Write your name here

Surname	Other names

Pearson Edexcel Certificate
Pearson Edexcel
International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

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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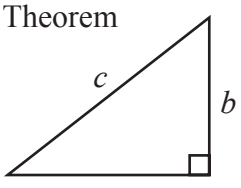
5/1/1/1/

P 4 4 3 8 9 A 0 1 2 4

PEARSON

International GCSE MATHEMATICS
FORMULAE SHEET – HIGHER TIER

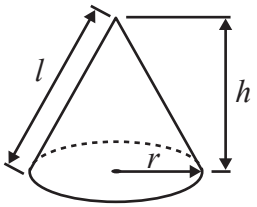
Pythagoras' Theorem



$a^2 + b^2 = c^2$

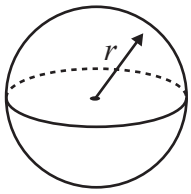
Volume of cone = $\frac{1}{3}\pi r^2 h$

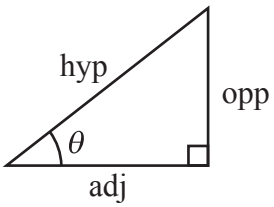
Curved surface area of cone = $\pi r l$



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

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





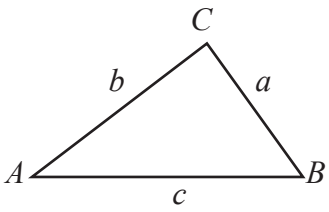
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

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

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

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

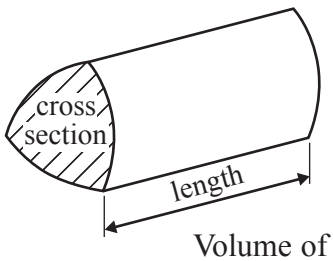
In any triangle ABC



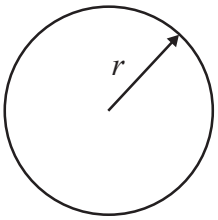
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



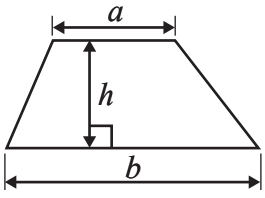
Volume of prism = area of cross section × length

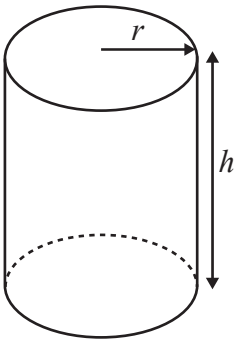


Circumference of circle = $2\pi r$

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 = $2\pi rh$

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)

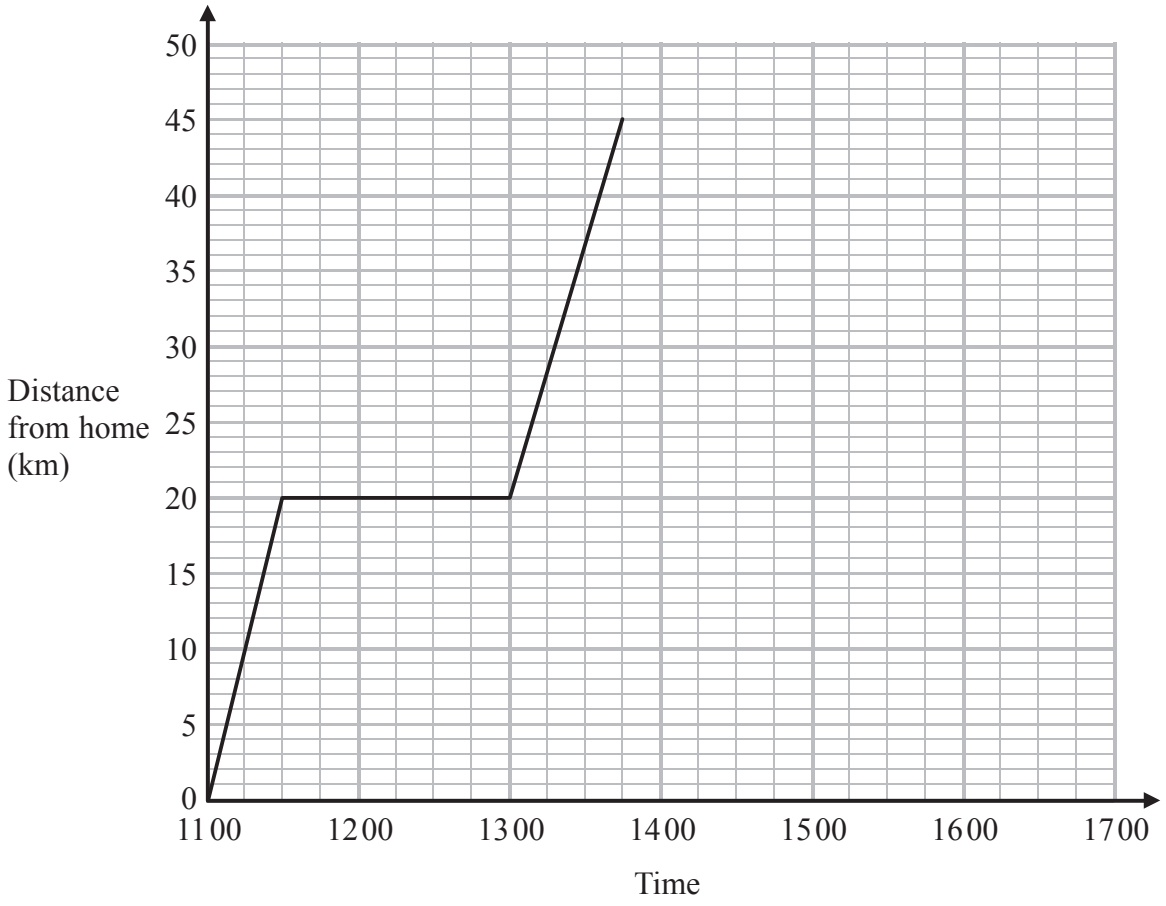
2 Pritam, Sarah and Emily share some money in the ratios 3 : 6 : 4
Sarah gets $15 more than Emily.

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.

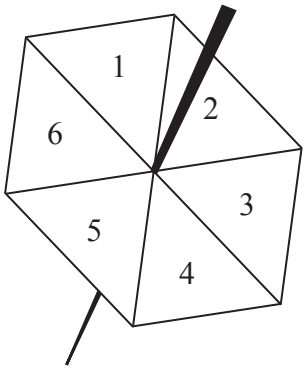
She then drove back home.
She arrived home at 16 30

(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)

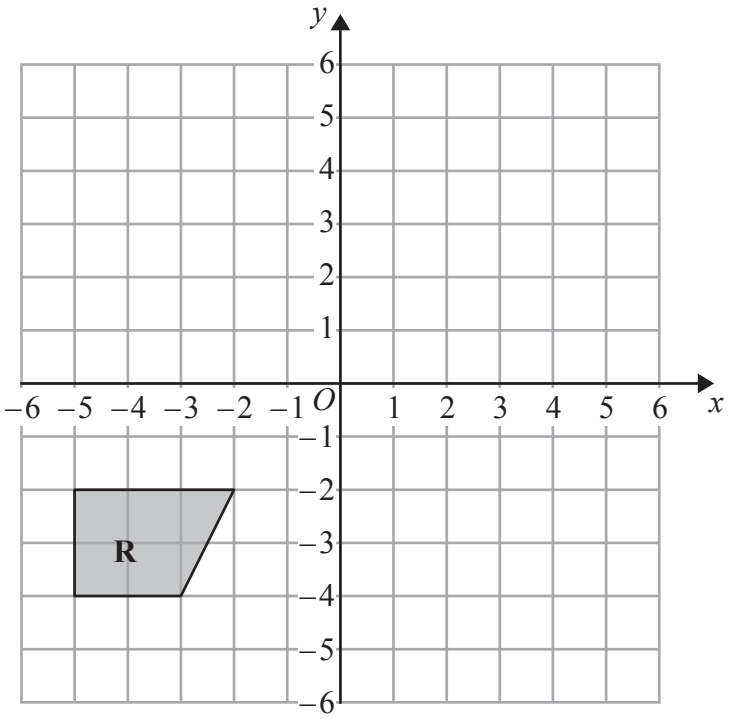
(b) Work out her mean score.

.....

(3)

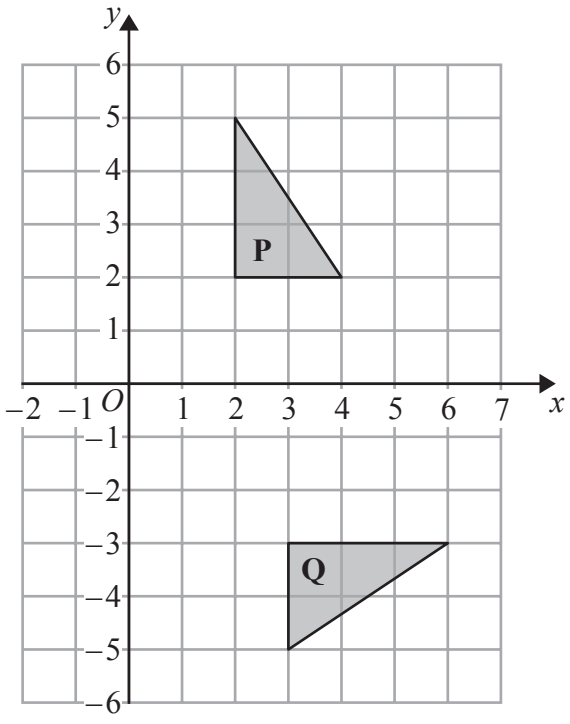
(Total for Question 4 is 5 marks)

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

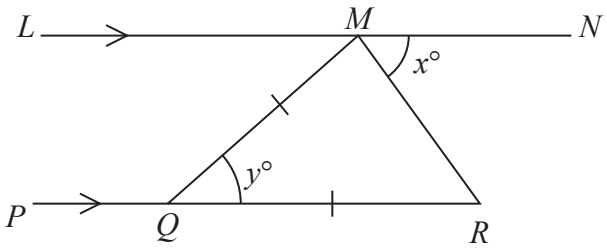


Diagram **NOT** accurately drawn

LMN is parallel to *PQR*.
QM = *QR*.
Angle *RMN* = *x*°
Angle *MQR* = *y*°

(a) Write down an expression for *y* in terms of *x*.

y = ...

(2)

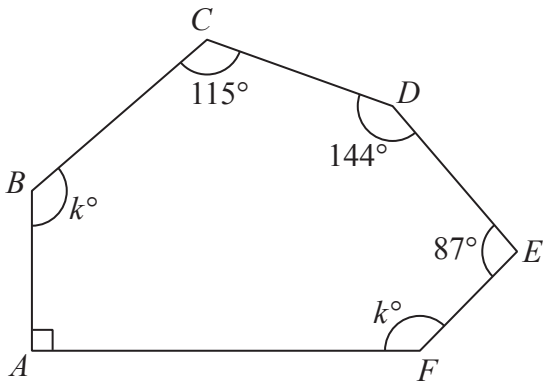


Diagram **NOT** accurately drawn

ABCDEF is a hexagon.

(b) Work out the value of *k*.

k = ...

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

.....

(2)

(Total for Question 7 is 9 marks)

8

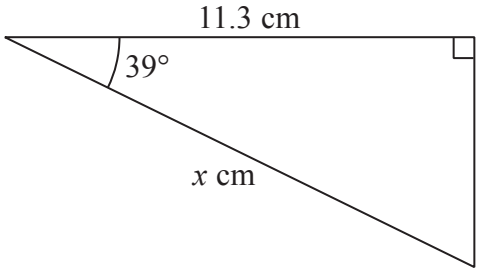


Diagram **NOT** accurately drawn

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

$x =$ .....

(Total for Question 8 is 3 marks)

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

.....

(2)

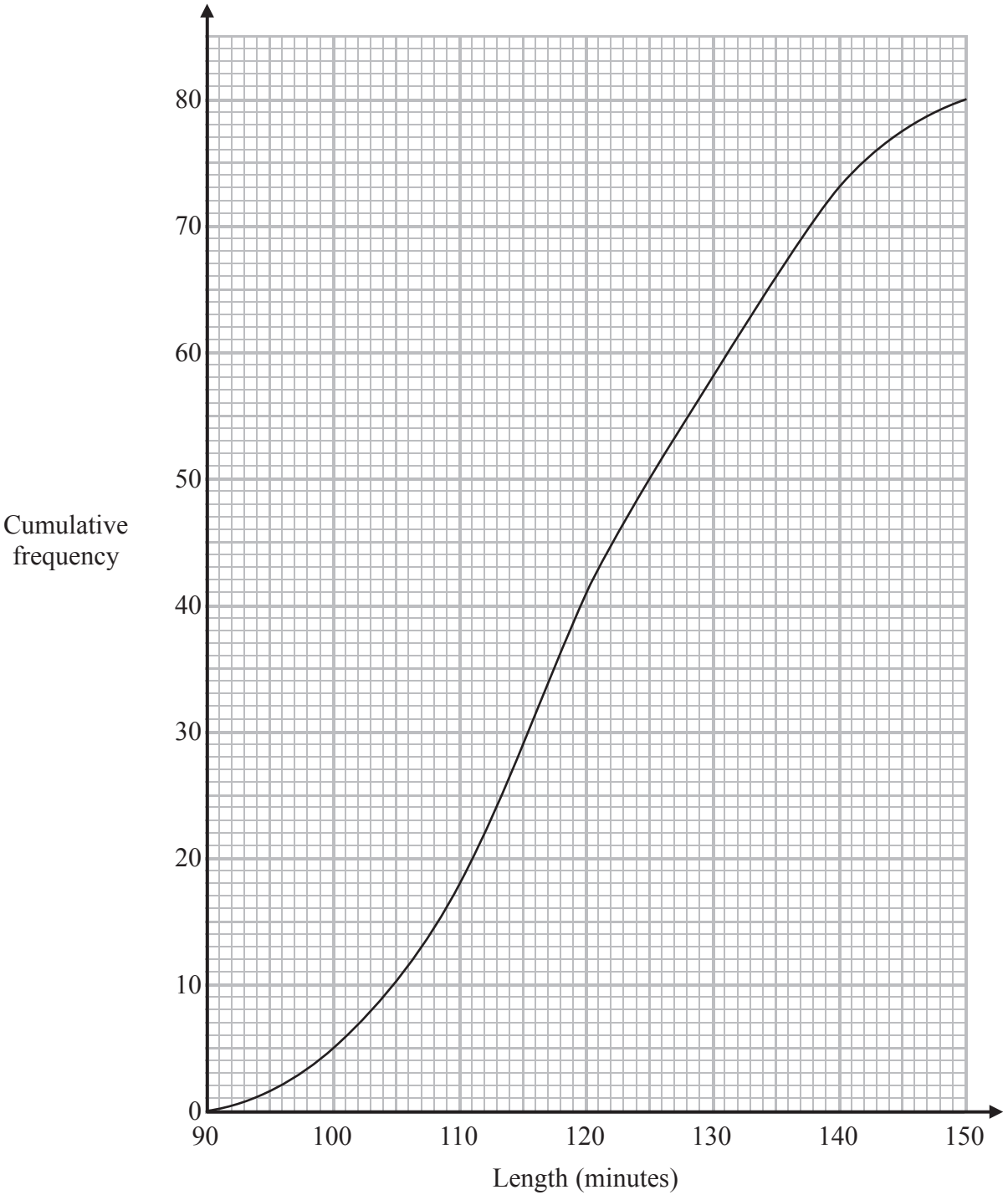
(b) n is an integer.
Write down all the values of n that satisfy $-3 \leqslant n < 2$

.....

(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

£ .....

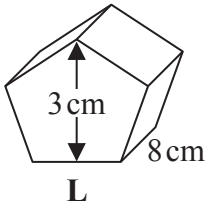
(Total for Question 12 is 3 marks)

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

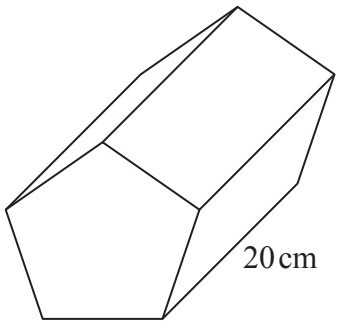
.....

(Total for Question 13 is 3 marks)

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



L



M

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**.

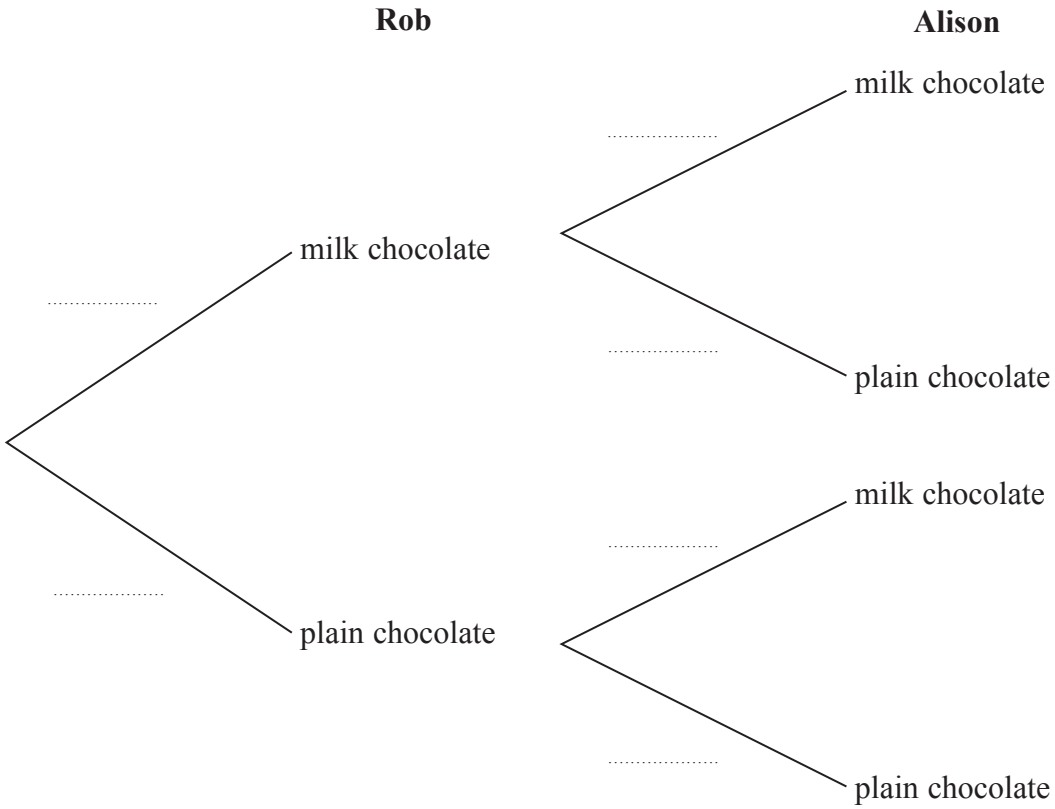
..... cm^3

(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

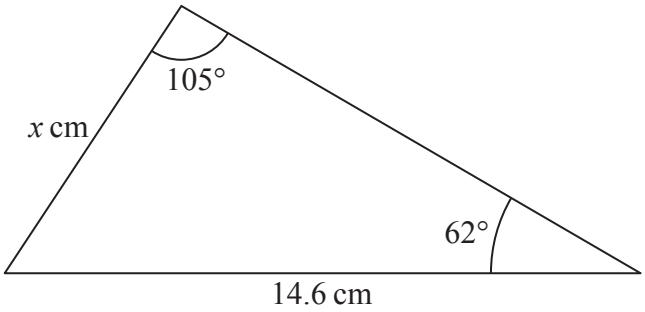


Diagram **NOT** accurately drawn

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

$x =$ .....

(Total for Question 16 is 3 marks)

17 $ABCD$ is a parallelogram.

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

Find $\overrightarrow{BD}$ as a column vector.

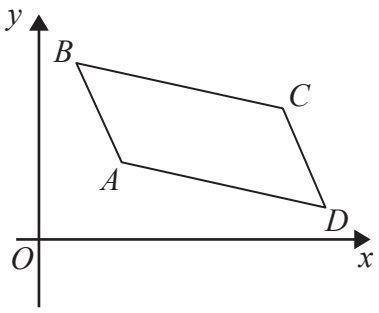


Diagram **NOT** accurately drawn

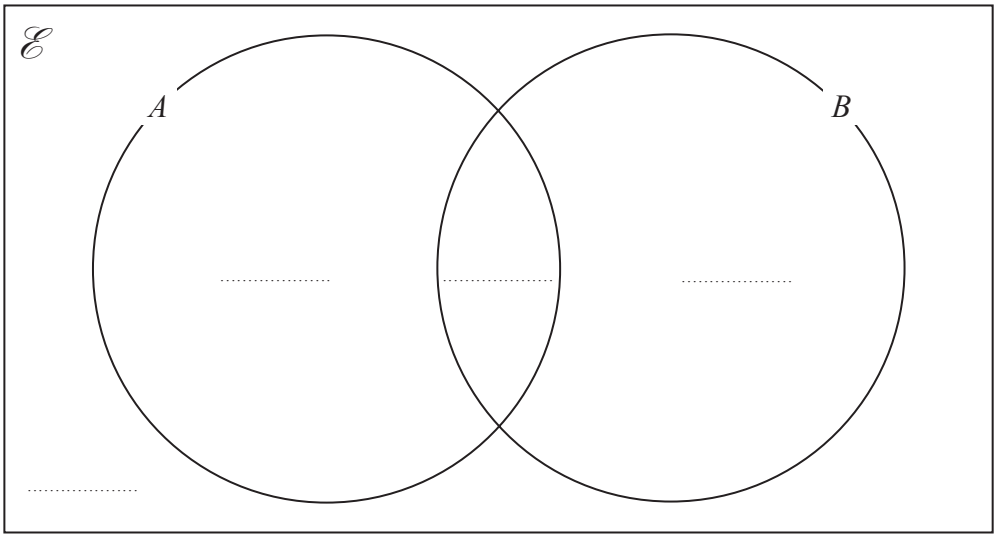
( )

(Total for Question 17 is 2 marks)

18 A and B are two sets.

$$n(\mathscr{E}) = 36$$
$$n(B) = 21$$
$$n(A \cap B) = 8$$
$$n(A') = 18$$

(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 $\left(5 - \sqrt{8}\right)\left(7 + \sqrt{2}\right) = 31 - 9\sqrt{2}$

Show each stage of your working.

(3)

Given that c is a prime number,

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

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 $\frac{dy}{dx}$

$\frac{dy}{dx} =$ .....

(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.

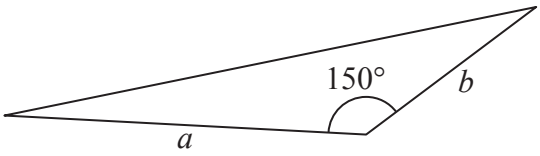
.....

(4)

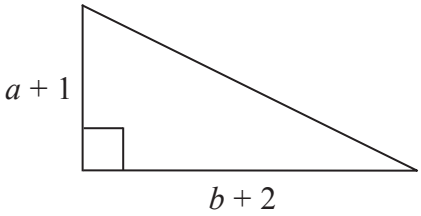
(Total for Question 21 is 6 marks)

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.

$a =$ .....

(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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