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**REGENT SECONDARY SCHOOL  
END OF YEAR EXAMINATION 2020  
SECONDARY ONE (EXPRESS)**

NAME: \_\_\_\_\_

INDEX NUMBER: \_\_\_\_\_

CLASS: \_\_\_\_\_

SETTER : MS KAREN LEE

**MATHEMATICS**

**4048/01**

Paper 1

**5 October 2020**

**1 hour 15 minutes**

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

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.

|                           |               |
|---------------------------|---------------|
|                           | <b>TARGET</b> |
|                           |               |
| <b>PARENT'S SIGNATURE</b> |               |
|                           |               |

This document consists of **12** printed pages.

2

Answer **all** questions.

- 1 Write the following numbers in order of size, starting with the **smallest**.

$$0.33, \quad \frac{1}{3}, \quad \left(\frac{1}{3}\right)^2, \quad 0.3$$

Answer ..... , ..... , ..... , ..... [1]

---

- 2 The number of students in a school is given as 900, correct to the nearest hundred.  
Write down the minimum number of students that could be in the school at this time.

Answer ..... [1]

---

- 3 (a) Express 4320 as a product of its prime factors.

Answer ..... [1]

- (b) The number  $\frac{4320}{p}$  is a perfect cube.

Given that  $p$  is an integer, find the smallest value of  $p$ .

Answer  $p =$  ..... [1]

3

- 4 By rounding each number to 2 significant figures, estimate the value of

$$\frac{\sqrt{64.432} \times 25.12}{(19.7)^2}$$

Answer ..... [2]

---

- 5 The equation of a straight line is  $2y = -6x + 5$ .

Find

- (a) the gradient of the line,

Answer ..... [1]

- (b) the coordinates of the  $y$ -intercept of the line.

Answer (....., .....) [1]

4

- 6 Write as a single fraction in its simplest form  $\frac{2+x}{3} - \frac{2(x-1)}{5}$ .

Answer ..... [3]

---

- 7 (a) Construct triangle  $ABC$  where angle  $ABC = 100^\circ$  and  $AC = 7$  cm.  
 $AB$  has already been drawn.

A  B

[2]

- (b) Write down the length of  $BC$ .

Answer ..... cm [1]

5

- 8 (a) Tan bakes some cookies.

He uses flour, sugar and butter in the ratio 5 : 2 : 3 respectively.

He uses 300 g of sugar.

- (i) How much butter does he use?

*Answer* ..... g [1]

- (ii) How much is the total mass of ingredients he used?

*Answer* ..... g [1]

- (b) Ng bakes some cookies using flour, oats and butter.

The ratio flour : oats is 3 : 2.

The ratio oats : butter is 8 : 7.

Find the ratio of flour : oats : butter.

*Answer* ..... : ..... : ..... [1]

6

9 Solve  $\frac{x-4}{2} - \frac{3x}{8} = 1$ .

Answer  $x = \dots\dots\dots$  [3]

---

10 (a) Simplify  $9 + 5(2x + 3)$ .

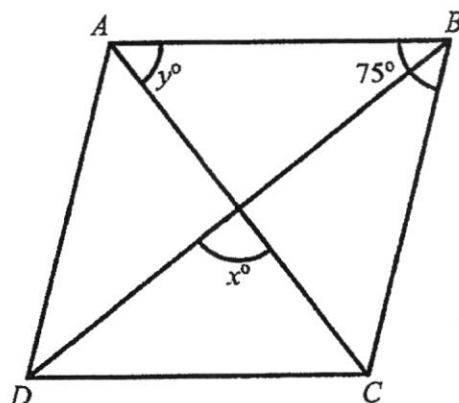
Answer  $\dots\dots\dots$  [2]

(b) Factorise completely  $7ax + 21ay - 14aby$ .

Answer  $\dots\dots\dots$  [1]

7

11



In the diagram,  $ABCD$  is a rhombus and angle  $ABC = 75^\circ$ .

Find, stating your reasons, the value of

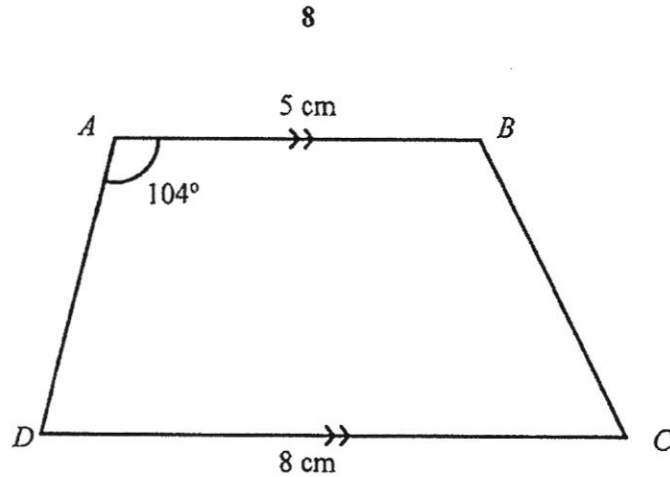
(a)  $x$ ,

Answer  $x = \dots\dots\dots$  [1]

(b)  $y$ .

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

12



In the diagram,  $ABCD$  is a trapezium where  $AB$  is parallel to  $DC$ .

$AB = 5$  cm,  $DC = 8$  cm and angle  $DAB = 104^\circ$ .

(a) Calculate, stating the reasons, angle  $ADC$ .

Answer  $\angle ADC = \dots\dots\dots^\circ$  [1]

(b) (i) Given the area of triangle  $BDC$  is  $16 \text{ cm}^2$ , show that the perpendicular height of the triangle is 4 cm.

Answer:

[1]

(ii) Hence, find the area of the trapezium  $ABCD$ .

Answer  $\dots\dots\dots \text{cm}^2$  [2]

9

13 Each term in this sequence is found by adding the same number to the previous term.

$a, 6, b, c, 30, \dots$

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

Answer  $a = \dots\dots\dots$

$b = \dots\dots\dots$

$c = \dots\dots\dots$  [2]

(b) Write down an expression, in terms of  $n$ , for the  $n$ th term.

Answer  $\dots\dots\dots$  [1]

(c) Explain why 103 is not a term of this sequence.

Answer  $\dots\dots\dots$

$\dots\dots\dots$  [1]

10

- 14 (a) Express 20 centimetres as a percentage of 3 metres.

Answer ..... % [2]

- (b) The price of a laptop was \$1899.

During the Great Singapore Sales, the price was \$1614.15.

Calculate the percentage decrease in price for the laptop.

Answer ..... % [2]

- 15 Alan is drawing a triangle.

Let the first angle be  $x$ .

The second angle is  $40^\circ$  smaller than the first angle.

The third angle is five times the size of the second angle.

Alan claims that the smallest angle is  $15^\circ$ , do you agree with him? Justify your answer by showing all workings.

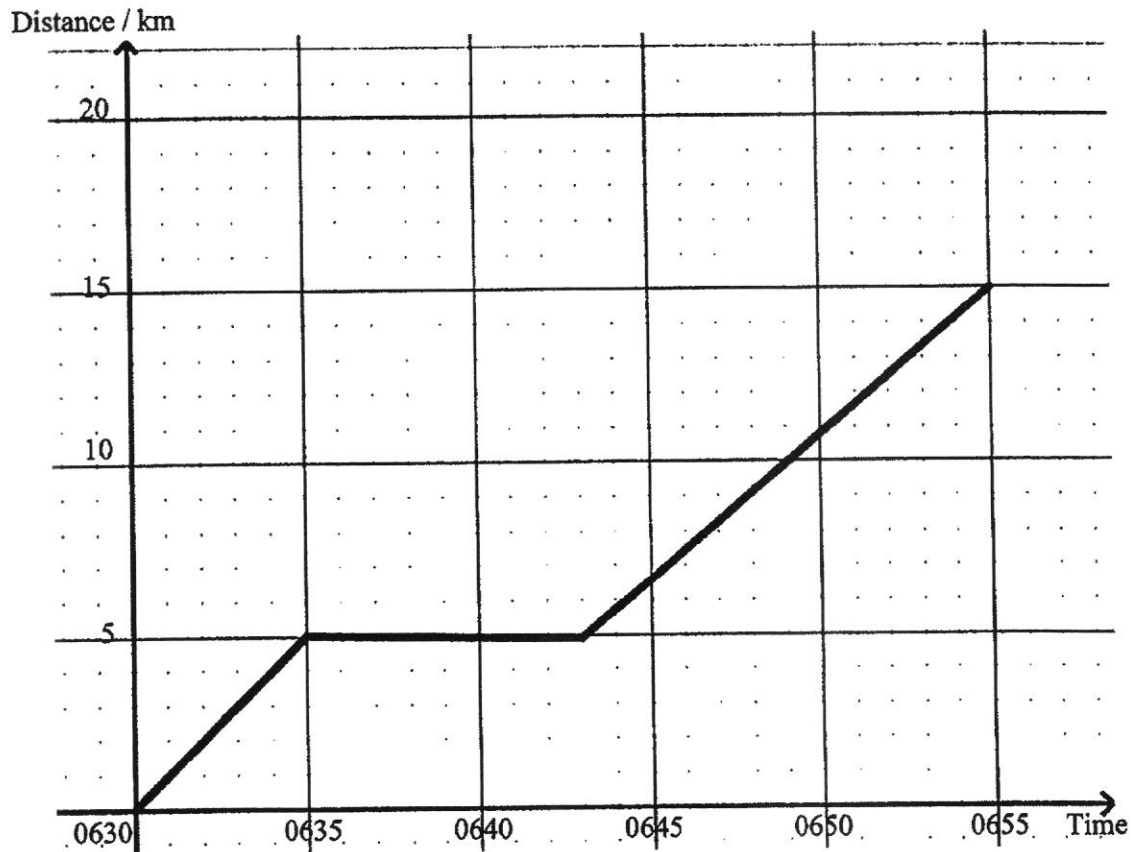
Answer ..... [4]

11

16 The graph shows Bob's journey from home to school.

He left home at 06 30 and cycled to McDonalds to get breakfast before taking a bus to school.

Assume that the bus did not stop along the way.



(a) How long did Bob spent at McDonalds?

Answer ..... minutes [1]

(b) What is the distance between McDonalds and Bob's school?

Answer ..... km [1]

(c) Calculate the speed, in kilometres per hour, of the bus.

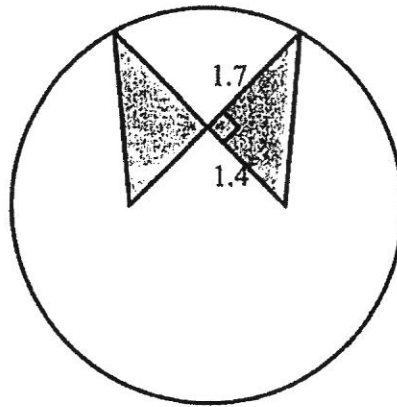
Answer ..... km/h [2]

12

17 The cross-section of a circular badge is as shown.

A ribbon-shape, consisting of two identical right-angled triangles, is removed from the badge.

All measurements are in centimetres.



Given that the radius of the circular badge is 2.5 cm, calculate the remaining area of the badge.

Answer ..... cm<sup>2</sup> [4]

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**End of Paper**



**REGENT SECONDARY SCHOOL  
END OF YEAR EXAMINATION 2020  
SECONDARY ONE (EXPRESS)**

NAME: \_\_\_\_\_

INDEX NUMBER: \_\_\_\_\_

CLASS: \_\_\_\_\_

SETTER: MS TAN LH

**MATHEMATICS  
PAPER 2**

**4048/02**

**6 October 2020  
1 hour 30 min**

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, 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.

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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.

|                                                                              |        |
|------------------------------------------------------------------------------|--------|
| <div style="text-align: center; font-size: 2em; font-weight: bold;">50</div> | TARGET |
|                                                                              |        |
| PARENT'S SIGNATURE                                                           |        |
|                                                                              |        |

This document consists of 11 printed pages.

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

- 1 Study the set of numbers below.

$$81, \frac{1}{3}, \sqrt{2}, -0.43, -8, 0.\dot{0}\dot{9}$$

Write down

- (a) a negative integer,

Answer ..... [1]

- (b) a square number,

Answer ..... [1]

- (c) an irrational number.

Answer ..... [1]

- 2 (a) Express  $\frac{3}{35}$  as a percentage.

Answer ..... % [1]

- (b) Express 17.6% as a fraction in its simplest form.

Answer ..... [1]

- 3 (a) Convert 90 km/h to m/s.

*Answer* ..... m/s [1]

- (b) A car travels for 90 km at 60 km/h.  
It then travels for 40 km at 40 km/h.

Calculate

- (i) the total time, in hours, for the whole journey,

*Answer* ..... h [2]

- (ii) the average speed for the whole journey.

*Answer* ..... km/h [2]

- 4 The rate of exchange between the Hong Kong dollar (HKD), Korean won (KRW) and Singapore dollar (SGD) are HKD 100 = SGD 1.75 and KRW 1000 = SGD 1.15.
- (a) Convert HKD 35 000 into Singapore dollars, giving your answers correct to the nearest cent.

Answer S\$..... [1]

- (b) Convert SGD 460 into Korean won, giving your answers correct to the nearest unit of the foreign currency.

Answer KRW..... [1]

5. When written as product of their prime factors,

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

$$B = 2 \times 3 \times 5 \times 7,$$

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

Find

- (a) the value of the cube root of  $A$ ,

Answer ..... [1]

- (b) the greatest number that will divide  $A$ ,  $B$  and  $C$  exactly,

Answer ..... [2]

- (c) the lowest common multiple of  $A$ ,  $B$  and  $C$ .

Answer ..... [2]

- 6 The diagram shows part of a number grid.

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  |
| 7  | 8  | 9  | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 |

A square outlining four numbers, as shown, can be placed anywhere on the grid.

- (a) If  $n$  represents the number in the top left corner of the square, write down an expression in terms of  $n$ , for the number in the bottom right corner of the square.

Answer ..... [1]

- (b) Find in its simplest form, an expression in terms of  $n$ , for the sum of the numbers in the square.

Answer ..... [2]

7

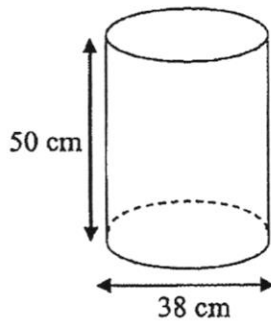


Diagram I

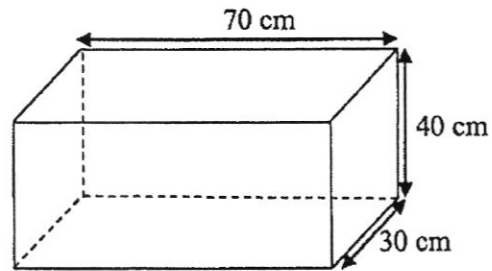


Diagram II

**Diagram I** shows an opened cylindrical tank of diameter of 38 cm and height 50 cm and is fully filled with water.

**Diagram II** shows an opened rectangular tank of length 70 cm, width 30 cm and height 40 cm.

- (a) Calculate the volume of water in the cylindrical tank.

Answer .....  $\text{cm}^3$  [2]

- (b) It takes 10 minutes to fill the cylindrical tank. Explain with working if it will take less or more time to fill the rectangular tank.

*Working:*

Answer .....  
 .....  
 .....  
 ..... [3]

- (c) A plastic material is used to construct the rectangular tank.

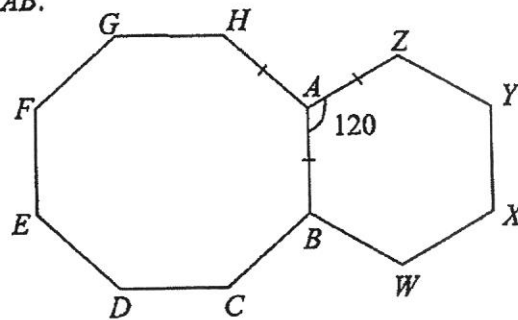
Calculate the area of the plastic material needed to construct 1 rectangular tank.

Answer .....  $\text{cm}^2$  [2]

- 8 (a) Find the size of one exterior angle of a regular hexagon.

Answer .....  $^\circ$  [1]

- (b) The figure shows a regular octagon  $ABCDEFGH$  and a regular hexagon  $ABWXYZ$  which shares a common side  $AB$ .



Calculate

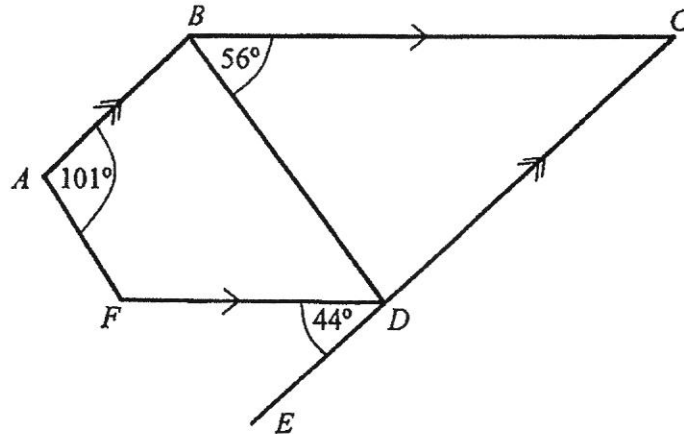
- (i) angle  $BAH$ ,

Answer .....  $^\circ$  [2]

- (ii) angle  $HAZ$ .

Answer .....  $^\circ$  [2]

- 9 In the diagram,  $AB$  is parallel to  $EDC$  and  $BC$  is parallel to  $FD$ . Angle  $CBD = 56^\circ$ , angle  $FDE = 44^\circ$  and angle  $BAF = 101^\circ$ .



- (a) Stating your reasons clearly, calculate

(i) angle  $BDF$ ,

Answer ..... $^\circ$  [1]

(ii) angle  $BCD$ ,

Answer ..... $^\circ$  [1]

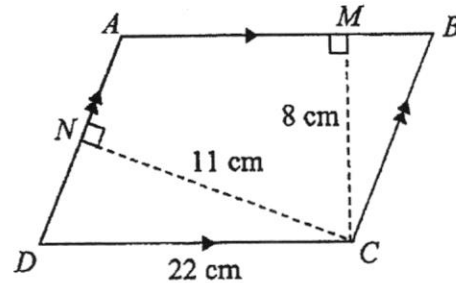
(iii) angle  $ABD$ .

Answer ..... $^\circ$  [2]

- (b) State, showing your reasoning, whether  $AF$  is parallel to  $BD$ .

Answer .....  
 .....  
 .....  
 ..... [2]

- 10 The figure below shows a parallelogram  $ABCD$ .  
 $AB$  is parallel to  $DC$  and  $DA$  is parallel to  $CB$ .  
 $MC$  is perpendicular to  $AB$  and  $NC$  is perpendicular to  $DA$ .



Given that  $DC = 22$  cm,  $MC = 8$  cm and  $NC = 11$  cm.

- (a) Calculate the area of the parallelogram  $ABCD$ .

Answer .....  $\text{cm}^2$  [2]

- (b) Show that the length of  $AD = 16$  cm.

[2]

- (c) Hence, calculate the perimeter of the parallelogram  $ABCD$ .

Answer ..... cm [2]

- 11 Elizabeth recorded the charges (\$ $y$ ) she has to pay the electrician based on the number of hours ( $x$  hours) the electrician worked.

The variables  $x$  and  $y$  are connected by the equation

$$y = 35 + 15x.$$

The table below shows some of the values she recorded.

|     |    |     |    |     |    |
|-----|----|-----|----|-----|----|
| $x$ | 0  | 1   | 2  | 3   | 4  |
| $y$ | 35 | $p$ | 65 | $q$ | 95 |

- (a) Calculate the value of  $p$  and  $q$ .

Answer  $p = \dots\dots\dots$  [1]

$q = \dots\dots\dots$  [1]

- (b) On the grid provided on page 11, draw the graph of  $y = 35 + 15x$  for  $0 \leq x \leq 4$ .  
On your axes, plot the points given in the table and join them with a straight line. [2]

- (c) Use your graph to find

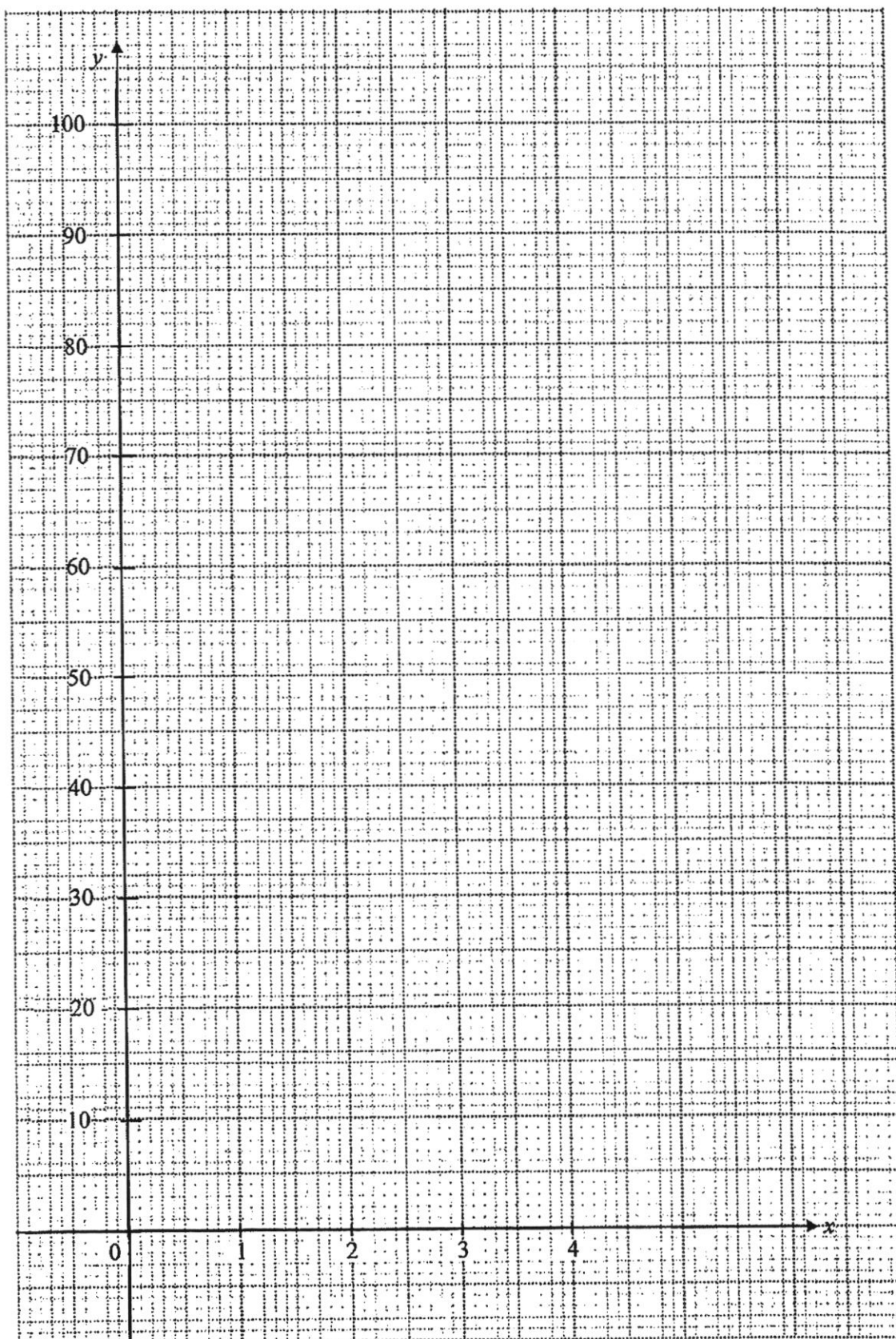
- (i) the amount of money he charged if he spent 2.5 hours on the job.

Answer \$..... [1]

- (ii) the number of hours the electrician spent on the job if he charged the electrician \$90.

Answer ..... h [1]

Graph of  $y = 35 + 15x$  for  $0 \leq x \leq 4$ .



End of paper

## 1 Express Mathematics SA2 2020 Marking Scheme

|   |                                                      |    |   |                 |
|---|------------------------------------------------------|----|---|-----------------|
| 1 | $\left(\frac{1}{3}\right)^2, 0.3, 0.33, \frac{1}{3}$ | B1 | 1 |                 |
|   |                                                      |    |   | Total marks = 1 |

|   |     |    |   |                 |
|---|-----|----|---|-----------------|
| 2 | 850 | B1 | 1 |                 |
|   |     |    |   | Total marks = 1 |

|   |     |                              |                 |   |  |
|---|-----|------------------------------|-----------------|---|--|
| 3 | (a) | $2^5 \times 3^3 \times 5$    | B1              | 1 |  |
|   | (b) | $p = 2^2 \times 5$<br>$= 20$ | B1              | 1 |  |
|   |     |                              | Total marks = 2 |   |  |

|   |                                                                                                                                                    |    |   |                 |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------|----|---|-----------------|
| 4 | $\frac{\sqrt{64.432} \times 25.12}{(19.7)^2} = \frac{\sqrt{64} \times 25}{20^2}$<br>$= \frac{8 \times 25}{400}$<br>$= \frac{1}{2} \text{ or } 0.5$ | M1 |   |                 |
|   |                                                                                                                                                    | A1 | 2 |                 |
|   |                                                                                                                                                    |    |   | Total marks = 2 |

|   |     |                                                            |    |   |                 |
|---|-----|------------------------------------------------------------|----|---|-----------------|
| 5 | (a) | $2y = -6x + 5$<br>$y = -3x + \frac{5}{2}$<br>gradient = -3 | B1 | 1 |                 |
|   | (b) | $\left(0, \frac{5}{2}\right)$                              | B1 | 1 |                 |
|   |     |                                                            |    |   | Total marks = 2 |

|    |                                                                                                                            |                                                                                                                        |    |   |                                                                                         |                 |
|----|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|----|---|-----------------------------------------------------------------------------------------|-----------------|
| 6  | $\frac{2+x}{3} - \frac{2(x-1)}{5}$ $= \frac{5(2+x)}{15} - \frac{6(x-1)}{15}$ $= \frac{10+5x-6x+6}{15}$ $= \frac{16-x}{15}$ | M1                                                                                                                     |    |   | Or                                                                                      |                 |
|    |                                                                                                                            | M1                                                                                                                     |    |   | $\frac{5(2+x)-6(x-1)}{15}$                                                              |                 |
|    |                                                                                                                            | A1                                                                                                                     | 3  |   |                                                                                         |                 |
|    |                                                                                                                            |                                                                                                                        |    |   |                                                                                         | Total marks = 3 |
| 7  | (a)                                                                                                                        | Refer to Appendix 1                                                                                                    |    |   |                                                                                         |                 |
|    |                                                                                                                            | C1 – For drawing angle $ABC = 100^\circ \pm 0.1^\circ$                                                                 | C1 |   |                                                                                         |                 |
|    |                                                                                                                            | C1 – For drawing $AC = 7 \text{ cm} \pm 0.1$                                                                           | C1 | 2 |                                                                                         |                 |
|    | (b)                                                                                                                        | 4.1 cm $\pm$ 0.1                                                                                                       | B1 | 1 |                                                                                         |                 |
|    |                                                                                                                            |                                                                                                                        |    |   |                                                                                         | Total marks = 3 |
| 8  | (a) (i)                                                                                                                    | 2 units rep. 300g<br>1 unit rep 150g<br>3 units rep 450g                                                               | B1 | 1 |                                                                                         |                 |
|    | (ii)                                                                                                                       | 10 units rep 1500g                                                                                                     | B1 | 1 |                                                                                         |                 |
|    | (b)                                                                                                                        | flour : oats : butter<br>3 : 2<br>8 : 7<br>12 : 8 : 7                                                                  | B1 | 1 |                                                                                         |                 |
|    |                                                                                                                            |                                                                                                                        |    |   |                                                                                         | Total marks = 3 |
| 9  |                                                                                                                            | $\frac{x-4}{2} - \frac{3x}{8} = 1$ $\frac{4(x-4)}{8} - \frac{3x}{8} = 1$ $4(x-4) - 3x = 8$ $4x - 16 - 3x = 8$ $x = 24$ | M1 |   | M1 for making common denominator<br>Or<br>$\frac{4(x-4)-3x}{8} = 1$<br>M1 for expansion |                 |
|    |                                                                                                                            |                                                                                                                        | M1 |   |                                                                                         |                 |
|    |                                                                                                                            |                                                                                                                        | A1 | 3 |                                                                                         |                 |
|    |                                                                                                                            |                                                                                                                        |    |   |                                                                                         | Total marks = 3 |
| 10 | (a)                                                                                                                        | $9+5(2x+3)$ $= 9+10x+15$ $= 10x+24$                                                                                    | M1 |   |                                                                                         |                 |
|    |                                                                                                                            |                                                                                                                        | A1 | 2 |                                                                                         |                 |
|    | (b)                                                                                                                        | $7a(x+3y-2by)$                                                                                                         | B1 | 1 |                                                                                         |                 |
|    |                                                                                                                            |                                                                                                                        |    |   |                                                                                         | Total marks = 3 |

|    |     |                                                                      |          |   |                         |
|----|-----|----------------------------------------------------------------------|----------|---|-------------------------|
| 11 | (a) | 90 (diagonals of rhombus bisect at right angle)                      | B1       | 1 | 0m if no/wrong reason   |
|    | (b) | $y = \frac{180-75}{2}$ (base $\angle$ of isos $\Delta$ )<br>$= 52.5$ | M1<br>A1 | 2 | -1m for no/wrong reason |
|    |     |                                                                      |          |   | Total marks = 3         |

|    |         |                                                                                                      |          |   |                       |
|----|---------|------------------------------------------------------------------------------------------------------|----------|---|-----------------------|
| 12 | (a)     | $\angle ADC = 180^\circ - 104^\circ$ (int $\angle$ )<br>$= 76^\circ$                                 | B1       | 1 | 0m if no/wrong reason |
|    | (b) (i) | Area of triangle $BDC = \frac{1}{2}bh$<br>$16 = \frac{1}{2} \times 8 \times h$<br>$h = 4$ cm (shown) | B1       | 1 |                       |
|    | (ii)    | Area of $ABCD = \frac{1}{2}(5+8)(4)$<br>$= 26 \text{ cm}^2$                                          | M1<br>A1 | 2 |                       |
|    |         |                                                                                                      |          |   | Total marks = 4       |

|    |     |                                                                                                                          |      |   |                                 |
|----|-----|--------------------------------------------------------------------------------------------------------------------------|------|---|---------------------------------|
| 13 | (a) | Difference $= \frac{30-6}{3}$<br>$= 8$<br>$a = -2$<br>$b = 14$<br>$c = 22$                                               | B1B1 | 2 | 1 correct 1m,<br>All correct 2m |
|    | (b) | $T_n = 8n - 10$                                                                                                          | B1   | 1 |                                 |
|    | (c) | $8n - 10 = 103$<br>$8n = 113$<br>$n = 14\frac{1}{8}$<br>As $n$ is not a whole number, 103 is not a term of the sequence. | B1   | 1 |                                 |
|    |     |                                                                                                                          |      |   | Total marks = 4                 |

|    |     |                                                        |          |   |                                                                                                |
|----|-----|--------------------------------------------------------|----------|---|------------------------------------------------------------------------------------------------|
| 14 | (a) | $\frac{20}{300} \times 100\%$<br>$= 6\frac{2}{3}\%$    | M1<br>A1 | 2 | If students write 6.67%, -1m overall for A. Minus 1m from whole qn if student did not write %. |
|    | (b) | $\frac{1899 - 1614.15}{1899} \times 100\%$<br>$= 15\%$ | M1<br>A1 |   |                                                                                                |
|    |     |                                                        |          |   | Total marks = 4                                                                                |

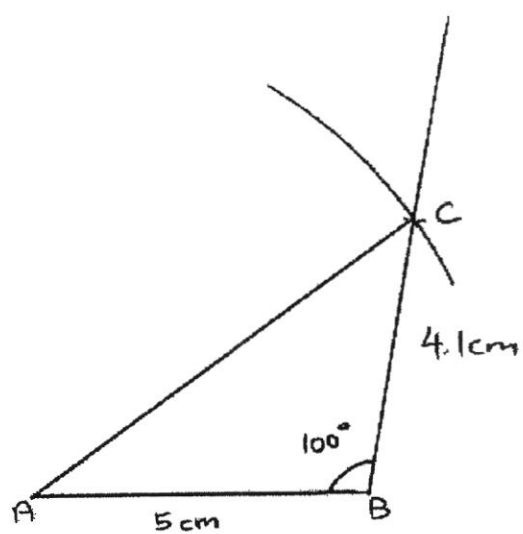
|    |                                                                       |    |                 |  |
|----|-----------------------------------------------------------------------|----|-----------------|--|
| 15 | $x + (x - 40) + 5(x - 40) = 180$                                      | M1 | 4               |  |
|    | $2x - 40 + 5x - 200 = 180$                                            | M1 |                 |  |
|    | $7x - 240 = 180$                                                      |    |                 |  |
|    | $7x = 420$                                                            |    |                 |  |
|    | $x = 60$                                                              | M1 |                 |  |
|    | $\therefore$ smallest angle $= 60^\circ - 40^\circ$                   |    |                 |  |
|    | $= 20^\circ$                                                          |    |                 |  |
|    | I do not agree with Alan as the smallest angle should be $20^\circ$ . | A1 |                 |  |
|    |                                                                       |    | Total marks = 4 |  |

|    |     |                                                |          |   |                 |
|----|-----|------------------------------------------------|----------|---|-----------------|
| 16 | (a) | 8 mins                                         | B1       | 1 |                 |
|    | (b) | 10 km                                          | B1       | 1 |                 |
|    | (c) | $10 \div \frac{12}{60}$<br>$= 50 \text{ km/h}$ | M1<br>A1 | 2 |                 |
|    |     |                                                |          |   | Total marks = 4 |

|    |                                                                                                |          |                 |                                                                              |
|----|------------------------------------------------------------------------------------------------|----------|-----------------|------------------------------------------------------------------------------|
| 17 | Area of circle = $\pi(2.5)^2$<br>$= 6.25\pi \text{ cm}^2$                                      | M1       | 4               | 19.635                                                                       |
|    | Area of 2 triangles<br>$= 2 \times \frac{1}{2} \times 1.7 \times 1.4$<br>$= 2.38 \text{ cm}^2$ | M1       |                 | If student used less than 5 s.f for workings, deduct 1m overall for accuracy |
|    | Remaining area = $6.25\pi - 2.38$<br>$= 17.3 \text{ cm}^2$ (3 s.f)                             | M1<br>A1 |                 |                                                                              |
|    |                                                                                                |          |                 |                                                                              |
|    |                                                                                                |          | Total marks = 4 |                                                                              |

5

## Appendix 1



## Regent Sec 1 Exp Mathematics EOY 2020 Marker's Report

| Qn   | Answer Scheme                                                                                                                                                                                                                                  | Mark         | 1I (36)       | 1D (37) | 1E (37) | 1G (37) | Marker's Report                                                                                        |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|---------|---------|---------|--------------------------------------------------------------------------------------------------------|
|      |                                                                                                                                                                                                                                                |              | (% incorrect) |         |         |         |                                                                                                        |
| 1a   | - 8                                                                                                                                                                                                                                            | B1           | 33.3          | 45.9    | 27.0    | 29.7    | well answered                                                                                          |
| 1b   | 81                                                                                                                                                                                                                                             | B1           | 19.4          | 18.9    | 13.5    | 10.8    | well answered                                                                                          |
| 1c   | $\sqrt{2}$                                                                                                                                                                                                                                     | B1           | 47.2          | 73.0    | 73.0    | 70.3    | Common mistake students: 1/3 or 0.09                                                                   |
| 2a   | $8\frac{4}{7}\%$                                                                                                                                                                                                                               | B1           | 16.7          | 13.5    | 27.0    | 8.1     | Answer must in exact in fraction.<br>Reject 8.57 (as it is a round off value): minus [1] for accuracy. |
| 2b   | $\frac{22}{125}$                                                                                                                                                                                                                               | B1           | 22.2          | 48.6    | 10.8    | 13.5    | well answered                                                                                          |
| 3a   | $90 \text{ km} / \text{h} = \frac{90000 \text{ m}}{3600 \text{ s}}$<br>$= 25 \text{ m} / \text{s}$                                                                                                                                             | A1           | 47.2          | 35.1    | 45.9    | 35.1    | well answered                                                                                          |
| 3bi  | time taken to travel 90 km = $\frac{\text{dist}}{\text{time}} = \frac{90}{60} = 1.5 \text{ h}$<br>time taken to travel 40 km = $\frac{\text{dist}}{\text{time}} = \frac{40}{40} = 1 \text{ h}$<br>total time taken = $1.5 + 1 = 2.5 \text{ h}$ | M1<br><br>A1 | 16.7          | 18.9    | 16.2    | 2.7     | well answered<br>M1 for working $\frac{90}{60}$                                                        |
| 3bii | $\text{average speed} = \frac{\text{total dist}}{\text{total time}}$<br>$= \frac{90+40}{2.5}$<br>$= 52 \text{ km} / \text{h}$                                                                                                                  | M1<br>A1     | 2.8           | 5.4     | 8.1     | 13.5    | well answered<br>M1 for ecf                                                                            |

|    |                                                                                                                                                                                           |          |      |      |      |      |      |                                                                                                                                                                                                                |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------|------|------|------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4a | HKD 100 = S\$ 1.75<br>HKD 35 000 = S\$ 1.75 × 350 = S\$ 612.50                                                                                                                            | B1       | 8.3  | 16.2 | 8.1  | 16.2 | 16.2 | well answered<br>some students give answer to<br>the nearest dollar (thinking that<br>ans to be given in 3s.f.) instead<br>of nearest cents as stated in<br>questions – mark awarded for<br>correct 3sf given. |
| 4b | S\$1.15 = KRW 1000<br>S\$1 = KRW $\frac{1000}{1.15} \times 1000$<br>S\$460 = KRW $\frac{1000}{1.15} \times 460 = \text{KRW } 400\,000$                                                    | B1       | 2.8  | 16.2 | 5.4  | 5.4  | 5.4  | well answered                                                                                                                                                                                                  |
| 5a | $\sqrt[3]{A} = \sqrt[3]{2^3 \times 5^3} = 2 \times 5 = 10$                                                                                                                                | B1       | 13.9 | 18.9 | 13.5 | 27.0 | 27.0 | Instead of $\sqrt[3]{\quad}$ , many presented<br>their ans as $\sqrt{\quad}$ .                                                                                                                                 |
| 5b | Largest integer = HCF of A, B, C<br>= 2 × 5<br>= 10                                                                                                                                       | M1<br>A1 | 44.4 | 56.8 | 32.4 | 24.3 | 24.3 | Lacking in concept of common<br>factor for all 3 numbers.                                                                                                                                                      |
| 5c | LCM of A, B, C = $2^3 \times 3 \times 5^3 \times 7^2$<br>= 147 000                                                                                                                        | M1<br>A1 | 33.3 | 56.8 | 21.6 | 32.4 | 32.4 | Forgotten how to find LCM                                                                                                                                                                                      |
| 6a | n + 7                                                                                                                                                                                     | B1       | 52.8 | 70.3 | 54.1 | 54.1 | 54.1 | Don't understand information<br>given in question.                                                                                                                                                             |
| 6b | n + n + 1 + n + 6 + n + 7<br>= 4n + 14                                                                                                                                                    | M1<br>A1 | 75.0 | 78.4 | 70.3 | 70.3 | 70.3 | Don't understand information<br>given in question.                                                                                                                                                             |
| 7a | Volume of water in cylindrical tank<br>= base area × ht<br>= $\pi r^2 h$<br>= $\pi \times \left(\frac{38}{2}\right)^2 \times 50$<br>= 56 705.7474<br>= 56 700 cm <sup>3</sup> (to 3 s.f.) | M1<br>A1 | 41.7 | 18.9 | 24.3 | 37.8 | 37.8 | Many students did not give<br>answer to 3 s.f.                                                                                                                                                                 |

|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |      |      |      |      |                                                                                                                                                     |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------|------|------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 7b    | <p>Flow rate = <math>56\,700\text{ cm}^3/10\text{ min}</math><br/> <math>= 5\,670\text{ cm}^3/\text{min}</math></p> <p>Volume of rect tank = <math>l \times b \times h</math><br/> <math>= 70 \times 30 \times 40</math><br/> <math>= 84\,000\text{ cm}^3</math></p> <p>time taken = <math>\frac{84\,000}{5\,670}</math><br/> <math>= 14.8\text{ min} &gt; 10\text{ min}</math></p> <p>It takes more time to fill the rectangular tank.</p> <p>Surface area of rect tank<br/> <math>= (70 \times 30) + 2(30 \times 40) + 2(70 \times 40)</math><br/> <math>= 10\,100\text{ cm}^2</math></p> | M1<br><br>M1<br>A1 | 11.1 | 10.8 | 10.8 | 10.8 | Accepted alternative solution: calculated volume of rect. tank, comparing which container has a larger volume thus more time required.              |
| 7c    | <p>It takes more time to fill the rectangular tank.</p> <p>Surface area of rect tank<br/> <math>= (70 \times 30) + 2(30 \times 40) + 2(70 \times 40)</math><br/> <math>= 10\,100\text{ cm}^2</math></p>                                                                                                                                                                                                                                                                                                                                                                                     | M1<br>A1           | 58.3 | 75.7 | 40.5 | 70.3 | Major mistake: calculated the top surface area.<br>Only 5 surfaces required as it is a open container.                                              |
| 8a    | <p>Exterior angle = <math>\frac{360^\circ}{6} = 60^\circ</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | B1                 | 33.3 | 59.5 | 32.4 | 48.6 | Many students calculated the interior angle but mistakenly took $360^\circ$ instead of $180^\circ$ (adj $\angle$ on a st line) to obtain ext angle. |
| 8bi   | <p><math>\angle BAH = \frac{(8-2) \times 180}{8}</math> (int. <math>\angle</math>s of octagon)<br/> <math>= 1080/8</math><br/> <math>= 135^\circ</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                 | B1                 | 19.4 | 37.8 | 32.4 | 10.8 | Can use ext angles                                                                                                                                  |
| 8bii  | <p><math>\angle HAZ = 360^\circ - 135^\circ - 120^\circ</math> (<math>\angle</math>s at a pt)<br/> <math>= 105^\circ</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | M1<br>A1           | 13.9 | 16.2 | 18.9 | 5.4  | ecf 2m<br>mistake – students assumed that its isos triangle.<br>No/wrong reason – 1 mark                                                            |
| 9ai   | $\angle BDF = \angle CBD = 56^\circ$ (alt. $\angle$ s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B1                 | 11.1 | 13.5 | 21.6 | 21.6 | No/wrong reason – zero mark                                                                                                                         |
| 9aii  | $\angle BCD = \angle FDE = 44^\circ$ (corresponding angle)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | B1                 | 5.6  | 24.3 | 24.3 | 18.9 | No/wrong reason – zero mark                                                                                                                         |
| 9aiii | <p><math>\angle ABD = 180^\circ - 44^\circ - 56^\circ</math> (int. <math>\angle</math>s)<br/> <math>= 80^\circ</math></p> <p>Or<br/> <math>\angle BDC = 180^\circ - 44^\circ - 56^\circ = 80^\circ</math> (adj <math>\angle</math>s on a st line)<br/> <math>\angle BDC = \angle BDC</math> (alt. <math>\angle</math>s)<br/> <math>= 80^\circ</math></p>                                                                                                                                                                                                                                    | M1<br>A1           | 33.3 | 43.2 | 43.2 | 27.0 | Many students did not recognise that its interior angles.                                                                                           |

|       |                                                                                                                                                                                                                                                                        |          |                 |                 |                 |                 |                                                                                                                                              |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------|-----------------|-----------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 9b    | The sum of interior angles of $\angle BAF$ and $\angle ABD$ ( $=181^\circ$ ) is not equal to 180, thus AF is not parallel to BD.<br>Or<br>$\angle ABD + \angle BAF = 101 + 80^\circ = 181^\circ$<br>Since interior angles $\neq 180^\circ$ , AF is not parallel to BD. | M1<br>A1 | <del>73.8</del> | <del>67.6</del> | <del>81.1</del> | <del>73.0</del> | Most students did not give the reason of interior angles but just stated that $101 + 80^\circ = 181^\circ \neq 180^\circ$                    |
| 10a   | Area of parallelogram = base $\times$ height<br>$= 22 \times 8$<br>$= 176 \text{ cm}^2$                                                                                                                                                                                | M1<br>A1 | 8.3             | 8.1             | 10.8            | 5.4             | well answered                                                                                                                                |
| 10b   | Area of parallelogram = base $\times$ height<br>$176 = AD \times 11$<br>$AD = 16 \text{ cm}$ (shown)                                                                                                                                                                   | M1<br>A1 | <del>44.4</del> | <del>67.6</del> | <del>51.4</del> | <del>29.7</del> | Students did not show that $AD = 16 \text{ cm}$ , instead uses substitute 16 into the area of parallelogram and show that it's equal to 176. |
| 10c   | Perimeter $= 2(16 + 22)$<br>$= 76 \text{ cm}$                                                                                                                                                                                                                          | A1       | 5.6             | 16.2            | 5.4             | 5.4             | well answered                                                                                                                                |
| 11a   | $p = 35 + 15(1) = \$50$<br>$q = 35 + 15(3) = \$80$                                                                                                                                                                                                                     | B1<br>B1 | 0.0             | 0.0             | 0.0             | 0.0             | well answered                                                                                                                                |
| 11b   | Graph $y = 35 + 15x$<br>All points correctly plotted<br>Straight line drawn                                                                                                                                                                                            | B1<br>B1 | 13.9            | 13.5            | 8.1             | 2.7             | well answered<br>mistake – points x too large and some uses dots instead of x to plot a point.                                               |
| 11ci  | Refer to student's graph: between \$72 - \$73                                                                                                                                                                                                                          | B1       | 8.3             | 29.7            | 18.9            | 29.7            | must read from graph.<br>Reject all substitution ans.                                                                                        |
| 11cii | Refer to student's graph: between 3.6h – 3.7h                                                                                                                                                                                                                          | B1       | 25.0            | 35.1            | 24.3            | 35.1            | must read from graph.<br>Reject all substitution ans.                                                                                        |

- (b) On the grid provided, draw the graph of  $y = 35 + 15x$  for  $0 \leq x \leq 4$ .

[2]

