

Write your name here

Surname

Other names

Pearson Edexcel Certificate
Pearson Edexcel
International GCSE

Centre Number

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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

You must have:

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

Total Marks

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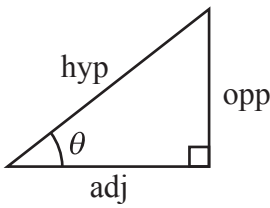
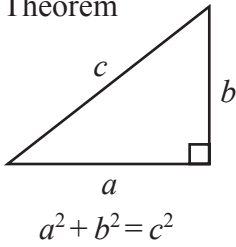
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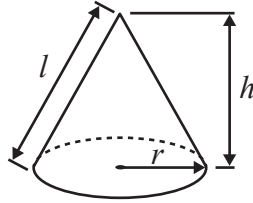
**International GCSE MATHEMATICS
FORMULAE SHEET – HIGHER TIER**

Pythagoras' Theorem



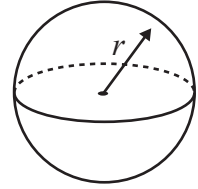
Volume of cone = $\frac{1}{3} \pi r^2 h$

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



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

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



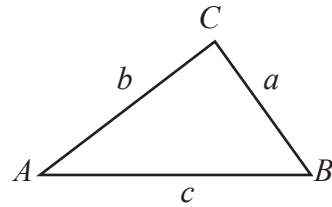
adj = hyp \times cos θ
opp = hyp \times sin θ
opp = adj \times tan θ

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

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

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

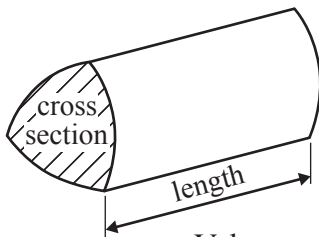
In any triangle ABC



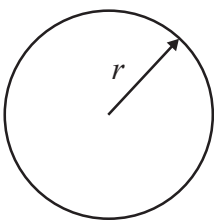
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



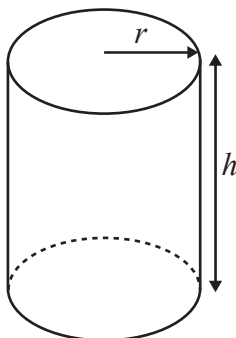
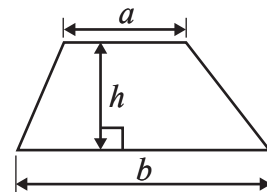
Volume of prism = area of cross section \times length



Circumference of circle = $2 \pi r$

Area of circle = πr^2

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



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

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.

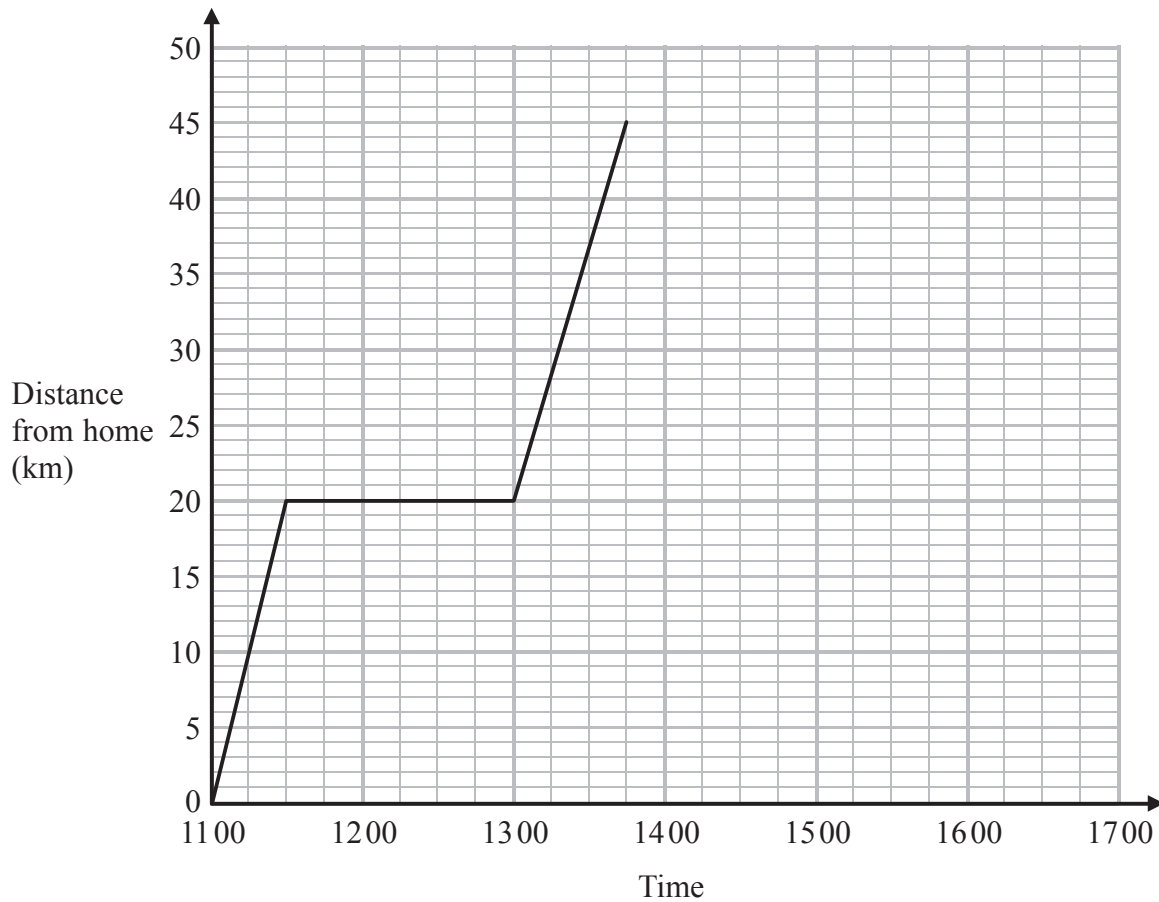
Work out the amount of money that Pritam gets.

\$

(Total for Question 2 is 3 marks)



- 3 Lia left home at 11 00 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

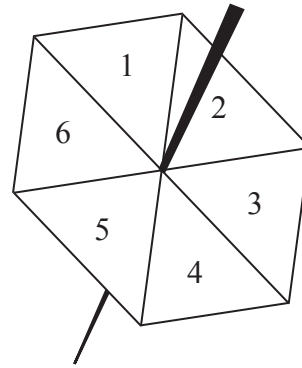
- (b) Show all this information on the distance-time graph.

(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)

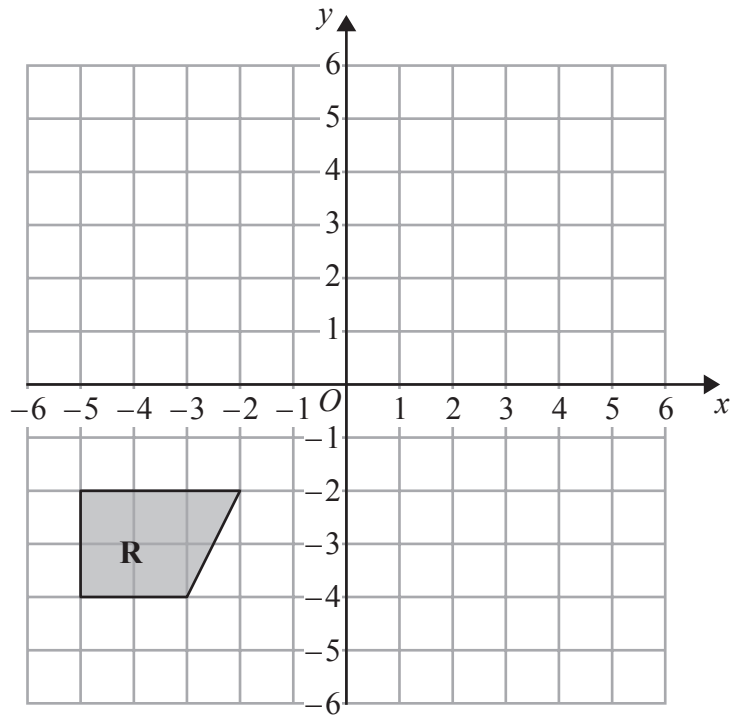
- (b) Work out her mean score.

.....
(3)

(Total for Question 4 is 5 marks)

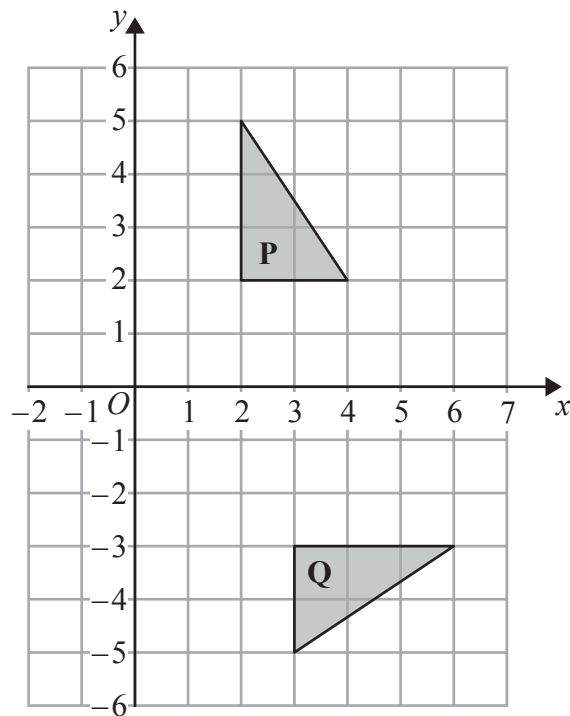


5



(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

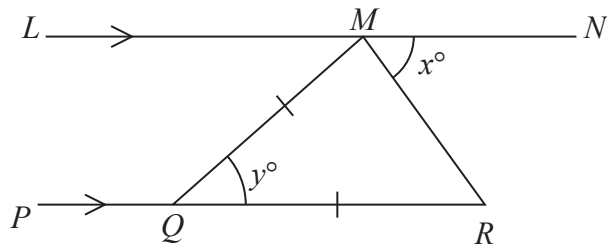


Diagram **NOT** accurately drawn

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)

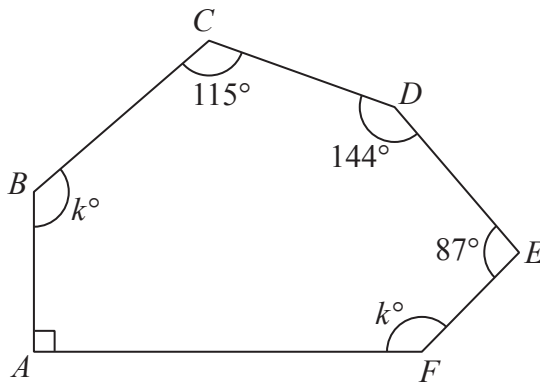


Diagram **NOT** accurately drawn

$ABCDEF$ 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

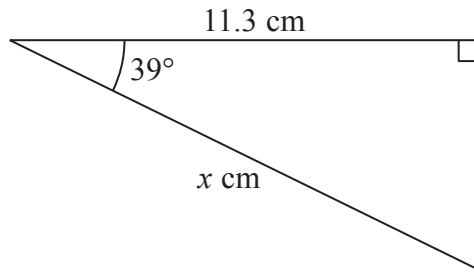


Diagram **NOT** accurately drawn

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

$x =$

(Total for Question 8 is 3 marks)

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

.....
(2)

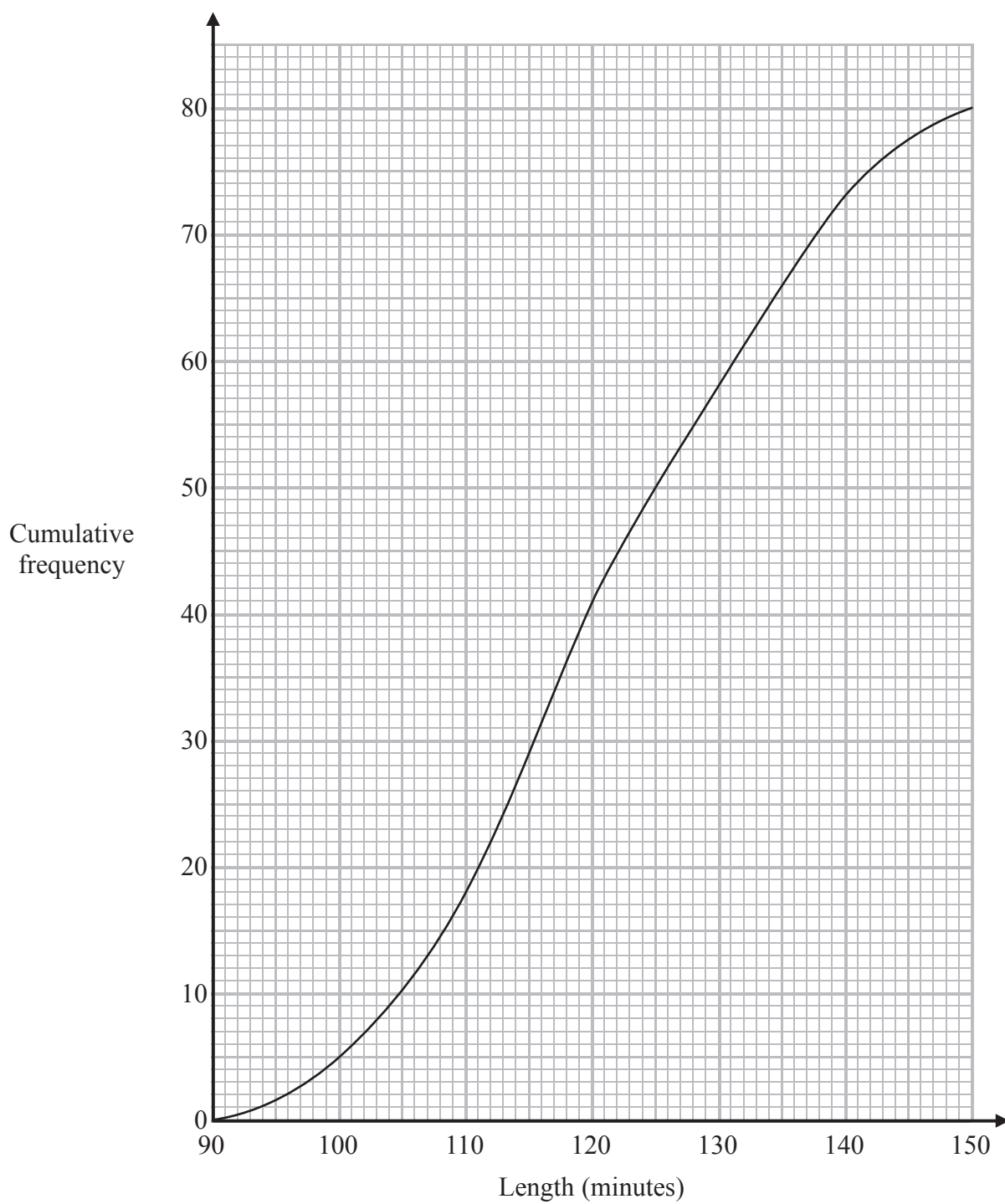
(b) n is an integer.
Write down all the values of n that satisfy $-3 \leq n < 2$

.....
(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.

.....

(Total for Question 13 is 3 marks)



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

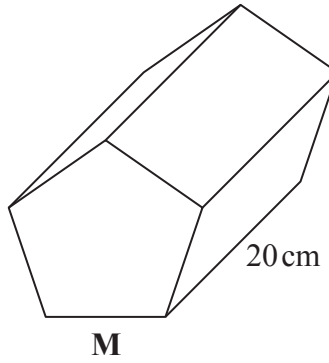
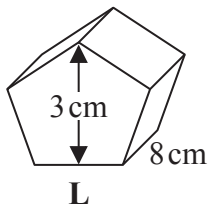


Diagram **NOT** accurately drawn

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**.

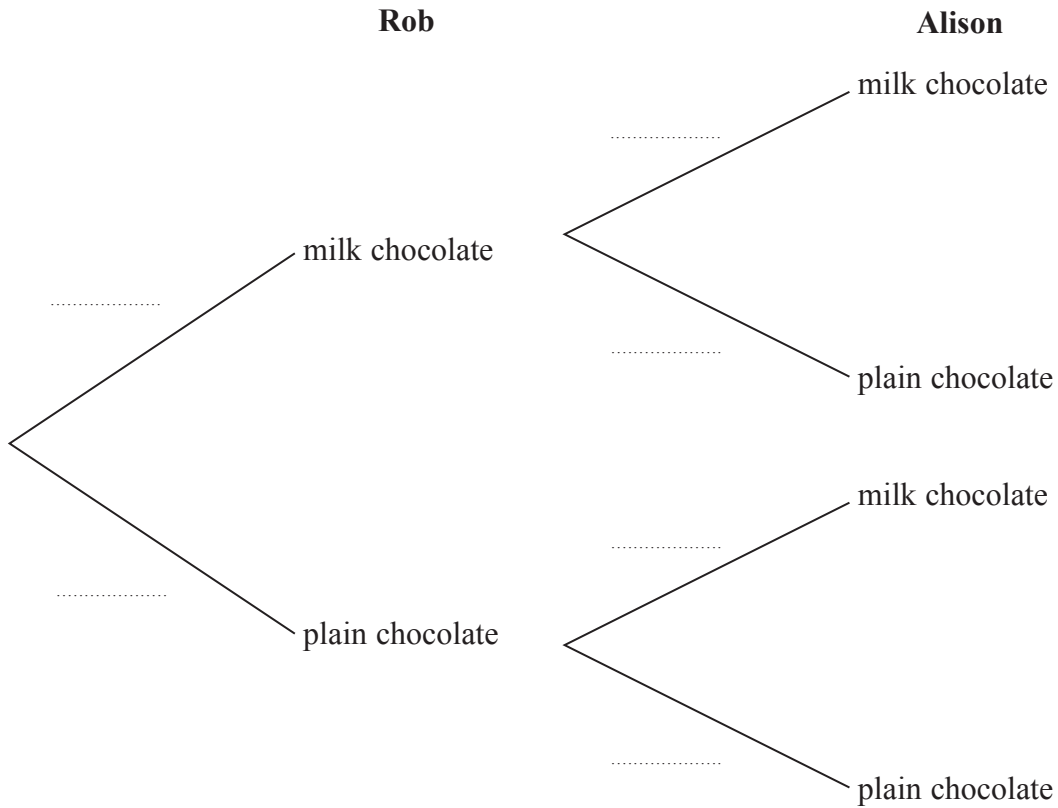
..... cm^3
(2)

(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

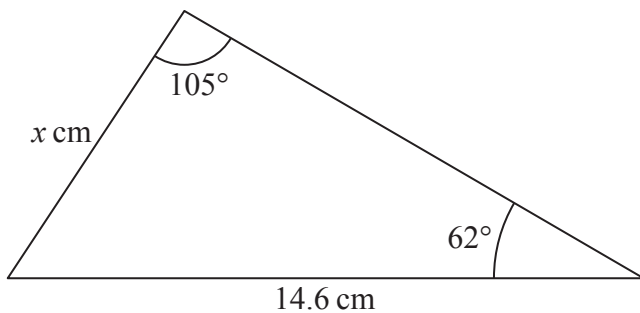


Diagram **NOT** accurately drawn

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

$x = \dots\dots\dots$

(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.

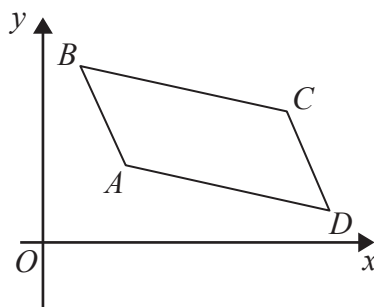


Diagram **NOT** accurately drawn

$\left(\quad \right)$

(Total for Question 17 is 2 marks)



18 A and B are two sets.

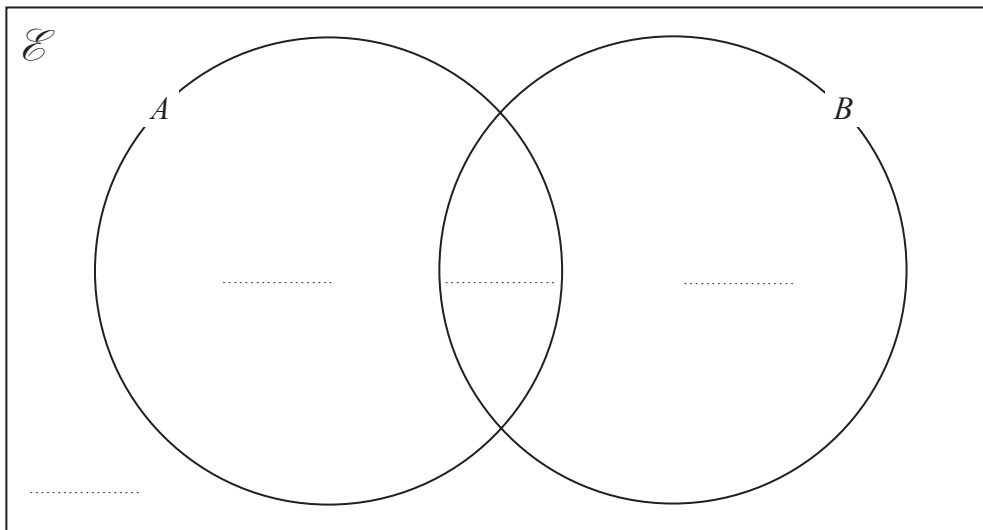
$$n(\mathcal{E}) = 36$$

$$n(B) = 21$$

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

$$n(A') = 18$$

(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.

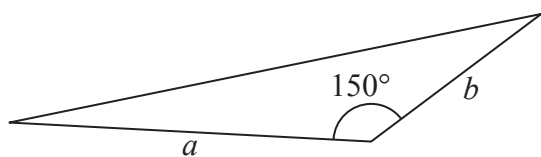
(b) Work out the coordinates of these two turning points.
Show your working clearly.

..... (4)

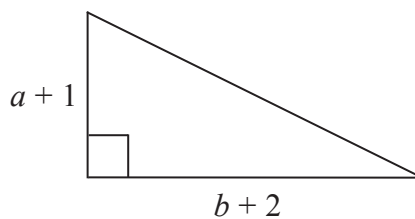
(Total for Question 21 is 6 marks)



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



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 .

$a = \dots\dots\dots$

(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)

TOTAL FOR PAPER IS 100 MARKS



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