


Write your name here							
Surname			Other names				
<b>Pearson Edexcel Certificate</b> <b>Pearson Edexcel</b> <b>International GCSE</b>		Centre Number			Candidate Number		
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<h1 style="margin: 0;">Mathematics A</h1> <h2 style="margin: 0;">Paper 4H</h2>							
							
					<b>Higher Tier</b>		
Thursday 4 June 2015 – Morning <b>Time: 2 hours</b>				Paper Reference <b>4MA0/4H</b> <b>KMA0/4H</b>			
<b>You must have:</b> Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.					Total Marks <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto;"></div>		

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.  
Anything you write on the formulae page will gain NO credit.

### Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

*Turn over* ►

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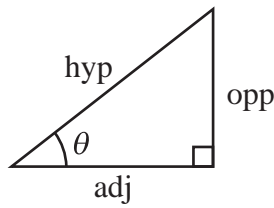
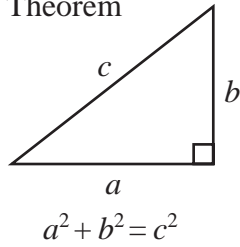
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**PEARSON**

**International GCSE MATHEMATICS  
FORMULAE SHEET – HIGHER TIER**

Pythagoras' Theorem

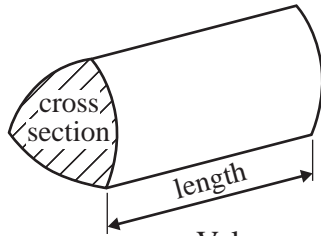


$$\begin{aligned} \text{adj} &= \text{hyp} \times \cos \theta \\ \text{opp} &= \text{hyp} \times \sin \theta \\ \text{opp} &= \text{adj} \times \tan \theta \end{aligned}$$

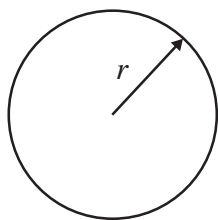
or  $\sin \theta = \frac{\text{opp}}{\text{hyp}}$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

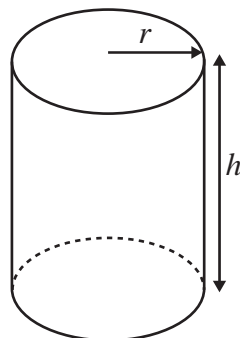


Volume of prism = area of cross section  $\times$  length



Circumference of circle =  $2\pi r$

Area of circle =  $\pi r^2$

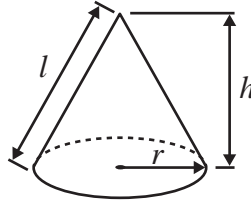


Volume of cylinder =  $\pi r^2 h$

Curved surface area of cylinder =  $2\pi r h$

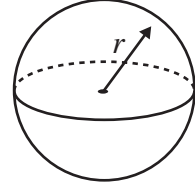
Volume of cone =  $\frac{1}{3}\pi r^2 h$

Curved surface area of cone =  $\pi r l$

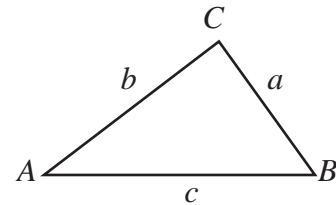


Volume of sphere =  $\frac{4}{3}\pi r^3$

Surface area of sphere =  $4\pi r^2$



In any triangle ABC

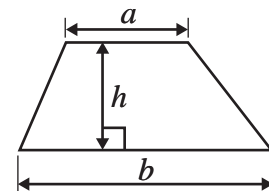


Sine rule:  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule:  $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle =  $\frac{1}{2} ab \sin C$

Area of a trapezium =  $\frac{1}{2}(a + b)h$



The Quadratic Equation

The solutions of  $ax^2 + bx + c = 0$ , where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



**Answer ALL TWENTY THREE questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

- 1** A bag contains only red bricks and blue bricks.  
There is a total of 20 bricks in the bag.

The probability that a brick taken at random from the bag will be red is  $\frac{2}{5}$

How many blue bricks are there in the bag?

.....  
**(Total for Question 1 is 3 marks)**

- 2** Pritam, Sarah and Emily share some money in the ratios 3 : 6 : 4  
Sarah gets \$15 more than Emily.

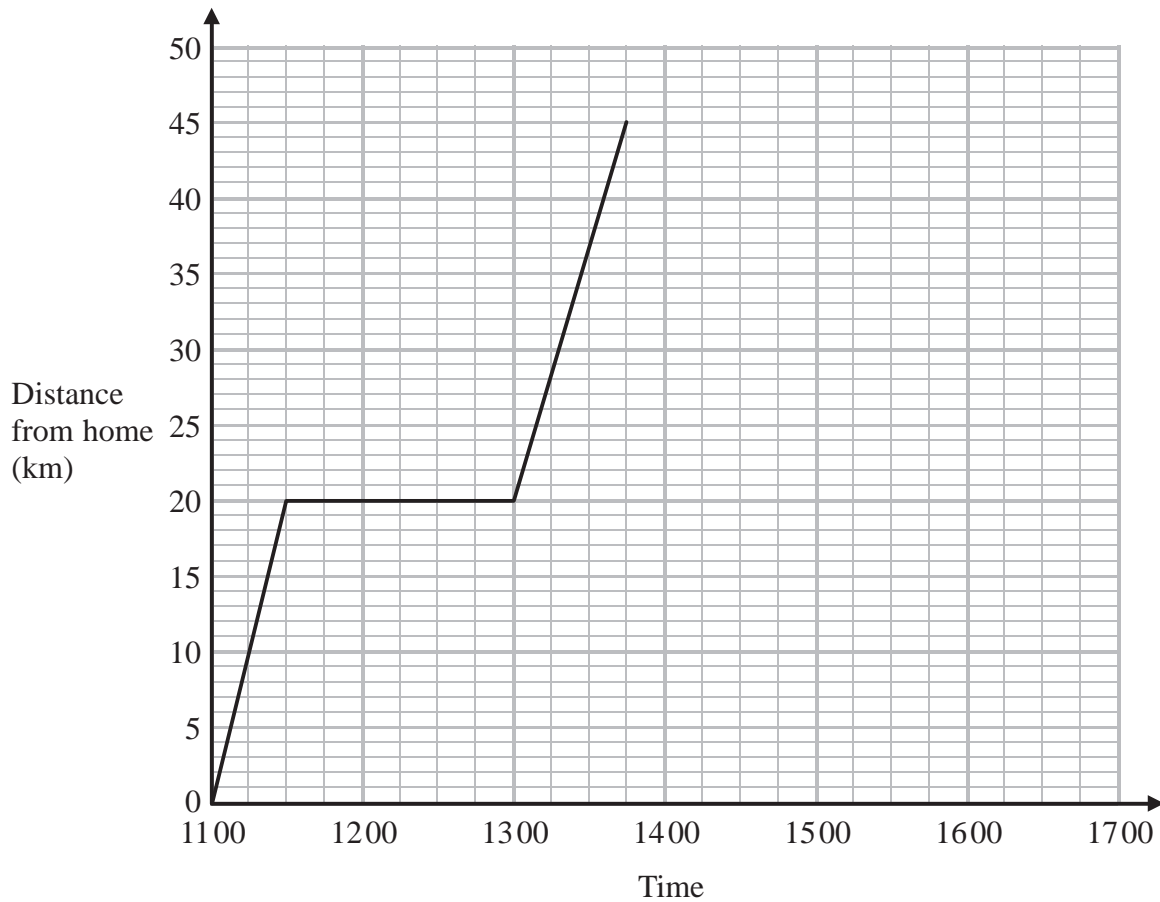
Work out the amount of money that Pritam gets.

\$ .....

**(Total for Question 2 is 3 marks)**



- 3 Lia left home at 1100 to drive to a shopping centre.  
On her way, she stopped at a friend's house.  
Here is the distance-time graph for her journey to the shopping centre.



- (a) (i) For how many minutes did Lia stay at her friend's house?

..... minutes

- (ii) How far is it from her friend's house to the shopping centre?

..... km  
(2)

Lia stayed at the shopping centre for  $1\frac{1}{2}$  hours.

She then drove back home.

She arrived home at 16 30

- (b) Show all this information on the distance-time graph.

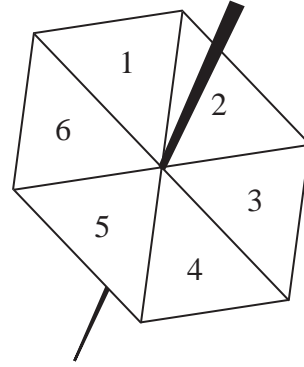
(2)

(Total for Question 3 is 4 marks)



- 4 Becky has a biased 6-sided spinner. She spins the spinner 25 times. She records the score for each spin. The table shows information about her scores.

Score	Frequency
1	9
2	6
3	3
4	2
5	1
6	4



- (a) Find her median score.

.....  
(2)

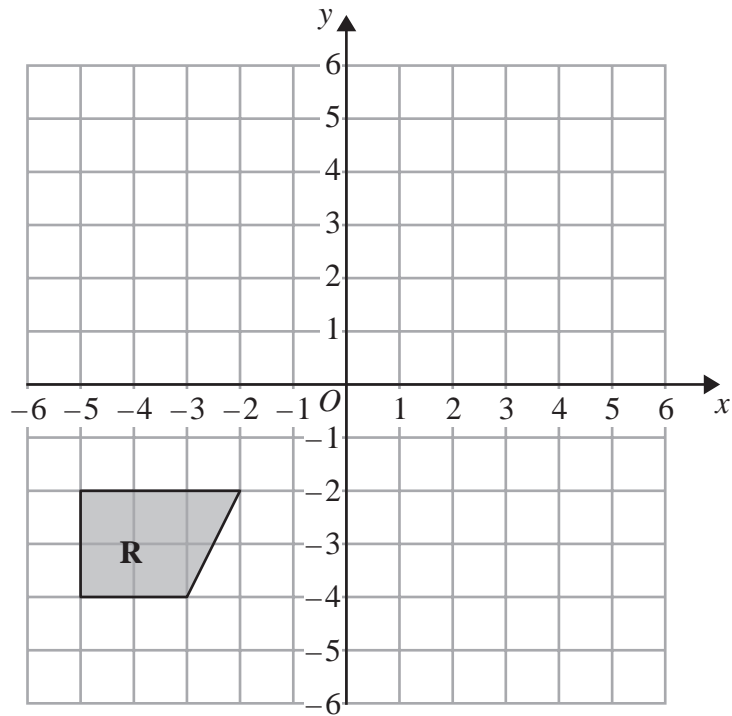
- (b) Work out her mean score.

.....  
(3)

**(Total for Question 4 is 5 marks)**

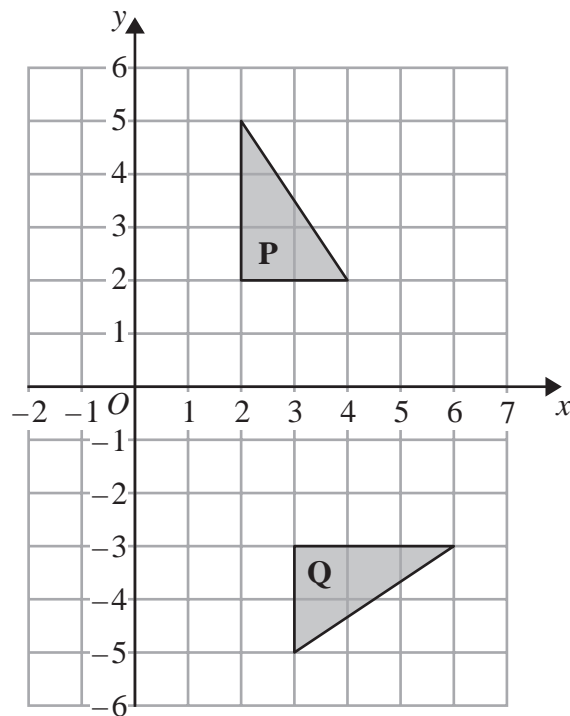


5



(a) On the grid above, reflect shape **R** in the line  $y = -x$

(2)



(b) Describe fully the single transformation that maps triangle **P** onto triangle **Q**.

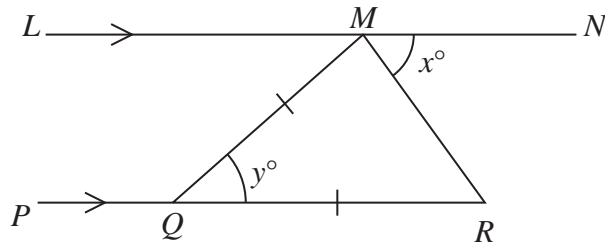
(3)

(Total for Question 5 is 5 marks)

6

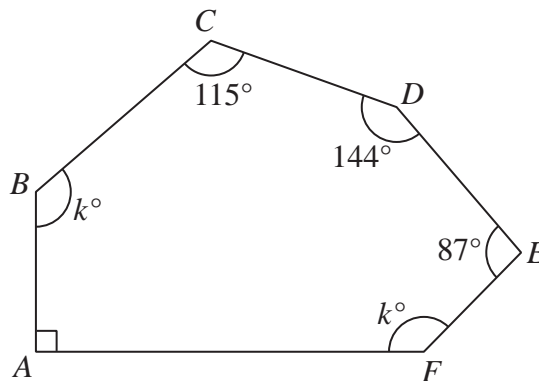


6

Diagram **NOT**  
accurately drawn $LMN$  is parallel to  $PQR$ . $QM = QR$ .Angle  $RMN = x^\circ$ Angle  $MQR = y^\circ$ (a) Write down an expression for  $y$  in terms of  $x$ .

$$y = \dots\dots\dots$$

(2)

Diagram **NOT**  
accurately drawn $ABCDEF$  is a hexagon.(b) Work out the value of  $k$ .

$$k = \dots\dots\dots$$

(4)

(Total for Question 6 is 6 marks)



7 (a) Expand  $6(4 - 3y)$

.....  
(1)

(b) Factorise  $e^2 + 4e$

.....  
(1)

(c) Solve  $7x + 8 = 2x - 3$   
Show clear algebraic working.

$x =$  .....  
(3)

(d) Expand and simplify  $(y + 10)(y - 2)$

.....  
(2)

(e) Factorise fully  $20e^5 f^2 - 16e^2 f$

.....  
(2)

**(Total for Question 7 is 9 marks)**



8

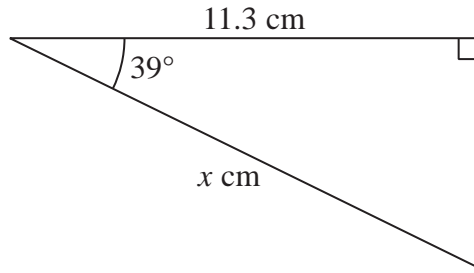


Diagram **NOT**  
accurately drawn

Work out the value of  $x$ .  
Give your answer correct to 2 decimal places.

$x = \dots\dots\dots$

**(Total for Question 8 is 3 marks)**

9 (a) Solve the inequalities  $-5 < x + 4 \leq 3$

$\dots\dots\dots$   
(2)

(b)  $n$  is an integer.

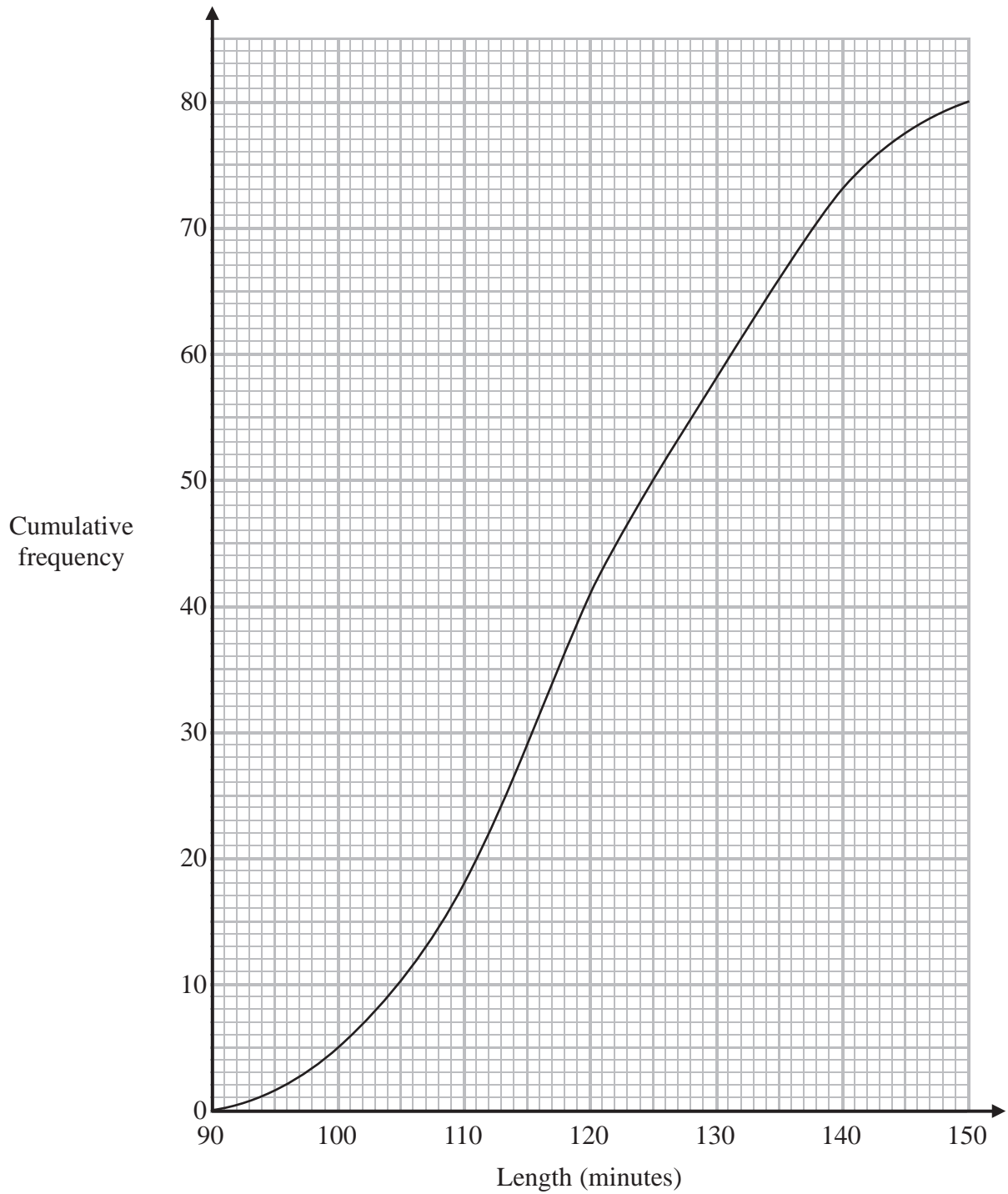
Write down all the values of  $n$  that satisfy  $-3 \leq n < 2$

$\dots\dots\dots$   
(2)

**(Total for Question 9 is 4 marks)**



- 10 The cumulative frequency graph shows information about the length, in minutes, of each of 80 films.



- (a) Find an estimate for the interquartile range.

..... minutes  
(2)

(b) Find an estimate for the percentage of the 80 films that lasted more than 125 minutes.

..... %

(3)

(Total for Question 10 is 5 marks)

**11**  $x$  is an integer.

The Lowest Common Multiple (LCM) of  $x$  and 12 is 120

The Highest Common Factor (HCF) of  $x$  and 12 is 4

Work out the value of  $x$ .

$x =$  .....

(Total for Question 11 is 2 marks)



- 12** The value of a boat depreciates by 16% each year.  
At the end of 2012, the value of the boat is £65 000

Work out the value of the boat at the end of 2015

£ .....

---

**(Total for Question 12 is 3 marks)**

- 13** Solve  $3x^2 + 2x - 7 = 0$   
Give your solutions correct to 3 significant figures.  
Show your working clearly.

.....

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**(Total for Question 13 is 3 marks)**



14 **L** and **M** are two mathematically similar prisms.

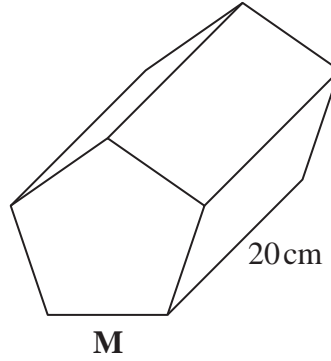
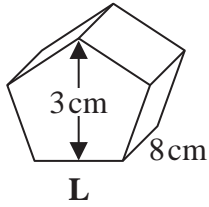


Diagram **NOT**  
accurately drawn

Prism **L** has length 8 cm.  
Prism **M** has length 20 cm.

Prism **L** has height 3 cm.

(a) Work out the height of prism **M**.

..... cm  
(2)

Prism **M** has a volume of  $1875 \text{ cm}^3$

(b) Work out the volume of prism **L**.

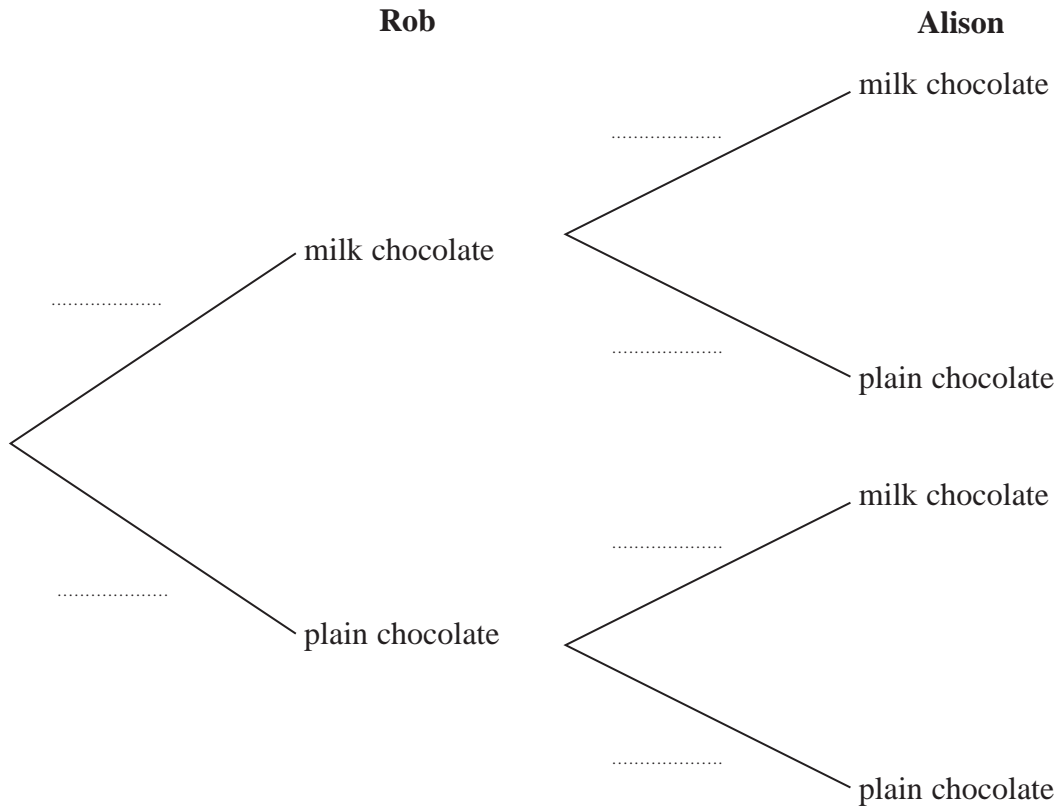
.....  $\text{cm}^3$   
(2)

(Total for Question 14 is 4 marks)



- 15** There are 6 milk chocolates and 4 plain chocolates in a box.  
 Rob takes at random a chocolate from the box and eats it.  
 Then Alison takes at random a chocolate from the box and eats it.

(a) Complete the probability tree diagram.



(3)

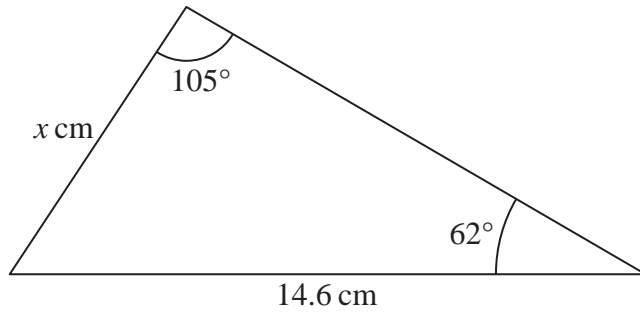
- (b) Work out the probability that there are now exactly 3 plain chocolates in the box.

.....  
(3)

**(Total for Question 15 is 6 marks)**



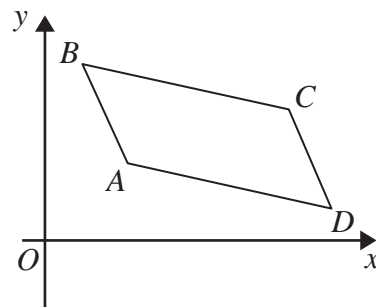
16

Diagram **NOT**  
accurately drawn

Work out the value of  $x$ .  
Give your answer correct to 1 decimal place.

 $x = \dots\dots\dots$ **(Total for Question 16 is 3 marks)**17  $ABCD$  is a parallelogram.

$$\vec{BC} = \begin{pmatrix} 5 \\ -1 \end{pmatrix} \quad \vec{DC} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$$

Find  $\vec{BD}$  as a column vector.Diagram **NOT**  
accurately drawn $\left( \quad \right)$ **(Total for Question 17 is 2 marks)**

18  $A$  and  $B$  are two sets.

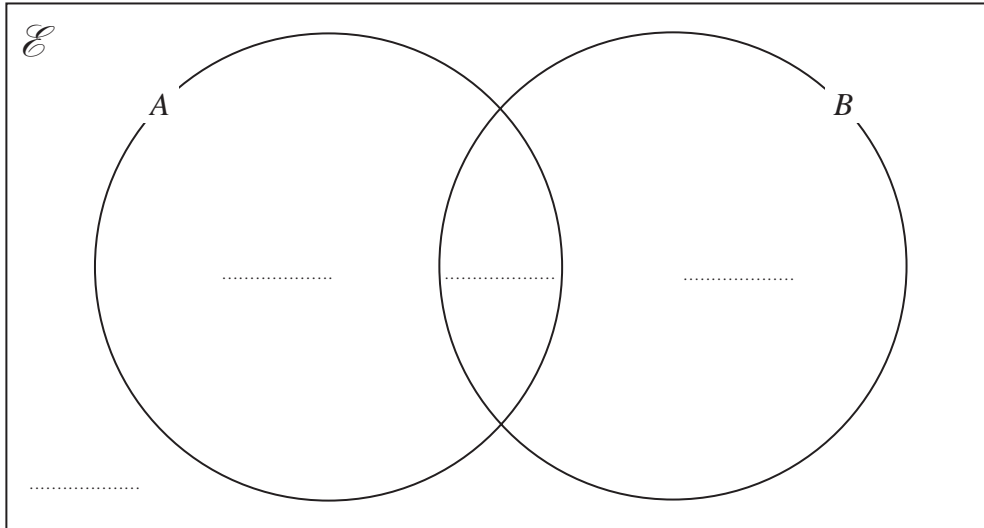
$$n(\mathcal{E}) = 36$$

$$n(B) = 21$$

$$n(A \cap B) = 8$$

$$n(A') = 18$$

(a) Complete the Venn diagram to show the **number of elements** in each region of the Venn diagram.



(3)

(b) Find  $n(A \cup B)$

.....  
(1)

(c) Find  $n(A \cap B')$

.....  
(1)

**(Total for Question 18 is 5 marks)**

**19** (a) Show that  $(5 - \sqrt{8})(7 + \sqrt{2}) = 31 - 9\sqrt{2}$

Show each stage of your working.

(3)

Given that  $c$  is a prime number,

(b) rationalise the denominator of  $\frac{3c - \sqrt{c}}{\sqrt{c}}$

Simplify your answer.

.....  
(2)

**(Total for Question 19 is 5 marks)**



**20**  $n$  is a positive integer.

(a) Explain why  $2n + 1$  is an odd number for all values of  $n$ .

.....

.....

.....

(1)

(b) Show, using algebra, that the sum of any 4 consecutive odd numbers is always a multiple of 8

(3)

(Total for Question 20 is 4 marks)



**21**  $y = x^3 + 6x^2 + 5$

(a) Find  $\frac{dy}{dx}$

$$\frac{dy}{dx} = \dots\dots\dots (2)$$

The curve with equation  $y = x^3 + 6x^2 + 5$  has two turning points.

(b) Work out the coordinates of these two turning points.  
Show your working clearly.

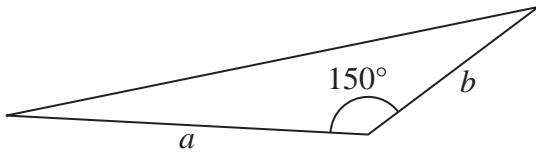
..... (4)

**(Total for Question 21 is 6 marks)**

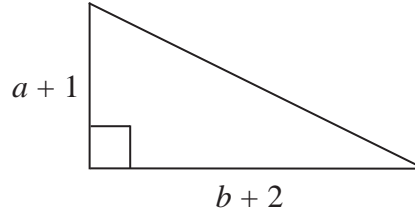


22 The diagram shows two triangles, **A** and **B**.

Diagram **NOT**  
accurately drawn



Triangle **A**



Triangle **B**

The area of triangle **B** is 3 times the area of triangle **A**.

Given that  $b > 4$ , find an expression for  $a$  in terms of  $b$ .

$$a = \dots\dots\dots$$

(Total for Question 22 is 5 marks)



**23** Solve  $x^2 + y^2 = 20$   
 $y = 10 - 2x$

Show clear algebraic working.

.....  
**(Total for Question 23 is 5 marks)**

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**TOTAL FOR PAPER IS 100 MARKS**



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