

Write your name here

Surname

Other names

**Pearson Edexcel Certificate
Pearson Edexcel
International GCSE**

Centre Number

Candidate Number

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Mathematics A

Paper 4H



Higher Tier

Thursday 4 June 2015 – Morning

Time: 2 hours

Paper Reference

4MA0/4H

KMA0/4H

Total Marks

You must have:

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

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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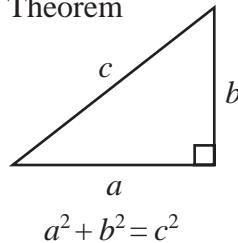
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PEARSON

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

Pythagoras' Theorem

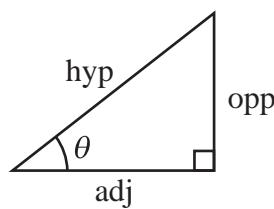
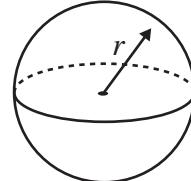
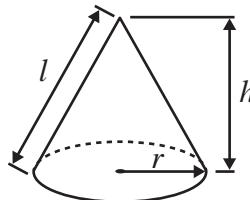


$$\text{Volume of cone} = \frac{1}{3} \pi r^2 h$$

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

$$\text{Curved surface area of cone} = \pi r l$$

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



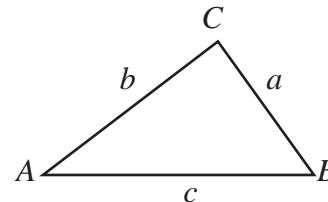
$$\begin{aligned}\text{adj} &= \text{hyp} \times \cos \theta \\ \text{opp} &= \text{hyp} \times \sin \theta \\ \text{opp} &= \text{adj} \times \tan \theta\end{aligned}$$

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

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

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

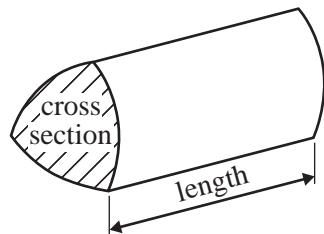
In any triangle ABC



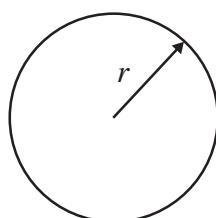
$$\text{Sine rule: } \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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



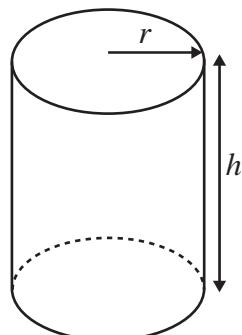
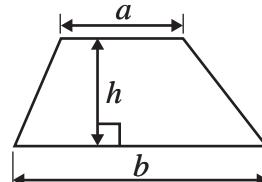
$$\text{Volume of prism} = \text{area of cross section} \times \text{length}$$



$$\text{Circumference of circle} = 2\pi r$$

$$\text{Area of circle} = \pi r^2$$

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



$$\text{Volume of cylinder} = \pi r^2 h$$

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

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.

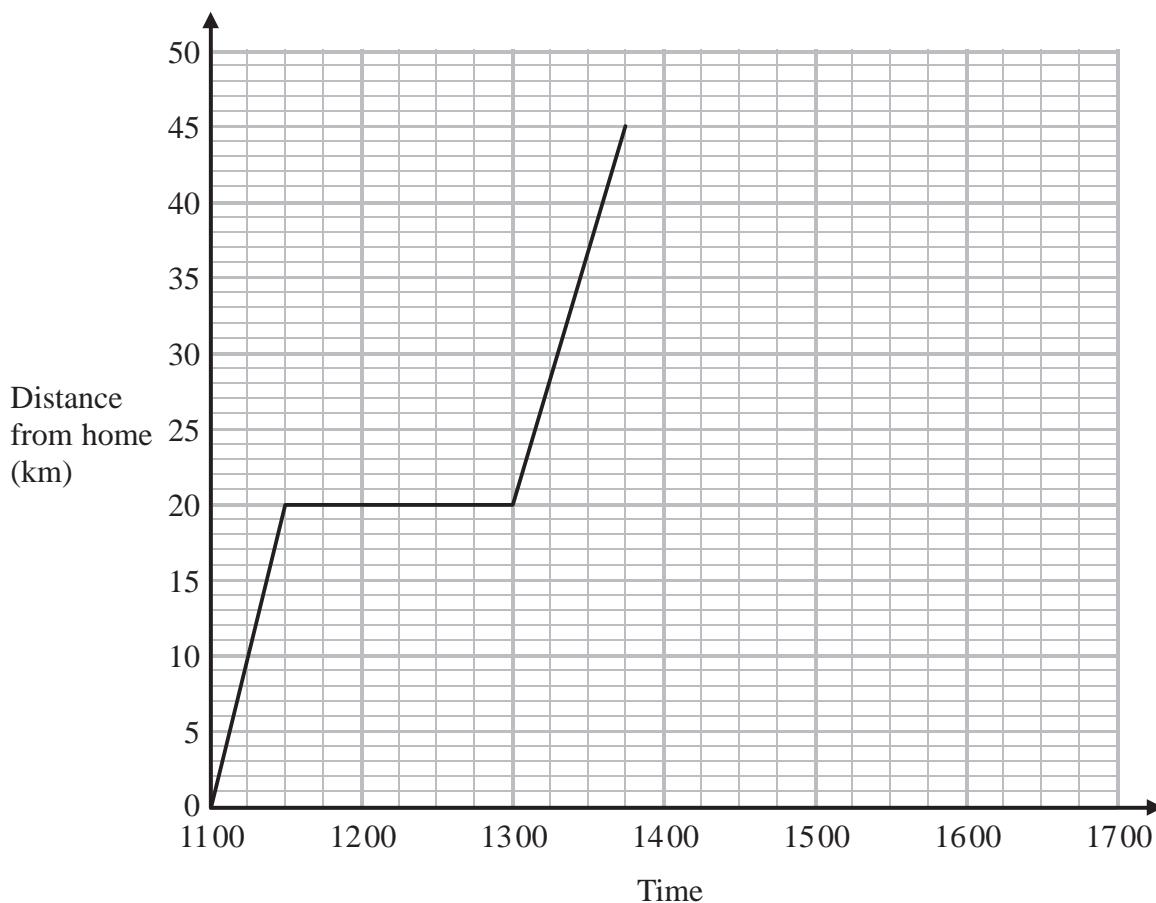
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(Total for Question 2 is 3 marks)



P 4 4 3 8 9 A 0 3 2 4

- 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.

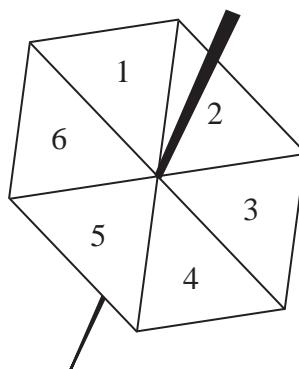
(2)

(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.

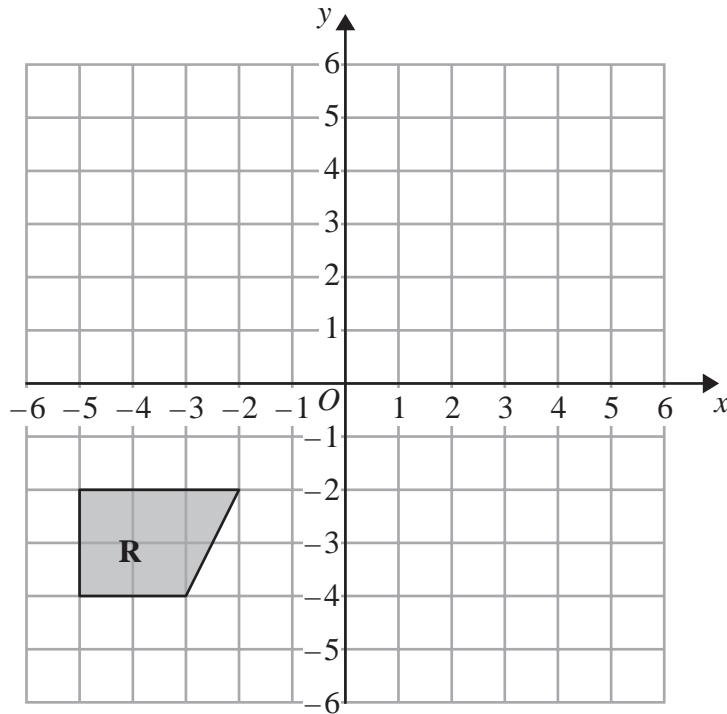
(3)

(Total for Question 4 is 5 marks)



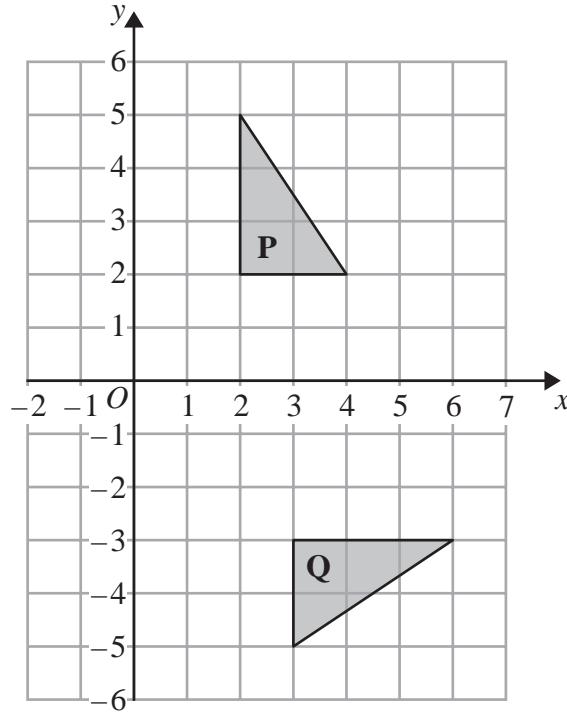
P 4 4 3 8 9 A 0 5 2 4

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

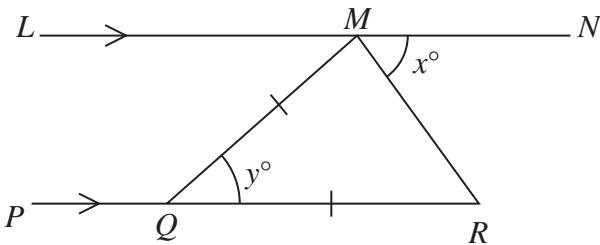


Diagram NOT
accurately drawn

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 .

$$y = \dots \quad (2)$$

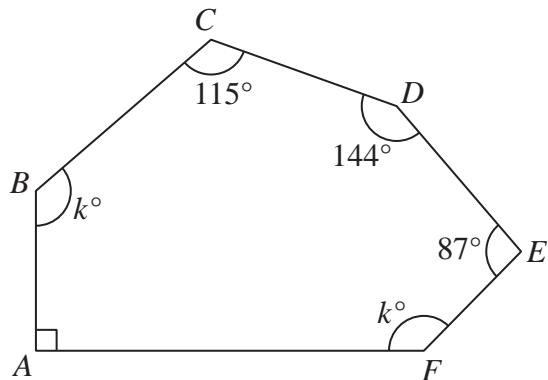


Diagram NOT
accurately drawn

$ABCDEF$ is a hexagon.

- (b) Work out the value of k .

$$k = \dots \quad (4)$$

(Total for Question 6 is 6 marks)



P 4 4 3 8 9 A 0 7 2 4

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 $20e^5f^2 - 16e^2f$

.....
(2)

(Total for Question 7 is 9 marks)



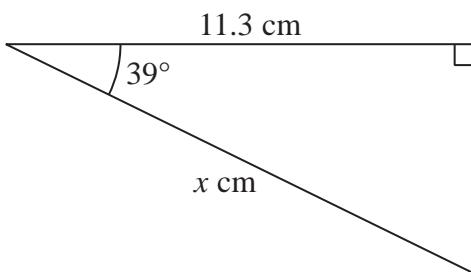
8

Diagram **NOT**
accurately drawn

Work out the value of x .

Give your answer correct to 2 decimal places.

$$x = \dots$$

(Total for Question 8 is 3 marks)

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

$$\dots$$

(2)

(b) n is an integer.

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

$$\dots$$

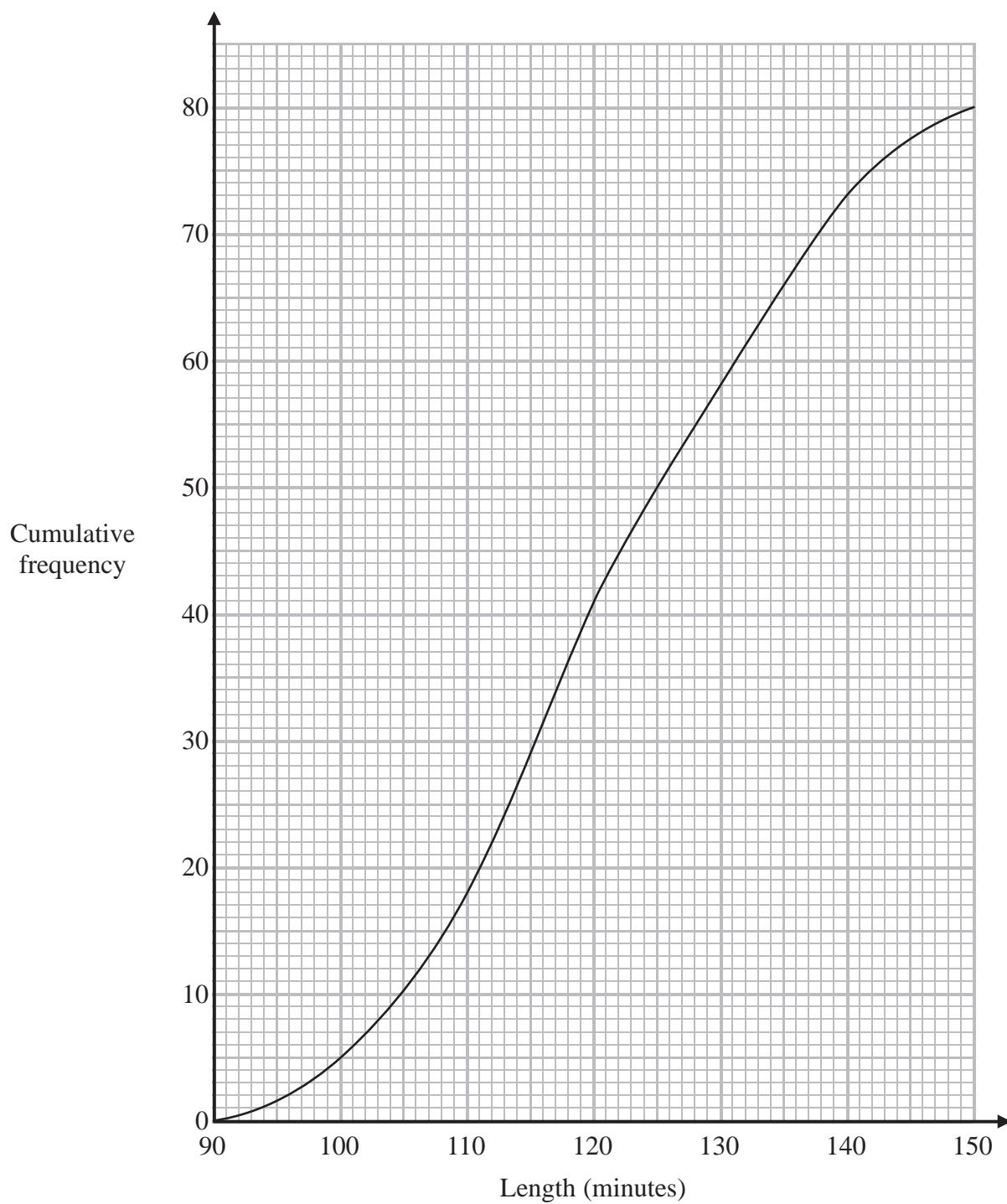
(2)

(Total for Question 9 is 4 marks)



P 4 4 3 8 9 A 0 9 2 4

- 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 .

$x = \dots$

(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.

.....

(Total for Question 13 is 3 marks)



14 L and M are two mathematically similar prisms.

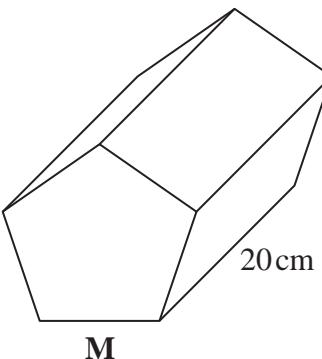
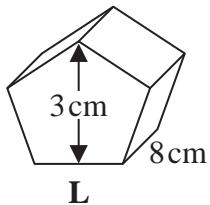


Diagram NOT
accurately drawn

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 cm^3

(b) Work out the volume of prism L.

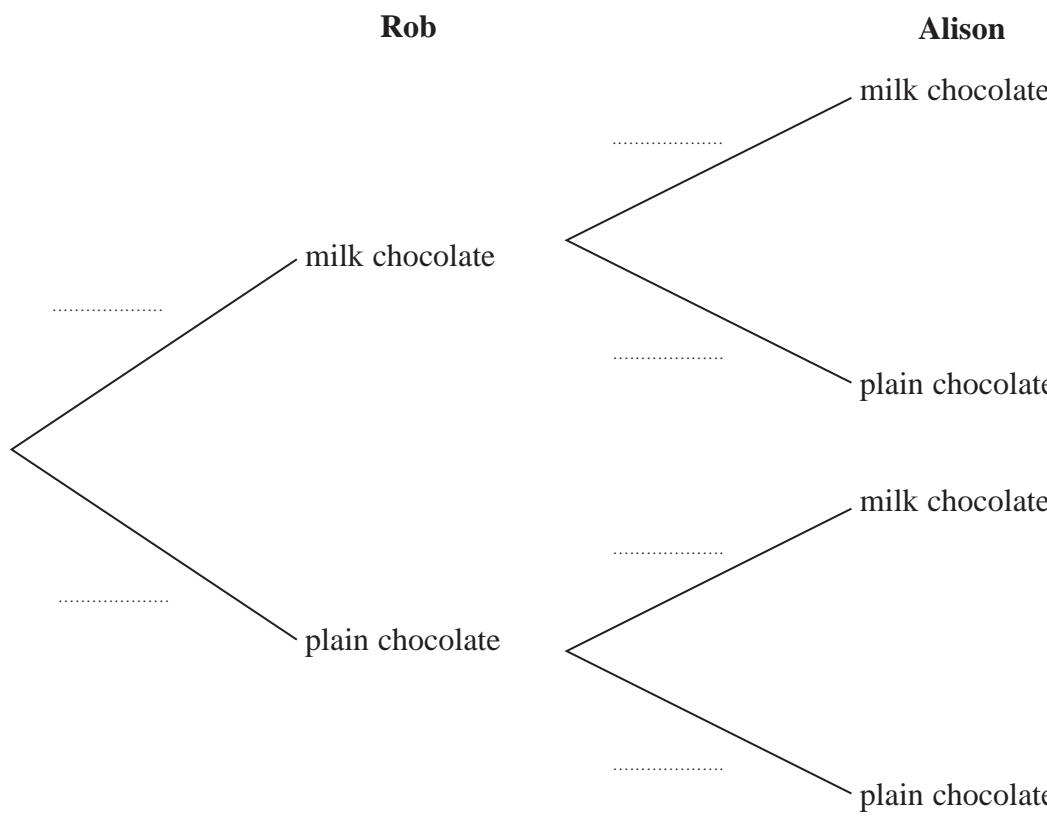
..... cm^3
(2)

(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)



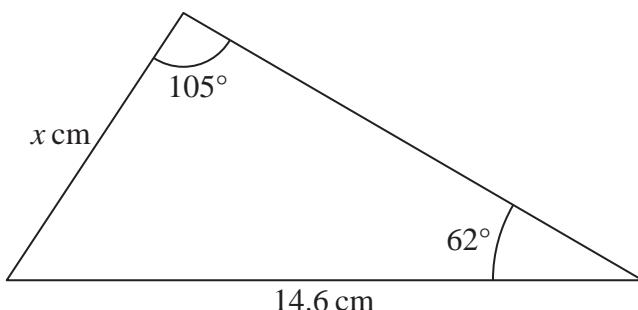
16

Diagram NOT
accurately drawn

Work out the value of x .

Give your answer correct to 1 decimal place.

$$x = \dots$$

(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.

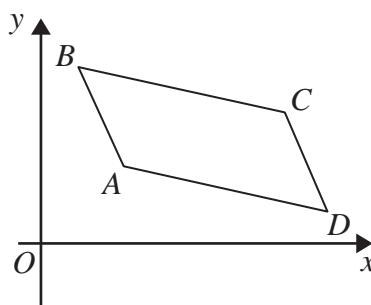


Diagram NOT
accurately drawn

$$\left(\quad \right)$$

(Total for Question 17 is 2 marks)



18 A and B are two sets.

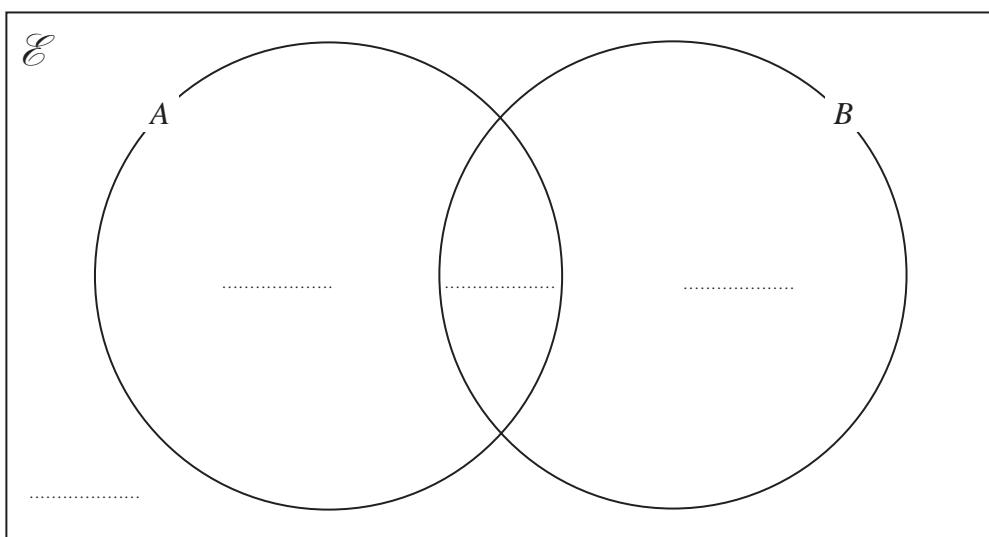
$$n(\mathcal{E}) = 36$$

$$n(B) = 21$$

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

$$n(A') = 18$$

- (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 $\frac{dy}{dx}$

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

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.

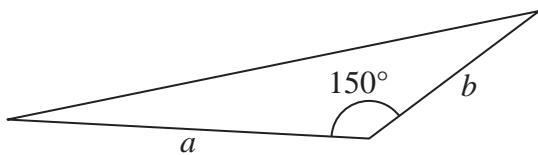
.....
(4)

(Total for Question 21 is 6 marks)

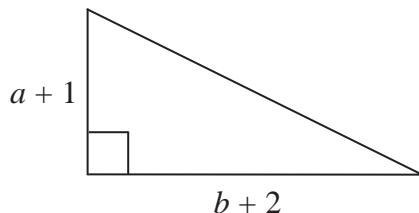


P 4 4 3 8 9 A 0 1 9 2 4

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



Triangle **A**



Triangle **B**

Diagram **NOT**
accurately drawn

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 .

$$a = \dots$$

(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)

TOTAL FOR PAPER IS 100 MARKS



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