

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  $\pi$ , use either your calculator value or 3.142, unless the question requires the answer in terms of  $\pi$ .

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.

<b>FOR EXAMINER'S USE</b>
<b>50</b>

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.

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

Answer: \_\_\_\_\_ [2]

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- 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.

(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  $x + 2y$ .

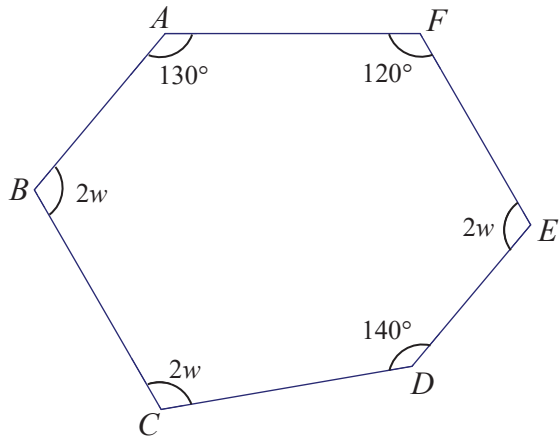
For  
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Use

Answer: ..... [2]

---

10 (a) Three of the exterior angles of a polygon with  $n$  sides are  $60^\circ$ ,  $45^\circ$  and  $75^\circ$ . The remaining exterior angles are each  $30^\circ$ . 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.

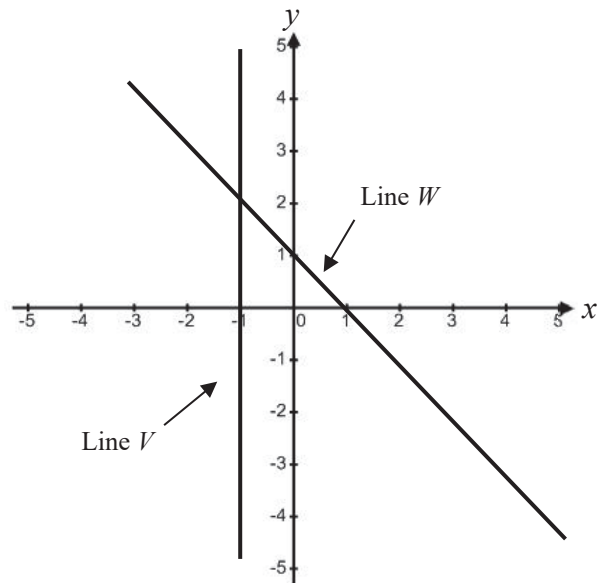
For  
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Use

Answer: ..... [2]

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14 Write down the equation of the following graphs.

- (a) Line  $V$
- (b) Line  $W$



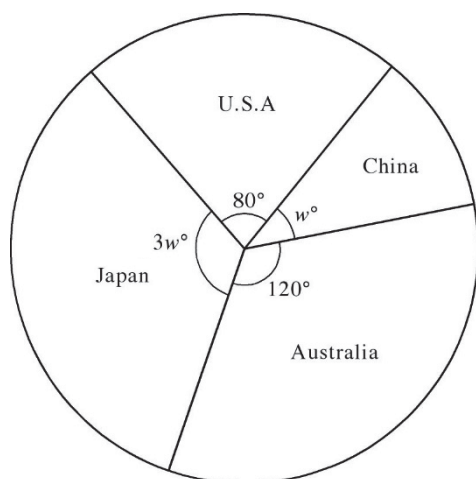
Answer: 14(a) ..... [1]

14(b) ..... [2]



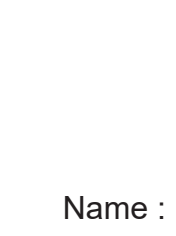
15 A group of Singaporeans were surveyed to determine which countries they would like to visit the most. Their choices were represented on a pie chart as given below.

- (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**

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Answer **all** the questions.

For  
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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 4<sup>th</sup> pattern of the sequence in the above box. [1]  
 (b) State the total number of dots required, in terms of  $n$ , to form the  $n^{\text{th}}$  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.

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Use

	Burger → $\$2x$ each	
	Fries → $\$2.00$ each	
	Drink → $\$(x+1)$ each	
	Sundae → $\$1.50$ each	

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]

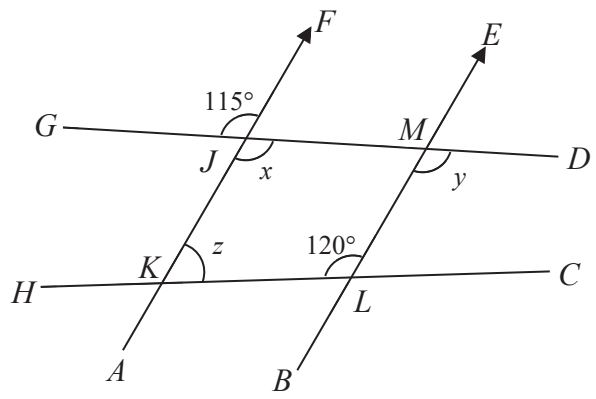
- 
- 5 Freya drives a distance of 150 km at a speed of 90 km/h. After resting for 20 mins, she took another 2.5 h to complete the remaining 245 km of the journey. Find Freya's average speed for the whole journey.

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

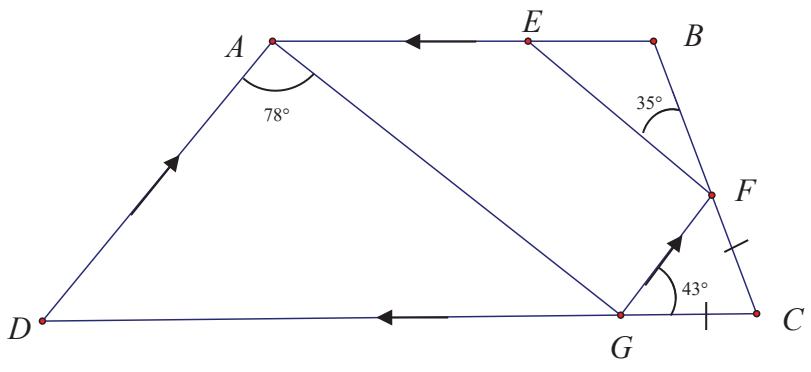
- (a) angle  $x$
- (b) angle  $y$
- (c) angle  $z$



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]

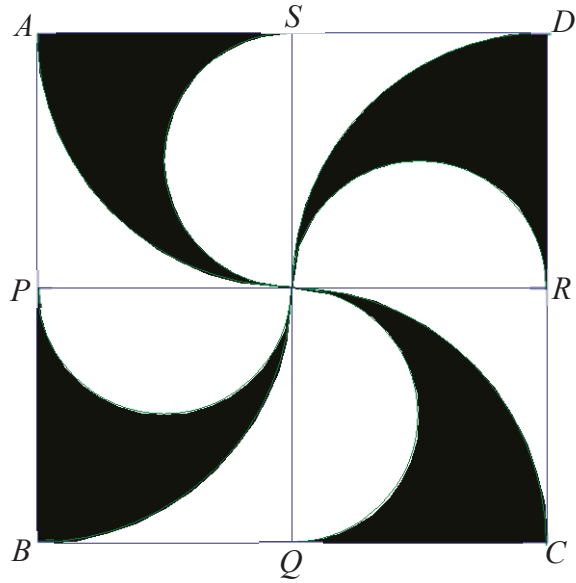
For  
Examiner's  
Use



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  $\pi$  to be 3.14)



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 a 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  $\pi$  to be 3.14, and round off your answers to the nearest integer)



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





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

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

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

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

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

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

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

2(b)(i)  $\dots\dots\dots 300 \dots\dots\dots$  [1]

2(b)(ii)  $\dots\dots\dots 4500 \dots\dots\dots$  [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)  $\frac{9s-4t}{5} + \frac{3s+2t}{2} + \frac{s-5t}{3}$

$$\frac{4g-3}{7} - \frac{2(g-1)}{3} = \frac{3(4g-3) - 14(g-1)}{21}$$

$$= \frac{12g - 9 - 14g + 14}{21} \quad [\text{M1}]$$

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

$$\frac{9s-4t}{5} + \frac{3s+2t}{2} + \frac{s-5t}{3} = \frac{6(9s-4t) + 15(3s+2t) + 10(s-5t)}{30}$$

$$= \frac{54s - 24t + 45s + 30t + 10s - 50t}{30} \quad [\text{M1}]$$

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

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

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

$$25bx + 35by = 5b(5x + 7y) \quad \text{[A]}$$

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

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

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

7(b)(ii)  $\dots\dots\dots (2n - 1)(4m - 1) \dots\dots\dots$  [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  $z$ ?

$$\begin{aligned} x + y + 36 &= 30 \times 3 = 90 \\ x + y &= 90 - 36 \\ x + y &= 54 && \text{[B]} \end{aligned}$$

$$\begin{aligned} w + x + y + z + 36 &= 40 \times 5 \\ w + x + y + z &= 200 - 36 \\ w + 54 + z &= 164 \\ w + z &= 164 - 54 \\ w + z &= 110 && \text{[B]} \end{aligned}$$

Average of  $w$  &  $z = 110 \div 2 = 55$  [B]

Answer:  $\dots\dots\dots 55 \dots\dots\dots$  [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]

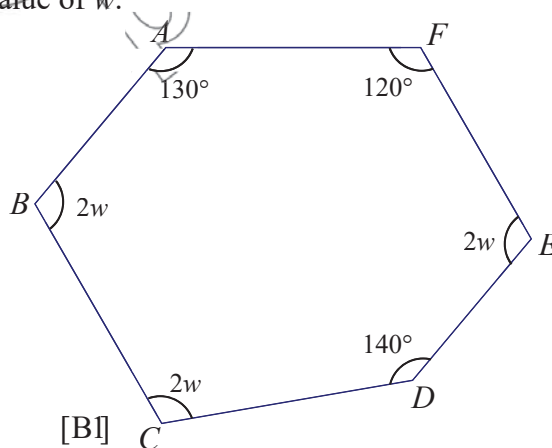
10 (a) Three of the exterior angles of a polygon with  $n$  sides are  $60^\circ$ ,  $45^\circ$  and  $75^\circ$ . The remaining exterior angles are each  $30^\circ$ . Calculate the value of  $n$ .

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

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

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

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



$$\text{Sum of all int. } \angle s = (6 - 2) \times 180^\circ = 720^\circ \quad [\text{B1}]$$

$$130^\circ + 120^\circ + 2w + 140^\circ + 2w + 2w = 720^\circ \quad [\text{B1}]$$

$$390^\circ + 6w = 720^\circ \quad [\text{B1}]$$

$$w = 55^\circ \quad [\text{B1}]$$

Answer: 10(a) ..... 9 ..... [2]

10(b) .....  $55^\circ$  ..... [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 [B1]  
 1% → \$1  
 120% → \$120 [B1]

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.

$$\text{Total parts} = 3 + 2 + 4 = 9 \text{ parts}$$

$$9 \text{ parts} = \$270$$

$$1 \text{ part} = \$30$$

$$3 \text{ parts} = \$90 \quad [A1]$$

$$\text{Layla's original contribution} : 2 \text{ parts} \rightarrow \$60$$

$$\text{Layla's new contribution} = \$60 \times 2 = \$120$$

$$\text{Karrie's new contribution} = \$90 \div 2 = \$45 \quad [B1]$$

$$\begin{aligned} \text{Miya's new contribution} &= \$270 - \$120 - \$45 \\ &= \$105 \quad [B1] \end{aligned}$$

Karrie : Layla : Miya

45 : 120 : 105

3 : 8 : 7 [A1]

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.

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

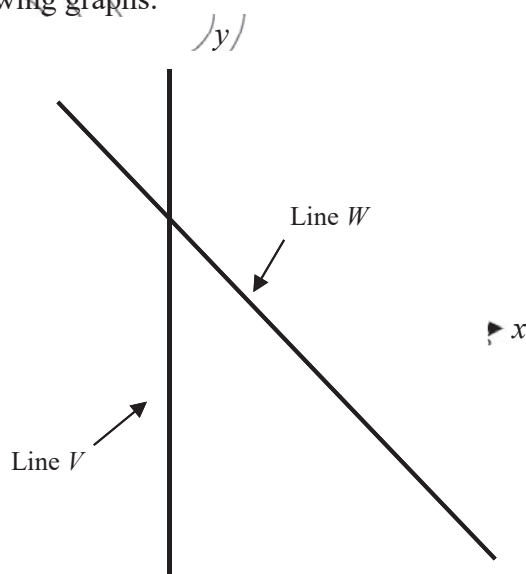
$$k < 26.25$$

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  $W$ :

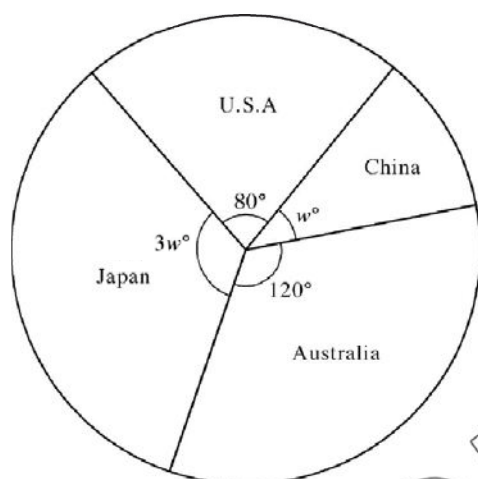
Gradient = -1  
y-intercept = 1    [B1]

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.



$$3w + 80^\circ + w + 120^\circ = 360^\circ \quad [B]$$

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

$$w = 40^\circ \quad [B]$$

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

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

$$80^\circ \rightarrow 40$$

$$10^\circ \rightarrow 5$$

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

	$40^\circ$	
Answer:	15(a) .....	[2]
	$33.3\%$	
	15(b) .....	[1]
	$180$	
	15(c) .....	[1]

☺ End of Paper ☺

Answer **all** the questions.

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 4<sup>th</sup> pattern of the sequence in the above box. [1]  
 (b) State the total number of dots required, in terms of  $n$ , to form the  $n^{\text{th}}$  pattern?  
 (c) Pattern  $P$  requires 333 dots. What is the value of ' $P$ '?

The difference between each pattern is 4 dots.

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

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

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

	Burger → \$2x each	
	Fries → \$2.00 each	
	Drink → \$(x+1) each	
	Sundae → \$1.50 each	

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]

$$10x + 10x + 3x + 3 + 6 \times 1.50 = 58$$

$$23x + 12 = 58$$

$$23x = 46$$

$$x = 2$$

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: /	<del>4(a)(i)</del> ..... $\frac{x}{6}$ h ..... [1]
$x = 1\frac{1}{3}$ h [A1]		<del>4(a)(ii)</del> ..... $\frac{x}{2}$ h ..... [1]
		4(b) ..... $1\frac{1}{3}$ 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.

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

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

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

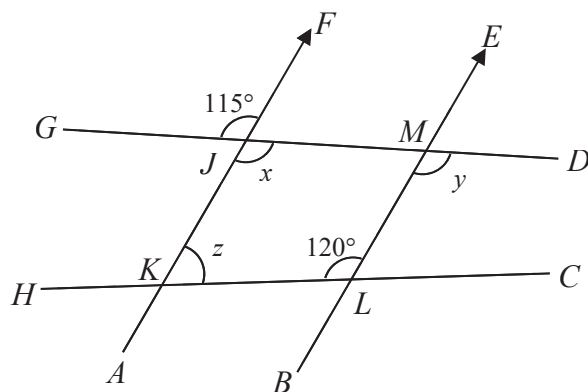
$$\text{Total time taken} = \frac{5}{3} + \frac{1}{3} + 2.5 = \frac{9}{2} \text{ h} \quad [\text{B1}]$$

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

Answer: .....  $87\frac{7}{9}$  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

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



$x = 115^\circ$  [A1]  
(vert. opp.  $\angle$ s)

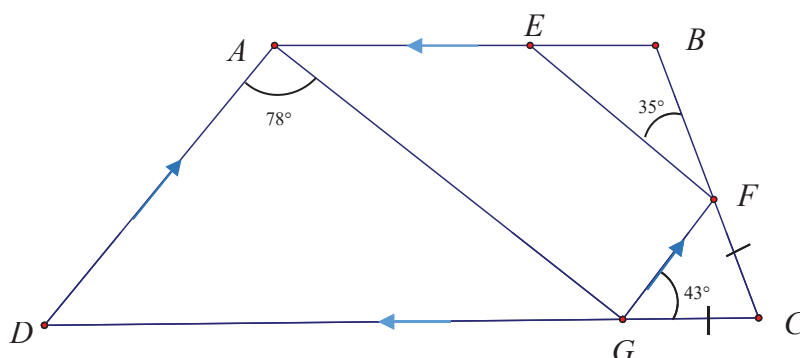
$y = x = 115^\circ$  [A1]  
(corr.  $\angle$ s, // lines)

$z = 180^\circ - 120^\circ$  [A1]  
(int.  $\angle$ s, // lines)  
 $z = 60^\circ$

*Minus 1m for not stating properties used*

Answer: 6(a) .....  $115^\circ$  [1]  
6(b) .....  $115^\circ$  [1]  
6(c) .....  $60^\circ$  [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]



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

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

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

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

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

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

[M2]

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

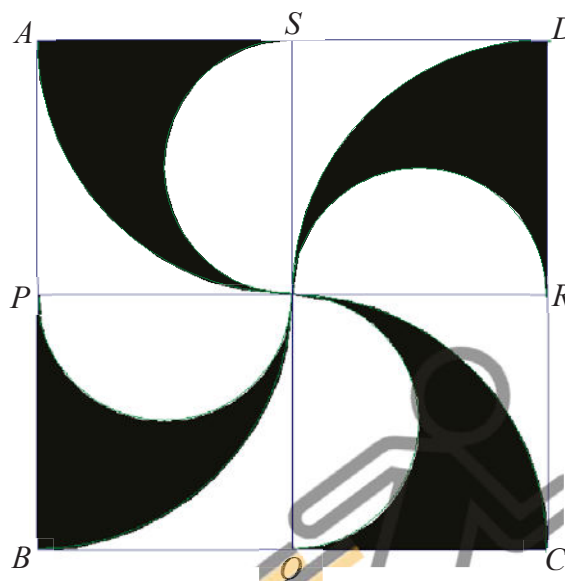
[A1]



- 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

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

(Take  $\pi$  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 cm<sup>2</sup> ..... [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  $\pi$  to be 3.14, and round off your answers to the nearest integer)



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

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

Answer: 9(a) ..... 931 mm<sup>3</sup> ..... [4]  
 9(b) ..... 1128 mm<sup>2</sup> ..... [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.

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

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

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

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

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		

(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 ☺



