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BEDOK VIEW SECONDARY SCHOOL

END-OF-YEAR EXAMINATION 2018

CANDIDATE
NAME

REGISTER
NUMBER

CLASS

MATHEMATICS SYLLABUS A
Secondary 2 Normal Academic
Paper 1

4045/01
4 October 2018
1 hour 15 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your 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.

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

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 total of the marks for this paper is 50.

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.

Total	
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Setter: Ms Beevi

Parent's / Guardian's Signature:

This document consists of **10** printed pages.

Do not turn over the page until you are told to do so.

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 (a) Expand and simplify $x^2 - (x + 2)^2$.

Answer (a) [2]

- (b) Factorise $2y^2 - 9y - 5$.

Answer (b) [2]

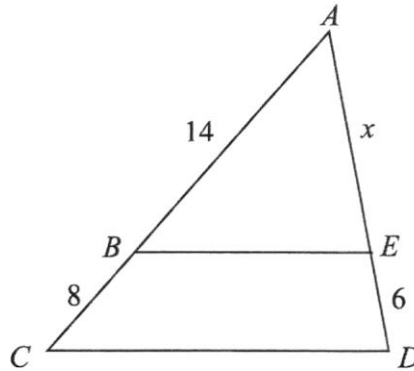
- 2 (a) Simplify $\frac{2x+4}{x^2+5x+6}$.

Answer (a) [3]

- (b) Simplify $\frac{24(x+y)}{8x^2} \div \frac{(x^2-y^2)}{3x}$.

Answer (b) [3]

- 3 Triangle ABE is similar to triangle ACD .
 $AB = 14$ cm, $BC = 8$ cm, $ED = 6$ cm and $AE = x$ cm.



Find the value of x .

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

- 4 A shopping centre carried out a survey to find out the colour preference of the shoppers. The table below shows the results of the survey.

Colour preference	Number of shoppers
Yellow	40
Blue	20
Red	30
Green	10

Find

- (a) the probability that the shoppers chose blue,

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

- (b) the probability that the shoppers did not choose green.

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

- 5 The variables x and y are connected by the equation $y = 2 - 2x$. The table below shows some corresponding values of x and y .

- (a) Complete the following table for $y = 2 - 2x$.

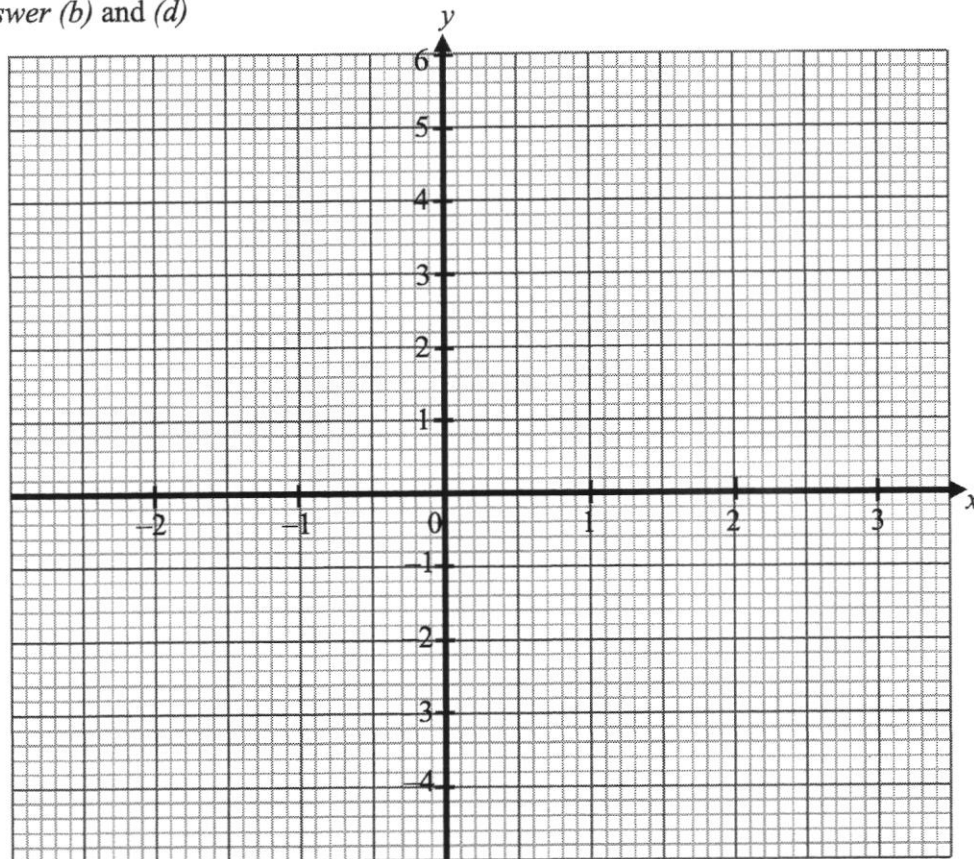
Answer (a)

x	-2	-1	0	1	2	3
y	6		2	0		-4

[2]

- (b) Using the axes provided below, draw the graph of $y = 2 - 2x$ for $-2 \leq x \leq 3$.

Answer (b) and (d)



[2]

- (c) Find the gradient of the line.

Answer (c) [1]

- (d) On the grid provided above, draw the line $x = -2$.

[1]

- (e) Calculate the area of the triangle enclosed by the lines $x = -2$, $y = 2 - 2x$ and the x -axis.

Answer (e) [2]

6 Given that y is directly proportional to x^2 and $y = 14$ when $x = 2$,

(a) express y in terms of x ,

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

(b) find the value of y when $x = 3$,

Answer (b) $y = \dots\dots\dots$ [2]

(c) hence, find the percentage change in y when x changes from 2 to 3.

Answer (c) $\dots\dots\dots\%$ [2]

- 7 (a) Construct triangle DEF , given that $DE = 8$ cm, $DF = 10$ cm and $EF = 6$ cm. The line DF has been drawn for you. [2]

Answer (a), (b) and (c)



- (b) Using a ruler and a compass, construct
- (i) the perpendicular bisector of line DF , [1]
 - (ii) the angle bisector of angle EFD . [1]
- (c) Mark clearly the point of intersection of (b)(i) and (b)(ii). Label the point as G . [1]
- (d) Measure the length of FG .

Answer (d) $FG = \dots\dots\dots$ cm [1]

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

(a) $2 - \frac{2x-5}{2}$

Answer (a) [2]

(b) $\frac{x+5}{2} + \frac{2x-1}{3}$

Answer (b) [2]

9 Given that $\frac{2p+q}{3q-4p} = \frac{5}{8}$, find the value of $\frac{p}{q}$.

Answer [3]

10 (a) Expand $(x - 3)(x + 3)$.

Answer (a) [1]

(b) Hence, without the use of calculator, find the value of 397×403 . Show your working clearly.

Answer (b) [2]

11 The first four terms of a sequence are shown below.

$$3+9=3\times 2^2=12$$

$$3+9+15=3\times 3^2=27$$

$$3+9+15+21=3\times 4^2=48$$

(a) Write down the 4th line of the pattern.

Answer (a) [1]

(b) A given line of the sequence is as follows:

$$3+9+15+21+27+\dots+x=3\times y^2=507$$

Find the value of x and of y .

Answer (b) $x = \dots\dots\dots$,

$y = \dots\dots\dots$ [3]



BEDOK VIEW SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2018

CANDIDATE
NAME

REGISTER
NUMBER

CLASS

MATHEMATICS SYLLABUS A
Secondary 2 Normal Academic
Paper 2

4045/02
8 October 2018
1 hour 30 minutes

Additional Materials: Answer Paper

READ THESE INSTRUCTIONS FIRST

Write your answers and working on the separate Answer Paper provided.
Write your 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.

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The total number of marks for this paper is 50.

The use of a 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.

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

Setter: Ms Beevi

Parent's / Guardian's Signature:

This document consists of 6 printed pages.

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Mathematical Formulae*Compound Interest*

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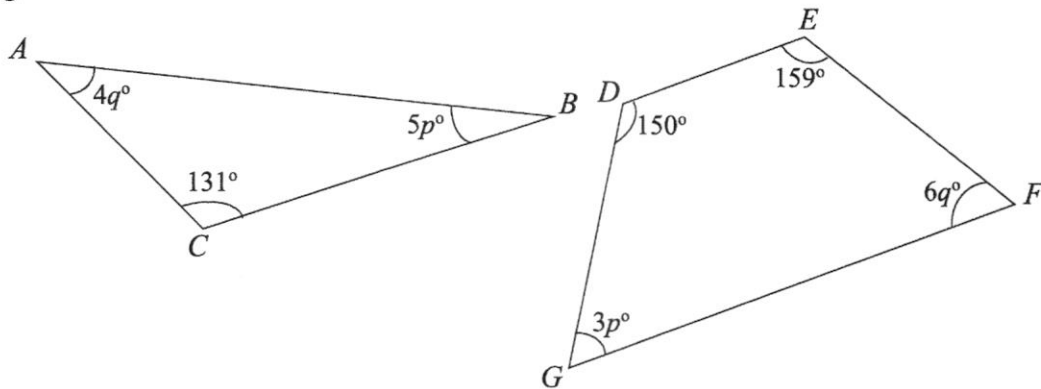
Statistics

$$\text{Mean} = \frac{\sum fx}{\sum f}$$

$$\text{Standard Deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$

Answer **all** the questions.

- 1 The figure below shows Triangle ABC and Quadrilateral $DEFG$ with the respective angles.



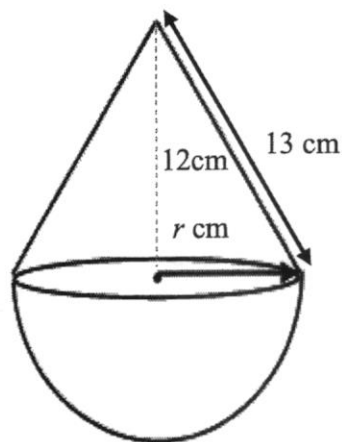
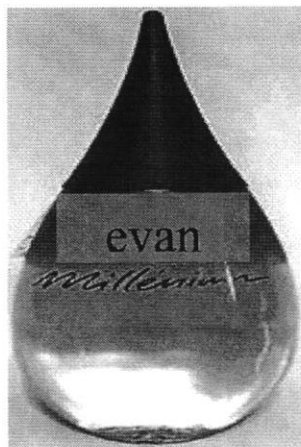
- (a) Using the information shown in the diagrams, write down two equations in terms of p and q . [2]
- (b) Solve these equations to find the values of p and q . [3]

- 2 (a) Factorise $27x^2 - 3y^2$. [2]
- (b) Given that $27x^2 - 3y^2 = 33$ and $3x - y = 1$, find the value of $3x + y$. [2]

- 3 Jacie is x years old. David, her brother, is 11 years older than her. Their mother is three times as old as Jacie.
- (a) Write down expressions, in terms of x for
- (i) David's age and [1]
- (ii) their mother's age. [1]
- (b) The sum of the ages of the three members of the family is 111.
- (i) Form an equation for the sum of the ages of the three members of the family. [1]
- (ii) Solve the equation to find the value of x . [1]

- 4 A florist sells a bouquet of flowers at \$25 each. If the florist wants to have total sales of at least \$520 for a particular day, she needs to sell x bouquet of flowers.
- (a) Using the above information, form and simplify an inequality for the number of bouquets of flowers she needs to sell. [2]
- (b) Hence write down the minimum number of bouquets that she needs to sell. [1]

- 5 The *Evan Millenium* Mineral bottle shown below can be modelled by attaching a cone to a hemisphere. The height of the cone is 12 cm and the slant height of the cone is 13 cm.



- (a) Find the radius of the model cone. [2]
- (b) Using your answer in (a), find the estimated total surface area of the *Evan Millenium* Mineral bottle. [2]
- (c) Find the estimated volume of the *Evan Millenium* Mineral bottle. [2]
-

- 6 The data below shows the number of hours spent by 20 students on the internet every day.

4	3	4	6	4
0	2	5	0	4
1	3	4	4	1
4	5	6	3	4

- (a) Draw a dot diagram to represent the data above. [2]
- (b) Find
- (i) the modal number of hours that students spend on the internet every day, [1]
- (ii) the mean number of hours that students spend on the internet every day, [2]
- (iii) the percentage of students who did not use the internet, [1]
- (iv) the probability that the students spent more than 3 hours on the internet every day. [2]
-

- 7 If $x^2 + y^2 = 14$ and $xy = 5$, find the value of $(3x + 3y)^2$. [3]
-

- 8 The ArtScience Museum is made up of a base and a flower-like structure consisting of 10 petals. The heights of the petals vary.

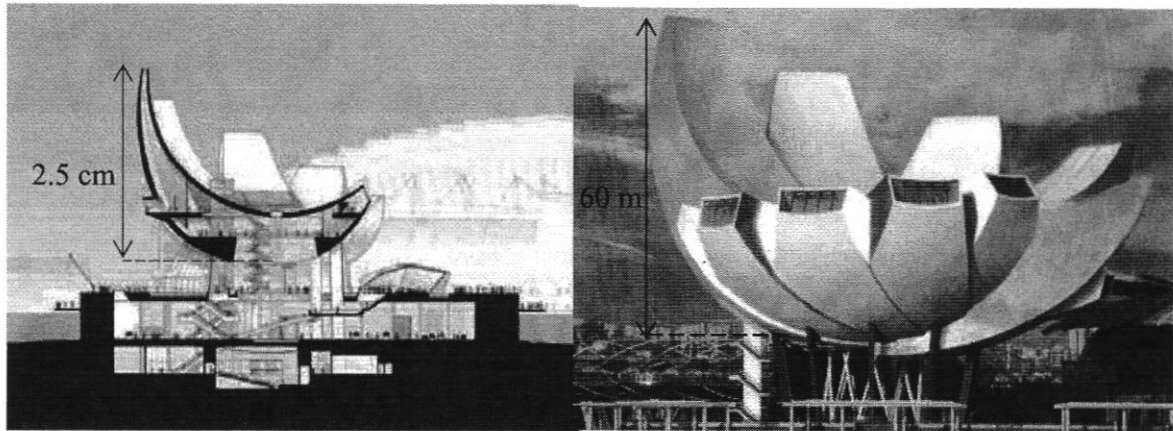


Diagram I

Diagram II

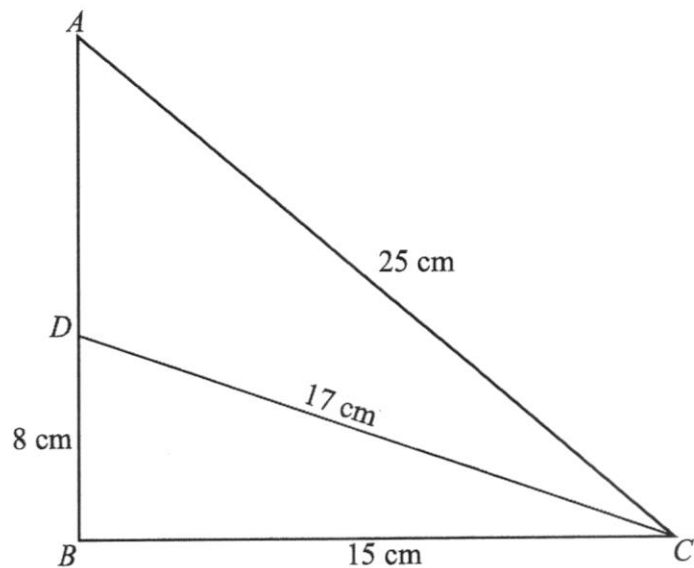
- (a) On the design drawing as shown in Diagram I, the height of the highest petal is 2.5 cm. The actual height of the highest petal is 60 m as shown in Diagram II.

Find

- (i) the scale of the design drawing in the form 1: n , [1]
- (ii) the height of the petal, in metres, that measures 1.9 cm on the design [2]
- (iii) the area of the petal on the design drawing if its actual area is 1728 m^2 . [3]
- (b) Using the price list below, find the cheapest combination of tickets for a group of 6 adults, 3 senior citizens and 2 children. Explain your answer with clear working. [3]

Exhibition	Category	Price
FUTURE WORLD: Where Art Meets Science	Adult	\$17
	Senior Citizen (65 years old and above)	\$14
	Child (2-12 years old)	\$10
	Family (2 Adults + 2 Children)	\$44

(Source: <https://www.marinabaysands.com/museum.html>. Correct as of Aug 2018)



Triangle ABC above has lengths, such that $AC = 25\text{ cm}$, $BC = 15\text{ cm}$ and $BD = 8\text{ cm}$.

- (a) Given that $CD = 17\text{ cm}$, determine if triangle BCD is a right-angled triangle. [2]
- (b) Find the length of AB . [2]
- (c) Find the area of triangle ABC . [2]
- (d) Find the shortest distance from B to AC . [2]

END OF PAPER

No.	Working	Remarks												
1	<p>(a) $x^2 - (x + 2)^2 = [x - (x + 2)][x + (x + 2)]$ [M1] $= (x - x - 2)(2x + 2)$ Correct $= -2(2x + 2)$ Expansion $= -4x - 4$ [A1]</p> <p>OR</p> <p>$x^2 - (x + 2)^2 = x^2 - (x^2 + 4x + 4)$ [M1] $= x^2 - x^2 - 4x - 4$ $= -4x - 4$ [A1]</p>													
	<p>(b) $2y^2 - 9y - 5 = (2y + 1)(y - 5)$</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">$2y$</td> <td style="padding: 5px;">$+1$</td> <td style="padding: 5px;">$+y$</td> <td></td> </tr> <tr> <td style="padding: 5px;">$1y$</td> <td style="padding: 5px;">-5</td> <td style="padding: 5px;">$-10y$</td> <td style="padding: 5px;">[M1]</td> </tr> <tr> <td colspan="2" style="border-top: 1px solid black; padding: 5px;">$2y^2$</td> <td style="border-top: 1px solid black; padding: 5px;">-5</td> <td style="border-top: 1px solid black; padding: 5px;">$-9y$</td> </tr> </table> <p>$2y^2 - 9y - 5 = (2y + 1)(y - 5)$ [A1]</p>	$2y$	$+1$	$+y$		$1y$	-5	$-10y$	[M1]	$2y^2$		-5	$-9y$	
$2y$	$+1$	$+y$												
$1y$	-5	$-10y$	[M1]											
$2y^2$		-5	$-9y$											

[Total : 4m]

2	<p>(a) $\frac{2x + 4}{x^2 + 5x + 6} = \frac{2(x + 2)}{(x + 3)(x + 2)}$ [M1] $= \frac{2}{(x + 3)}$ [M1] [A1]</p>	
	<p>(b) $\frac{24(x+y)}{8x^2} \div \frac{(x^2-y^2)}{3x}$ $= \frac{24(x+y)}{8x^2} \times \frac{3x}{x^2-y^2}$ [M1] : Change to Multiplication $= \frac{24(x+y)}{8x^2} \times \frac{3x}{(x-y)(x+y)}$ [M1] : Factorize $= \frac{9}{x(x-y)}$ [A1]</p>	

[Total: 6m]

3	$\text{scale factor} = k = \frac{22}{14} = \frac{11}{7} \quad [\text{M1}]$ $k = \frac{AD}{AE} = \frac{AC}{AB}$ $k = \frac{11}{7} = \frac{x}{x+6}$ $\frac{x+6}{x} = \frac{11}{7} \quad [\text{M1}] : \text{Cross-Multiplication}$ $11x = 7x + 42$ $11x - 7x = 42$ $4x = 42$ $x = \frac{42}{4} = 10.5 \quad [\text{A1}]$	
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[Total: 3m]

4	(a) $P(\text{Blue}) = \frac{20}{100} = \frac{1}{5}$ or 0.2 [B1]	
	(b) $P(\text{Green}) = \frac{10}{100} = \frac{1}{10}$ or 0.1 [M1] $P(\text{Not Green}) = 1 - \frac{1}{10}$ $= \frac{9}{10}$ or 0.9 [A1]	

[Total: 3m]

5	(a)	<table border="1"> <tr> <td>x</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>y</td> <td>6</td> <td>4 [B1]</td> <td>2</td> <td>0</td> <td>-2 [B1]</td> <td>-4</td> </tr> </table>	x	-2	-1	0	1	2	3	y	6	4 [B1]	2	0	-2 [B1]	-4	
		x	-2	-1	0	1	2	3									
y	6	4 [B1]	2	0	-2 [B1]	-4											
	(b)	<p>[B1]: Correct plotting of points [B1]: Correct plotting of straight line and label</p>															
	(c)	$m = \frac{y_2 - y_1}{x_2 - x_1}$ $m = -2 \quad \text{[B1]}$															
	(d)	As shown in the graph provided [B1]															
	(e)	<p>Area of triangle = $\frac{1}{2} \times \text{Base} \times \text{Perpendicular Height}$</p> $= \frac{1}{2} \times 3 \times 6 \quad \text{[M1]}$ $= 9 \text{ units}^2 \quad \text{[A1]}$															

[Total: 8m]

6	<p>(a) $y = kx^2$ $y = 14, x = 2$ $14 = k(2)^2$ $k = \frac{14}{4} = 3.5$ [M1] $y = 3.5x^2$ [A1]</p>	
	<p>(b) When $x = 3$, $y = 3.5(3^2)$ [M1] $y = 31.5$ [A1]</p>	
	<p>(c) % change in $y = \frac{31.5-14}{14} \times 100\%$ [M1] $= \frac{17.5}{14} \times 100\%$ $= 125\%$ [A1]</p>	

[Total: 6m]

7	Refer to the Answer booklet attached for drawing of locus	
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[Total: 6m]

8	<p>(a) $2 - \frac{2x-5}{2}$ $= \frac{2}{1} - \left(\frac{2x-5}{2}\right)$ [M1] $= \frac{4-2x+5}{2}$ $= \frac{-2x+9}{2}$ [A1]</p>	
	<p>(b) $\frac{x+5}{2} + \frac{2x-1}{3}$ $= \frac{3(x+5)}{6} + \frac{2(2x-1)}{6}$ $= \frac{3x+15+4x-2}{6}$ [M1] $= \frac{7x+13}{6}$ [A1]</p>	

[Total: 4m]

9	$\frac{2p + q}{3q - 4p} = \frac{5}{8}$ $8(2p + q) = 5(3q - 4p) \quad \text{[M1]}$ $16p + 8q = 15q - 20p$ $16p + 20p = 15q - 8p$ $36p = 7q \quad \text{[M1]}$ $\frac{p}{q} = \frac{7}{36} \quad \text{[A1]}$	
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[Total: 3m]

10	<p>(a)</p> $(x - 3)(x + 3)$ $= (x)^2 - (3)^2$ $= x^2 - 9 \quad \text{[B1]}$	
	<p>(b)</p> $(x - 3)(x + 3) = (397)(403)$ $(x - 3)(x + 3) = (400 - 3)(400 + 3) \quad \text{[M1]}$ $\therefore x = 400$ $(x)^2 - (3)^2 = (400)^2 - (3)^2$ $x^2 - 9 = (400)^2 - (3)^2$ $x^2 - 9 = 160000 - 9$ $= 159991 \quad \text{[A1]}$	

[Total: 3m]

11	<p>(a)</p> $3 + 9 + 15 + 21 + 27 = 3 \times 5^2 = 75 \quad \text{[B1]}$	
	<p>(b)</p> $3y^2 = 507$ $y^2 = 169$ $y = 13 \quad \text{[A1]}$ <p>When $y = 12$,</p> $= 3 \times y^2 = 3(144) = 432 \quad \text{[M1]}$ <p>$\therefore x = 507 - 432$</p> $x = 75 \quad \text{[A1]}$	

[Total: 4m]

No.	Working	Remarks
1	<p>(a) $131^\circ + 5p^\circ + 4q = 180^\circ$ ----- (1) $150^\circ + 159^\circ + 6q + 3p = 360^\circ$ ----- (2) From (1): $5p + 4q = 180 - 131$ $5p + 4q = 49$ [B1] From (2): $3p + 6q = 360 - 150 - 159$ $3p + 6q = 51$ [B1]</p>	<p><i>*Don't have to state the reasons for the angles</i></p>
	<p>(b) $(1) \times 3:$ $15p + 12q = 147$ ----- (3) $(2) \times 5:$ $15p + 30q = 255$ ----- (4) } [M1] $(4) - (3):$ $30q - 12q = 255 - 147$ $18q = 108$ $q = \frac{108}{18} = 6$ Sub $q = 6$ into (2): $3p + 6q = 51$ $3p = 51 - 6q$ $3p = 51 - 6(6)$ $p = 5$ [A1], $q = 6$ [A1] OR $5p + 4q = 49$ ----- (1) $3p + 6q = 51$ ----- (2) $(2): 3p = 51 - 6q$ $p = \frac{51-6q}{3}$ ----- (3) Sub (3) into (1): $(1): 5p + 4q = 49$ $5\left(\frac{51-6q}{3}\right) + 4q = 49$ $\frac{255 - 30q + 4q(3)}{3} = 49$ $\frac{255 - 30q + 12q}{3} = 49$ $\frac{255 - 18q}{3} = 49(3)$ $-18q = 147 - 255$ $q = \frac{-108}{-18} = 6$ Sub $q = 6$ into (2): $(2): 3p + 6q = 51$ $3p + 6(6) = 51$ $p = \frac{15}{3} = 5$ $p = 5$ [A1], $q = 6$ [A1]</p>	

2	(a)	$27x^2 - 3y^2 = 3(9x^2 - y^2)$ $= 3[(3x)^2 - (y)^2] \quad \text{[M1]}$ $= 3(3x - y)(3x + y) \quad \text{[A1]}$	
	(b)	$27x^2 - 3y^2 = 33$ $3(3x - y)(3x + y) = 33 \quad \text{[M1]}$ $(3x - y)(3x + y) = 11$ <p>Since $(3x - y) = 1$,</p> $(3x + y)(1) = 11$ $3x + y = 11 \quad \text{[A1]}$	

[Total: 4m]

3	(a)	(i)	Jacie = x years old Olivia = $(x + 11)$ years old [B1]	
		(ii)	Mother's age = $3x$ years old [B1]	
	(b)	(i)	Total age = Jacie + Olivia + Mother = 111 $x + (x + 11) + 3x = 111$ or $5x + 11 = 111$ or $5x = 100$ [B1]	
		(ii)	$5x = 111 - 11$ $x = \frac{100}{5} = 20$ [B1]	

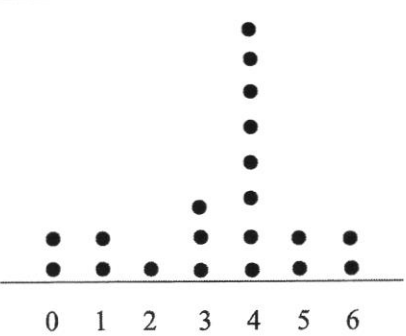
[Total: 4m]

4	(a)	1 bouquet = \$25 Let x be the numbers of bouquets to be sold. $25x \geq 520$ [M1] $x \geq \frac{520}{25}$ $x \geq 20.8$ [A1]	
	(b)	Min no. of $x = 21$ [A1]	

[Total: 3m]

5	(a)	$r = \sqrt{13^2 - 12^2}$ [M1] $r = \sqrt{25} = 5 \text{ cm}$ [A1]	
	(b)	Total surface area of Evan mineral bottle = Surface area of cone + surface area of hemisphere $= \pi r l + 2\pi r^2$ $= \pi(5)(13) + 2\pi(5)^2$ [M1] $= 115\pi$ $= 361.281552$ $= 361 \text{ cm}^2$ (3sf) [A1]	
	(c)	Volume of Evan mineral bottle = Volume of cone + Volume of hemisphere $= \frac{1}{3}\pi r^2 h + \frac{2}{3}\pi r^3$ $= \frac{1}{3}\pi(5)^2(12) + \frac{2}{3}\pi(5)^3$ [M1] $= 100\pi + \frac{250}{3}\pi$ $= \frac{550\pi}{3}$ $= 575.9586532$ $= 576 \text{ cm}^3$ (3sf) [A1]	

[Total: 6m]

6	(a)	 <p style="text-align: center;">No of hours spent on the Internet every day</p>		<p><i>*[B1] for correct representation of the values</i></p> <p><i>*[B1] for correct labelling and correct identification of a dot diagram</i></p>
	(b)	(i)	4 hours [B1]	
	(ii)	Mean = $\frac{\quad}{20}$ [M1] = 3.35 [A1]		
	(iii)	% of students who did not use the internet = $\frac{2}{20} \times 100\%$ = 10% [A1]		
	(iv)	Let x be the number of students that spent the number of hours on the internet. $P(X > 3) = \frac{\quad}{20}$ [M1] $= \frac{12}{20} = \frac{3}{5}$ or 0.6 [A1]		

[Total: 8m]

7	$x^2 + y^2 = 14$ and $xy = 5$ $(3x + 3y)^2 = [3(x + y)]^2$ [M1]: Proper Expansion of $(3x + 3y)^2$ $= (3)^2(x + y)^2$ $= 9(x + y)^2$ $= 9(x^2 + y^2 + 2xy)$ $= 9[(14 + 2(5))]$ [M1]: Proper Substitution of $x^2 + y^2 = 14$ and $xy = 5$ $= 9(24) = 216$ [A1]	
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[Total: 3m]

8	(a)	(i)	<p><i>Diagram I: Diagram II</i> $1: n$ $2.5\text{cm}: 60\text{m}$ $1\text{cm}: 24\text{m}$ $1\text{cm}: 2400\text{ cm}$ $1: 2400$ [B1]</p>	
		(ii)	<p><i>Diagram I: Diagram II</i> $1 : 2400$ $1.9: 2400 \times 1.9$ <i>Height of the petal in Diagram II=</i> $(2400 \times 1.9)\text{cm}$ [M1] $= 4560\text{cm} = 45.6\text{m}$ [A1]</p>	
		(iii)	<p><i>Diagram I: Diagram II</i> $1\text{cm} : 2400\text{ cm}$ $1\text{cm}: 24\text{m}$ $(1\text{cm})^2: (24\text{m})^2$ [M1] $1\text{cm}^2: 576\text{m}^2$ $\frac{1728}{576} : 1728\text{m}^2$ [M1] <i>Area of the highest petal on the I:</i> $\frac{1728}{576} \times 1\text{cm}^2$ $= 3\text{cm}^2$ [A1]</p>	
	(b)	<p><i>Combination A = 6 Adults + 3 Senior Citizens+ 2 Children</i> $= 6(17) + 3(14) + 2(10)$ $= \\$164$ [M1]</p> <p><i>Combination B = 6 Adults + 3 Senior Citizens +2 Children</i> $= (2A+2C)+4A+3S$ $= 1\text{ Family} + 4A + 3S$ $= 44+4(17)+3(14)$ $= \\$154$ [M1]</p> <p><i>*1m for working to show the cheapest combination</i> <i>*1m for explanation of the chosen combination.</i> <i>Since Combination B < Combination A, by \$10, hence it is more worth it to purchase Combination B. [A1]</i></p>	<p><i>*[A1] as long as able to make a decision on the best combination</i></p>	

[Total: 9m]

9	(a)	<p>If $\triangle BCD$ is a right-angled triangle, $BC^2 + BD^2 = CD^2$ $LHS = BC^2 + BD^2 = 15^2 + 8^2$ $LHS = 289$ $RHS = CD^2$ $RHS = 17^2$ $RHS = 289 = LHS$ Since $LHS = RHS = 289$, $\therefore \triangle BCD$ is a right-angled Triangle. [A1]</p>	
	(b)	<p>$25^2 = 15^2 + AB^2$ [M1] $= 25^2 - 15^2$ $AB^2 = 400$ $AB^2 = 20^2$ $AB = 20$ cm [A1]</p>	
	(c)	<p>Area of triangle $= \frac{1}{2} \times \text{Base} \times \text{Perpendicular height}$ $= \frac{1}{2} \times 15 \times 20 = 150 \text{ cm}^2$ [M1] [A1]</p>	
	(d)	<p>Let the shortest distance be BX. Area of $\triangle ABC = 150 \text{ cm}^2$ $150 \text{ cm}^2 = \frac{1}{2} \times 25 \times BX$ [M1] $BX = 12$ cm [A1]</p>	

[Total: 8m]