidays 1600 – 2359	

Find how much Michael in (b) has to pay if he were to travel by ComfortDelGro to Changi Airport. [2]

- (d) Khairul wishes to travel from Tampines MRT to ION Orchard, which is 16 km away. The average speed a taxi travels is 80 km/h during non-peak period.

Find which taxi company Khairul should choose for the cheapest fare. [4]

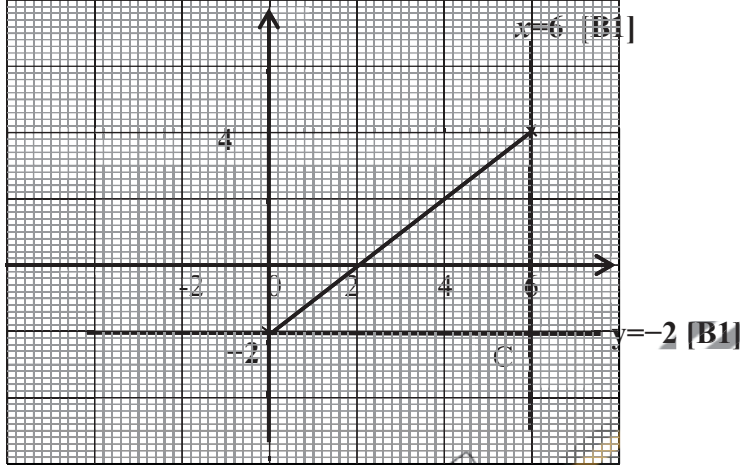
- (e) State any assumption(s) made in your calculations in (d). [1]

End of Paper

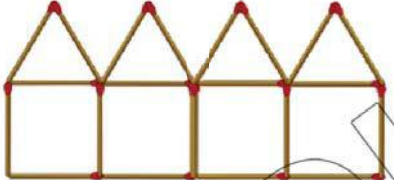
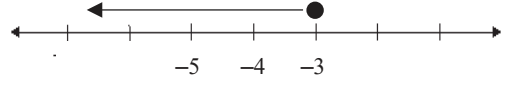
Junyuan Secondary Secondary School
End of Year 2017
Secondary 1 Express
Marking Scheme

1	(a)	$a = 3$	B1	
	(b)	$2^2 \times 3 \times 7 = 84$	B1	
2	(a)	$4ax - 16ay + 12by - 3bx$ $4a(x - 4y) + 3b(4y - x)$ $4a(x - 4y) - 3b(x - 4y)$ $(x - 4y)(4a - 3b)$	M1 A1	
3	(a)	0.0023	M1 A1	
	(b)	$0.4^2 \quad \frac{1}{4} \quad 44\% \quad 0.\dot{4}$	B2	Any mistake – 1m.
4	(a)	$21 = 3 \times 7$ $18 = 2 \times 3^2$ $\text{LCM} = 2 \times 3^2 \times 7 = 126$ $\frac{126}{21} = 6 \text{ twenty - cents coins}$ $\frac{126}{18} = 7 \text{ five - pence coins}$	M1 (LCM) A1 A1	
5	(a)	$-2800 + (-1200) + 900 + 1500 + 1000 = -\600 $\text{Total loss} = \$600$	B1	Follow through from (a)
	(b)	$2000 - (-600)$ $= \$2600$ $\text{Profit for Sep} = \2600	M1 A1	
6	(a)	$4x$	B1	
	(b)	$4x + 20 = 2(x + 20)$ $4x + 20 = 2x + 40$ $2x = 20$ $x = 10$ $\therefore 20 \text{ years time} = 4(10) + 20 = 60 \text{ years old}$	M1 A1	
7		$\text{Area of trapezium } PQST$ $= \frac{1}{2} \times (14 + 18) \times 7$ $= 112 \text{ cm}^2$. $\text{Area of semi-circle } PRT$ $= \frac{1}{2} \times \frac{22}{7} \times 7^2$ $= 77 \text{ cm}^2$. $\text{Area of shaded region}$ $= 112 - 77 = 35 \text{ cm}^2$	M1 M1 A1	

8	(a)	Distance = $12 \times \frac{1}{3} = 4\text{km}$	B1	
	(b)	Return speed = 24 km/h Time taken for return journey = $\frac{4}{24} \text{ hr} = \frac{1}{6} \text{ hr}$ Speed = $\frac{4 \times 2}{\frac{1}{6} + \frac{1}{3}}$ = 16 km / h	M1 A1	
9	(a)	$8x \geq 8$ $x \geq 1$	M1 A1	
	(b)	1	B1	
	(c)	2	B1	
10	(a)	P : PB : C 5 : 6 3 : 4 15 : 18 : 20 9 : 10	M1 A1	
	(b)	1 unit \rightarrow \$0.30 6 units \rightarrow \$1.80	M1 A1	
11	(a)	$4x - 5 = 9 + 6x$ $-2x = 14$ $x = -7$	M1 A1	
	(b)	$\frac{3n-m}{4} - \frac{2n-m}{3}$ $= \frac{9n-3m-8n+4m}{12}$ $= \frac{n+m}{12}$	M1 A1	
12	(a)	Sum of interior angles of pentagon $= (5-2) \times 180^\circ$ $= 540^\circ$ $135 + 100 + 85 + 70 + 180 - x = 540$ $540 = 570 - x$ $x = 30^\circ$	M1 A1	
	(b)	$\angle BCG = 84^\circ$ (alternate angles, parallel lines) $\angle DCG = 84 - 39 = 45^\circ$ $\angle CDE = 180 - 45$ (interior angles, parallel lines) = 135° $3x + 135 = 360$ (angles at a pt) $x = 75$	M1 M1 A1	Deduct 1 mark if any reason is not provided
13	(a)(i)	$2800 + 480 = 3280\text{g}$	B1	
	(a)(ii)	$3280 + 480 = 3760\text{g}$	B1	
	(b)	$2800 + 480n$	B1	

	(c)	$2800 + 480(m) = 8000$ $m = 10.3$ (3 s.f)	B1	
	(d)	The expression should only be used to find his weight for the first year. It is unrealistic to say that the weight of the girl still increases by 480 g every month at age of 10.	B1	
14	(a)	 <p>By drawing a suitable triangle under the straight line.</p> $\text{gradient} = \frac{6}{6} = 1$		<p>B1 -Correctly indicated C</p> <p>B1</p>
	(d)	$\frac{1}{2} \times 6 \times 6 \text{ units}^2$ $= 18 \text{ units}^2$	M1 A1	

Junyuan Secondary School
End-of-Year Examinations 2017
Mathematics Paper 2
Marking Key
Secondary One Express

1	(a)	$1296 = 2^4 \times 3^4$	[B1]
	(b)	$672 = 2^5 \times 3 \times 7$ $\text{HCF} = 2^4 \times 3$ $= 48$	[M1] [A1]
2		$\angle ABC = \angle AED = (180 - 4x)^\circ$ (int. \angle s, $AB \parallel DE$, $BC \parallel AE$) Sum of int. angles of pentagon $= (5 - 2) \times 180^\circ$ $= 540^\circ$ $2(180 - 4x) + 4x + 5x + 18 + 134 = 520$ $x = 28^\circ$	[M1] [M1] [A1]
3	(a)		[B1]
	(b)	$T_1 = 6$ $T_2 = 11$ $T_3 = 16$ $T_4 = 21$	[B2] [SC1] for 2 or 3 correct answers
	(c)	$T_n = 5n + 1$	[B1] Accept $T_n = 6 + 5(n - 1)$
	(d)	$5n + 1 = 99$ $n \neq \text{integer}$	[B1] Accept any logical reasoning for n must be an integer
4	(a)	$(-\frac{1}{2})^2 - 3(-2)^3 + \sqrt[3]{\frac{27}{64}} = 25$	[B1]
	(b)(i)	$3x + 1 \leq \frac{3x - 7}{2}$ $6x + 2 \leq 3x - 7$ $3x \leq -9$ $x \leq -3$	[M1] [A1]
	(b)(ii)		[B1]
	(b)(iii)	9	[B1]

5	(a)	$\pi r^2 h = 11.9$ $r = 1.2309 \text{ cm}$ $x = (2)(1.2309)$ $= 2.46 \text{ cm (3 s.f.)}$	[M1] [A1]
	(b)	surface area $= 2\pi r^2 + 2\pi rh$ $= 2\pi(1.2309)^2 + 2\pi(1.2309)(2.5)$ $= 9.52 + 19.335$ $= 28.9 \text{ cm}^2$	[M1] [A1]
	(c)	height of one \$1 coin $= \frac{2.5}{10}$ $= 0.25 \text{ cm}$ increase in surface area $= (2.4618)(\pi)(0.25)(6)$ $= 11.601 \text{ cm}^2$ increase in percentage $= \frac{11.601}{28.88} \times 100\%$ $= 40.2\% \text{ (3 s.f.)}$	[M1] [M1] [A1]
6	(a)		
	(b)	By calculation: 4.67 min (3 s.f.) Therefore, accept 4.6, 4.65 and 4.7 min only.	[B1]
	(c)(i)	gradient $= \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{3}{4}$	[M1] Correct co-ordinates substituted into formula [A1]

	(c)(ii)	Every minute, the volume of the crystal increases by $\frac{3}{4} \text{ cm}^3$.	[B1]
	(d)	The initial volume of the crystal is 2 cm^3 .	[B1] Accept “initial volume of crystal”, “volume of crystal at the beginning/start”.
7	(a)	$BC = (\frac{2}{3})(54)$ $= 36 \text{ cm}$ $BP = (\frac{1}{3})(36)$ $= 12 \text{ cm}$ $QR = (\frac{4}{5})(54)$ $= 43.2 \text{ cm}$	[B1] [B1] [B1]
	(b)	Area of $CDRQ = \frac{1}{2}(43.2 + 54)(12)$ $= 583.2 \text{ cm}^2$	[B1]
	(c)	Area of flag $= (54)(36)$ $= 1944 \text{ cm}^2$ $CDRQ : \text{flag}$ $= 583.2 : 1944$ $= 3 : 10$	[M1] [A1]
	(d)	Area of $ADT = (54)(36) - (583.2)(2) = 216$ $= 561.6 \text{ cm}^2$ $\frac{1}{2} \times \text{base} \times \text{height} = 561.6$ $36 \times \text{height} = 1123.2$ $\text{height} = 31.2 \text{ cm}$	[M1] [A1]
8	(a)	$\\$3.00 + \\$0.80(7) = \\$8.60$	[B1]
	(b)(i)	$0837 \rightarrow 0902: 25 \text{ minutes}$ $\text{Speed} = \frac{15.5}{25/60}$ $= 37.2 \text{ km/h}$	[M1] [A1]
	(b)(ii)	$\$3.00 + \$0.45(16) + \$0.20(25) = \15.20	[B1]
	(c)	Fare without surcharge $= \$3.20 + \$0.22(\frac{10000}{400}) + \$0.22(\frac{4500}{300})$ $= \$12.00$ Fare with surcharge $= (\$12.00)(1.25)$ $= \$15.00$	[M1] [A1]

			Accept answer $\geq \$15$ if student consider waiting time at \$0.22 per minute.
	(d)	<p>GrabCar = $\\$3.00 + (16)(\\$0.80) = \\$15.80$</p> <p>Time taken = $\frac{16}{80}$ $= 0.2 \text{ h}$ $= 12 \text{ min}$</p> <p>Uber X = $\\$3.00 + (16)(\\$0.45) + (12)(\\$0.20) = \\12.60</p> <p>ComfortDelGro = $\\$3.20 + (\frac{10000}{400})(\\$0.22) + (\frac{5100}{300})(\\$0.22)$ $= \\$12.44$</p> <p>From above, ComfortDelGro offers the cheapest fare.</p>	<p>[B1]</p> <p>[B1]</p> <p>[B1]</p> <p>[B1]</p>
	(e)	Assume there is smooth traffic / no jam / no waiting of traffic light.	<p>[B1]</p> <p>Accept any logical answer.</p>



REGENT SECONDARY SCHOOL
END OF YEAR EXAMINATION (SA2) 2017
SECONDARY ONE (EXPRESS)

NAME: _____
CLASS: _____

INDEX NUMBER: _____
SETTER : Ms Jacintha

MATHEMATICS

4048/01
9th October 2017

Paper 1

1 hour 15 mins

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your class, index number and name on all the work you hand in.

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give your answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total of the marks for this paper is 50.

<div style="border: 1px solid black; width: 100px; height: 100px; position: relative;"><div style="position: absolute; top: 0; right: 0; width: 50%; height: 50%; border: 1px solid black; transform: rotate(45deg);"></div><div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); font-size: 40px; font-weight: bold;">50</div></div>	TARGET
PARENT'S SIGNATURE	

This document consists of **10** printed pages.

Answer **all** questions.For
Examiner's
UseFor
Examiner's
Use**1** Express

- (a)**
- 33% as a fraction in its lowest terms,

Answer (a)..... [1]

- (b)**
- $15\frac{1}{4}$
- as a percentage.

Answer (b)..... [1]

- 2**
- By rounding off each term to 1 significant figure, estimate the value of
- $\frac{56.89 - \sqrt{104.2}}{\sqrt[3]{61.76 + 3.99}}$
- .

Answer [2]

3 Consider the following numbers,

$$\sqrt[3]{125}, 0.\dot{5}\dot{1}\dot{6}, 8, -\frac{49}{7}, \pi$$

Write down all the

- (a)**
- irrational number(s).

Answer (a)..... [1]

- (b)**
- integer(s).

Answer (b)..... [1]

- (c)**
- perfect cube(s).

Answer (c)..... [1]

For
Examiner's
Use

For
Examiner's
Use

- 4 (a)** Write a simplified algebraic expression for the statement “ Cube root of the product of w and x .’

Answer (a) [1]

- (b)** Express $\frac{b-5}{3} - \frac{2b-3}{5}$ as a single fraction.

Answer (b) [3]

- 5** A sum of money was divided between Amy and Daniel in the ratio 5 : 12. After Amy spent \$22, the ratio became 3 : 16. Find the amount of money Amy had at first.

Answer \$..... [3]

- 6** The number 1888 can be expressed as $2^a \times b$, where a and b are integers.

(a) Find the value of a and of b .

Answer (a) $a = \dots\dots\dots$ [1]

$b = \dots\dots\dots$ [1]

(b) Given that $x = 2^3 \times 5 \times 7$, evaluate the highest common factor of 1888 and x .

Answer (b) $\dots\dots\dots$ [1]

(c) Find the smallest integer n such that $1888n$ is a perfect square.

Answer (c) $n = \dots\dots\dots$ [1]

For
Examiner's
Use

For
Examiner's
Use

- 7 A man ran 2.4 km in 16 minutes. He then walked a further 900 m at an average speed of 4 km/h. Calculate

(a) his speed, in km/h, in the first 16 minutes,

Answer (a).....km/h [2]

(b) the time, in minutes, he took to walk,

Answer (b).....minutes [2]

(c) his average speed, in m/s, for the whole distance travelled.

Answer (c).....m/s [2]

- 8 If $a = 2\frac{1}{4}$ and $b = 0.75$, find the ratio of $a : b$.

Answer [2]

For
Examiner's
Use

9 (a) Factorise completely

(i) $-6c^2 - 4cd$

Answer (a)(i) [1]

(ii) $4pq + 2p^2 - 10p$

Answer (a)(ii) [2]

(b) Expand and simplify $3 - (2x^2 + 4)$.

Answer (b)..... [2]

For
Examiner's
Use

For
Examiner's
Use

For
Examiner's
Use

10 Solve the following equations.

(a) $x + 3 = 2x + 1$.

Answer $x = \dots\dots\dots$ [2]

(b) $\frac{2}{x} = \frac{3}{x+2}$.

Answer $x = \dots\dots\dots$ [2]

(c) $2 - \frac{x-9}{3} = -3$.

Answer $x = \dots\dots\dots$ [3]

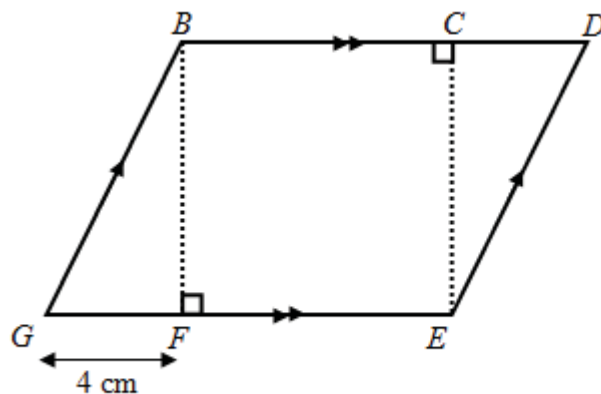
- 11 (a)** Solve $-3q > 6$ and illustrate the solution on a number line in the space given below.

Answer (a) [2]

- (b)** Find the smallest integer value q that satisfies the inequality $4q - 1 > 6$.

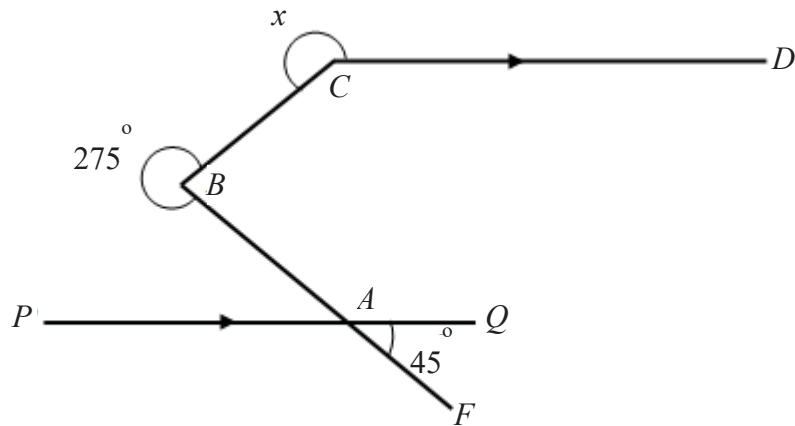
Answer (b) [2]

- 12** In the diagram below, $BCEF$ is a square with an area of 36 cm^2 and $GF = 4 \text{ cm}$. Calculate the area of parallelogram $BDEG$.



Answer cm^2 [2]

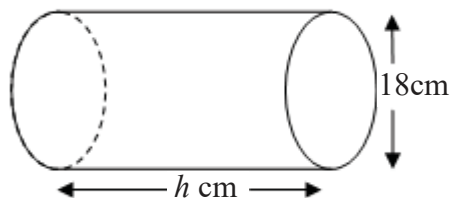
- 13** Find the value of x in the figure below, showing your working clearly.
State the properties and angles where possible.



Answer [3]

For
Examiner's
Use

- 14** In the **closed** cylinder below, the diameter of the cross-section is 18 cm. Given that its total surface area is $702\pi \text{ cm}^2$, calculate the height, h , of the cylinder.

For
Examiner's
UseAnswer $h =$ [3]*Have you checked your work?***END OF PAPER**



**REGENT SECONDARY SCHOOL
END OF YEAR EXAMINATION (SA2) 2017
SECONDARY ONE (EXPRESS)**

NAME: _____
CLASS: _____

INDEX NUMBER: _____
SETTER: Ms Jacintha

MATHEMATICS

Paper 2

4048/02

10th October 2017

1 hour 30 minutes

Additional Materials: Answer Paper

READ THESE INSTRUCTIONS FIRST

Write your class, index number and name on all the work you hand in.

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give your answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total of the marks for this paper is 50.

<div style="border: 1px solid black; width: 100px; height: 100px; position: relative;"><div style="position: absolute; top: 0; right: 0; width: 50%; height: 50%; border: 1px solid black; transform: rotate(45deg);"></div><div style="position: absolute; bottom: 0; left: 0; width: 50%; height: 50%; border: 1px solid black;"></div></div> <div style="font-size: 2em; font-weight: bold; margin-top: 10px;">50</div>	TARGET
PARENT'S SIGNATURE	

Answer **all** questions.

- 1 (a) Find the sum of interior angles of a 12-sided polygon. [2]

- (b) A polygon has 15 sides. Three of its exterior angles are 45° , 46° and 29° while the twelve remaining exterior angles of the polygon are x° each. Find the value of x . [2]
-

- 2 The population of Brunei was 422 000 in 2016. This value has been rounded off to the nearest 1000.

- (a) What is the largest possible value of the population of Brunei in 2016 ? [1]

- (b) What is the smallest possible value of the population of Brunei in 2016 ? [1]
-

- 3 (a) The price of a computer increases from \$1300 to \$1420. Find the percentage increase in its price. [2]

- (b) The marked price of a paint art is \$6750. There is a discount of 5% for members.

- (i) Find the selling price for a member after the discount. [1]

- (ii) Given that there is a GST of 7%, find the total amount payable by the member, leaving your answer in the nearest cents. [2]
-

- 4 (a) Simplify the following expression.

$$\frac{2p+5}{7} + \frac{3q-1}{4} \quad [2]$$

- (b) Expand and simplify the following expression.

$$5(4a+5b) - 3(2a-7b) \quad [2]$$

- (c) Factorise the following expression completely.

$$18gh + 9g - 27gk \quad [2]$$

- 5 A pattern was created using toothpicks. The first three figures are shown below.



Figure 1



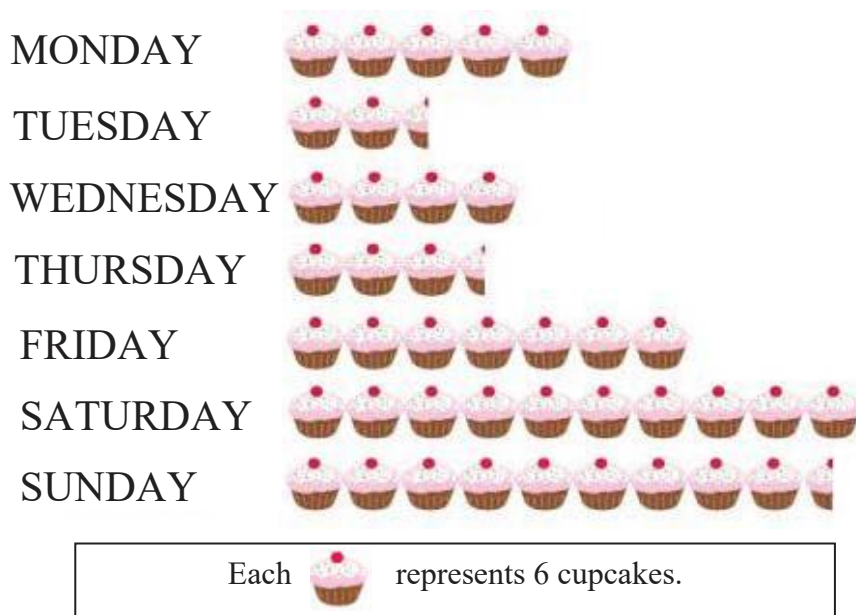
Figure 2



Figure 3

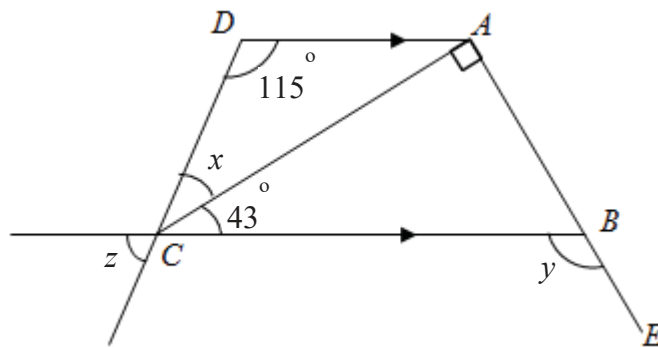
- (a) How many toothpicks are used in Figure 5? [1]
- (b) Write down an expression, in terms of n , for the number of toothpicks in Figure n . [1]
- (c) Calculate the number of toothpicks in Figure 250. [1]

- 6 The following pictogram illustrates the number of cupcakes sold in a bakery in a particular week.



- (a) How many more cupcakes were sold on Monday as compared to Tuesday? [1]
- (b) If each cupcake was sold at \$3.50, calculate the total sales amount from the cupcakes sold in that week. [2]
- (c) Express the ratio of cupcakes sold on weekends to that sold on weekdays. [1]

- 7 The diagram below shows trapezium $ABCD$ where AD is parallel to BC . ABE is a straight line, $\angle CAB = 90^\circ$, $\angle ADC = 115^\circ$ and $\angle ACB = 43^\circ$.



Stating the reasons clearly, find

(a) x , [2]

(b) y , [2]

(c) z . [1]

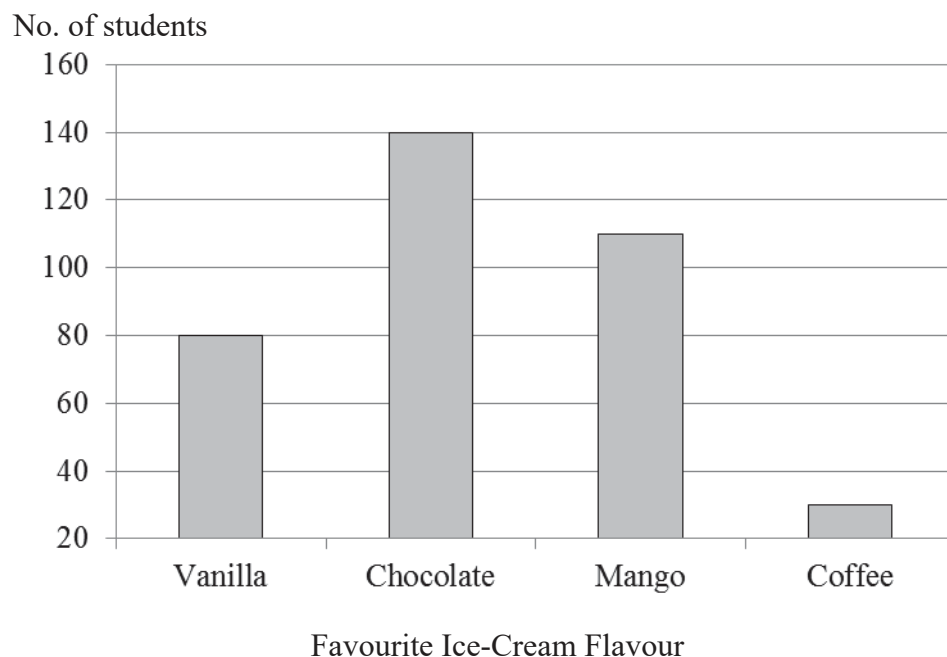
8 (a) Draw and label $\triangle ABC$ such that $\angle BAC = 48^\circ$, $AB = 7.9$ cm and $AC = 4.8$ cm. [3]

(b) Construct the perpendicular bisector of AB . [1]

(c) Construct the bisector of $\angle ABC$. [1]

(d) Label the intersection point of the perpendicular bisector of AB and the angle bisector of $\angle ABC$ as M . Measure the distance M from A . [2]

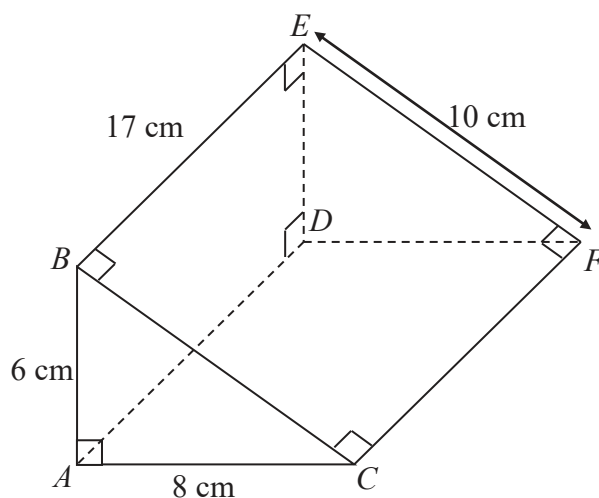
- 9 The bar graph below shows the survey result of a group of Secondary One Students from Santa Secondary School on their preference of ice-cream flavour.



- (a) How many more students prefer Mango flavour to Coffee flavour? [1]
- (b) What fraction of the students chose Chocolate flavour as their favourite? [2]
- (c) What percentage of the students did not choose Vanilla as their favourite flavour? [2]
- (d) Jamie observed the bar graph and claimed that the number of students who prefer Chocolate flavour is twice the number of students who prefer Vanilla flavour. State one way in which the bar graph is misleading Jamie. [2]

- 10** The diagram below shows a solid prism. The prism has a cross-section of a right-angled triangle.

$AB = 6$ cm, $AC = 8$ cm, $EF = 10$ cm and $BE = 17$ cm.



Calculate,

- (a) the area of the cross-section ABC , [1]
- (b) the volume of the prism, [1]
- (c) the total surface area of the prism. [2]
- (d) A cylindrical container with radius 10 cm is filled with some water. Ten such solid prisms were dropped into the container, causing the water level to rise. Assuming that there is no water flowing out of the container, calculate the increase in the water level in the container. [3]

Have you checked your work?
END OF PAPER

Answer $x = \dots\dots\dots$

(e) $2 - \frac{x-9}{3} = -3$

[1]

Answer $x = \dots\dots\dots$

[2]

[3]

- For
Examiner's
Use* **10** **(a)** Solve $-3q > 6$ and illustrate the solution on a number line in the space given below.

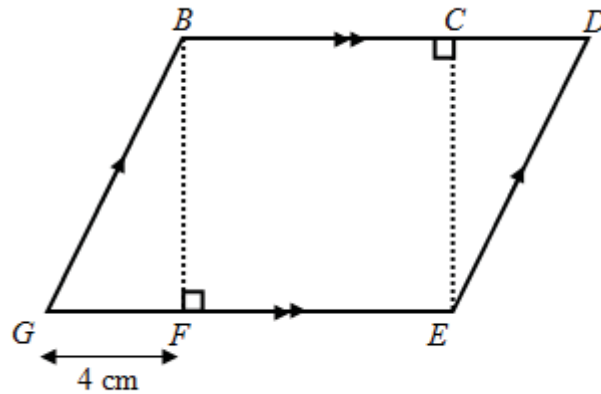
*For
Examiner's
Use*

Answer (a) [2]

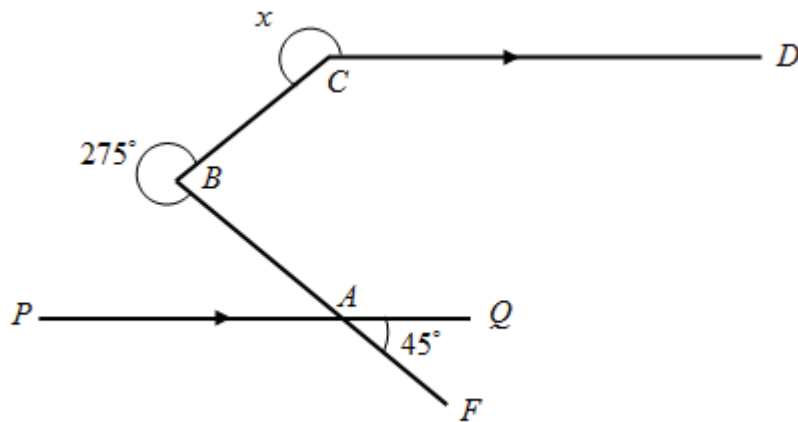
- (b)** Find the smallest integer value q that satisfies the inequality $4q - 1 > 6$.

Answer (b) [2]

- 11 In the diagram below, $BCEF$ is a square with an area of 36 cm^2 . What is the area of parallelogram $BDEG$?



- 12 Find the value of x in the figure below. Answer cm^2 [2]

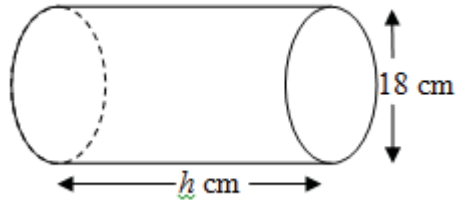


Answer [3]

For
Examiner's
Use

- 13** In the cylinder below, the diameter of the cross-section is 18 cm. Given that its total surface area is $702\pi \text{ cm}^2$, calculate the height, h , of the cylinder.

For
Examiner's
Use



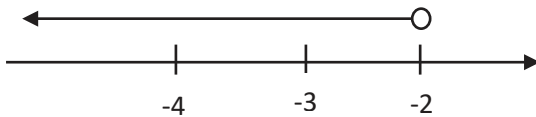
Answer [3]

Have you checked your work?
END OF PAPER

1E EOY PAPER 1 2017 MARKING SCHEME

Qn	Working	Marks	Marker's report
1a	$\frac{33}{100}$	B1	Well done
1b	1525%	B1	Many students put 15.25% instead.
2	$\frac{60 - \sqrt{100}}{\sqrt[3]{60 + 4}} = \frac{50}{4}$ $= 12.5$	M1 A1	Common mistake : Students did not estimate and only rounded off the final answer to 1sf.
3a	π	B1	Badly done. Students
3b	$\sqrt[3]{125}, 8, -\frac{49}{7}$	B1	
3c	8	B1	
4a	$\sqrt[3]{wx}$		
4b	$\frac{b-5}{3} - \frac{2b-3}{5}$ $= \frac{5(b-5)}{15} - \frac{3(2b-3)}{15}$ $= \frac{5b-25-6b+9}{15}$ $= \frac{-b-16}{15}$	M1 M1 A1	<p>Majority of students got 1 mark only.</p> <p>Common mistake :</p> $\frac{b-5}{3} - \frac{2b-3}{5}$ $= \frac{5(b-5)}{15} - \frac{3(2b-3)}{15}$ $= \frac{5b-25-6b-9}{15}$ $= \frac{-b-34}{15}$
5	$5 : 12 \approx 20 : 48$ $3 : 16 = 9 : 48$ $20 - 9 = 11$ 11 units → \$22 1 unit → \$2 20 units → 2 x 20 = \$40	M1 M1 A1	Well done.
6a	$1888 = 2^5 \times 59$ $a = 5$ $b = 59$	B1 B1	Well done

6b	8	B1	Many students left the answer as 2^3
6c	118	B1	Well done.
7a	$\frac{2.4}{\left(\frac{16}{60}\right)}$ $= 9 \text{ km/h}$	M1 A1	Students who got this wrong did not convert the time to hours.
7b	$\frac{900 \div 1000}{4} \times 60$ $= 13.5 \text{ min s}$	M1 A1	Badly done. Many did not divide by 1000.
7c	$\frac{2400 + 900}{(16 \times 60) + (13.5 \times 60)}$ $= 1.86 \text{ m/s}$	M1 A1	
8	$\frac{9}{4} : 0.75$ $9 : 3$ $3 : 1$	M1 A1	
9ai	$-6c^2 - 4cd$ $= -2c(3c + 2d)$ <i>or</i> $= 2c(-3c - 2d)$	A1	
9aii	$2p(2q + p - 5)$	B2	Well done. One mark was given for the 2p factorised out correctly.
9b	$3 - (2x^2 + 4)$ $= 3 - 2x^2 - 4$ $= -2x^2 - 1$	M1 A1	Many managed to get $3 - 2x^2 - 4$ but simplified it wrongly.
10a	$x + 3 = 2x + 1$ $2x - x = 3 - 1$ $x = 2$	M1 A1	Well done.
10b	$\frac{2}{x} = \frac{3}{x+2}$ $3x = 2(x+2)$ $3x = 2x + 4$ $x = 4$	M1 A1	Students had an issue simplifying after cross-multiplication.
10c	$2 - \frac{x-9}{3} = -3$ $\frac{6-x+9}{3} = -3$ $15-x = -9$ $x = 24$	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> $5 = \frac{x-9}{3}$ $15 = x-9$ $x = 24$ </div> M1 M1 A1	Badly done. Students did not change the sign of '9' after making common denominator on the left.

11a	$q < -2$ 	B1 B1	Badly done. Students were able to solve the inequality but could not illustrate it on the number line correctly.
11b	$4q - 1 > 6$ $q > 1.75$ $q = 2$	M1 A1	Well done.
12	Length of square = $\sqrt{36} = 6\text{cm}$ Area = 10×6 $= 60\text{cm}^2$	M1 A1	Well done.
13	Draw a line BX through B $\angle ABX = 45^\circ$ (corr \angle s) $\angle ABC = 360 - 275$ $= 85^\circ$ (\angle s at a pt) $\angle XBC = 85 - 45$ $= 40^\circ$ Produce the line DC to Y $\angle BCY = 40^\circ$ (alt \angle s) $x = 180 + 40$ $= 220^\circ$	M1 (1 mark for any 2 correct reasons) A1	
14	$2(\pi \times 9 \times 9) + 2 \times \pi \times 9 \times h = 702\pi$ $162\pi + 18\pi h = 702\pi$ $18\pi h = 540\pi$ $h = 30\text{cm}$	M1 M1 A1	Average. Presentation of working for this question was done badly. Many remembered the formulas wrongly.

1E EOY PAPER 2 2017 MARKING SCHEME

Qn	Working	Marks	Marker's report
1a	$(12-2) \times 180$ $= 1800$	M1 A1	Reasonably done. Some students did not remember the formula.
1b	$45+46+29+12x = 360$ $12x = 240$ $x = 20$	M1 A1	Reasonably done. Some students went to calculate sum of interior angles instead.
2a	422499	B1	Mostly well done
2b	421500	B1	Mostly well done
3a	$\frac{1420-1300}{1300} \times 100$ $= 9.23\% \text{ or } 9\frac{3}{13}\%$	M1 A1	
3bi	$\frac{6750}{100} \times 95$ $= \$6412.50$	A1	
3bii	$\frac{6412.50}{100} \times 107$ $= \$6861.38$	M1 A1	
4a	$\frac{2p+5}{7} + \frac{3q+1}{4}$ $= \frac{4(2p+5) + 7(3q+1)}{28}$ $= \frac{8p+20+21q+7}{28}$ $= \frac{8p+21q+27}{28}$	M1 A1	Well done.
4b	$5(4a+5b) - 3(2a-7b)$ $= 20a+25b-6a+21b$ $= 14a+46b$	M1 A1	Reasonably done. Some students did not expand the second part of the question correctly.
4c	$18gh+9g-27gk$ $= 9g(2h-1-3k)$ M1 awarded for factorising one factor out correctly.	B2 OR	Not well done. Students are not familiar with factorisation.
5a	11	B1	Well done
5b	$2n+1$	B1	Reasonably done. But many students did not simplify their answers. Common errors

			include: $3+2(n-1)$ or $n+n-1$. $2 \times n - 1$ was penalised for presentation.
5c	501	B1	Well done. No ecf awarded.
6a	15	B1	Well done.
6b	249×3.50 $= \$871.50$	M1 A1	Well done. Same presentation error for some students who expressed answer as \$871.5
6c	39 : 44	B1	Well done.
7a	$x = 180 - 115 - 43$ $= 22^\circ(\text{int } \angle s)$	M1 A1	Well done.
7b	$\angle ABC = 180 - 90 - 43$ $= 47^\circ(\angle s \text{ in } \Delta)$ $y = 180 - 47$ $= 133^\circ(\angle s \text{ on strt line})$	M1	
7c	$z = 22 + 43$ $= 65^\circ(\text{vert opp } \angle s)$	A1 (Minus 1m for no reason in any of the parts)	Well done. Students who wrote (opp. angles) were penalised. Vertically opposite is the key word to be awarded marks for reasons. Ecf allowed for students who got 7a wrong.
9a	80	B1	Well done
9b	$\frac{140}{360}$ $= \frac{7}{18}$	M1 A1	Reasonably done. Some students miscalculated total as 340.
9c	$\frac{280}{360} \times 100$ $= 77.8\% \text{ or } 77\frac{7}{9}\%$	M1 A1	Reasonably done. Some students expressed answer as recurring decimal and was marked for accuracy.
9d	The bar graph is misleading as its vertical axis starts from 20 instead of 0, thus making the number of students who prefer Chocolate flavour look like it is twice the	B2	Badly done. A few students in the whole cohort got full credit. 1m was awarded for mentioning that the graph started at 20, 1m for showing

	number of students who prefer Vanilla flavour when it is only a difference of 60.		evidence of not having twice the numbers.
10a	$\frac{1}{2} \times 6 \times 8$ $= 24cm^2$	A1	Reasonably done.
10b	24×17 $= 408cm^2$	A1	Reasonably done.
10c	$Vol = (24 \times 2) + (17 \times 10) + (17 \times 6) + (17 \times 8)$ $= 456cm^2$	M1 A1	Reasonably done.
10d	$Volume\ of\ 10\ prisms = 408 \times 10$ $= 4080cm^3$ $Increase = \frac{4080}{\pi(10)^2}$ $= 13.0cm(3sf)$	M1 M1 A1	

