Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

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2501179758

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **October/November 2019**

1 hour 45 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical Instruments
Graphics Calculator

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
Do not use staples, paper clips, glue or correction fluid.
You may use an HB pencil for any diagrams or graphs.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** the questions.
Unless instructed otherwise, give your answers exactly or correct to three significant figures as appropriate.
Answers in degrees should be given to one decimal place.
For π, use your calculator value.
You must show all the relevant working to gain full marks and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 96.

This document consists of **15** printed pages and **1** blank page.

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[Turn over

Formula List

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle, radius r.	$A = \pi r^2$
Circumference, C, of circle, radius r.	$C = 2\pi r$
Curved surface area, A, of cylinder of radius r, height h.	$A = 2\pi rh$
Curved surface area, A, of cone of radius r, sloping edge l.	$A = \pi rl$
Curved surface area, A, of sphere of radius r.	$A = 4\pi r^2$
Volume, V, of prism, cross-sectional area A, length l.	$V = Al$
Volume, V, of pyramid, base area A, height h.	$V = \frac{1}{3}Ah$
Volume, V, of cylinder of radius r, height h.	$V = \pi r^2 h$
Volume, V, of cone of radius r, height h.	$V = \frac{1}{3}\pi r^2 h$
Volume, V, of sphere of radius r.	$V = \frac{4}{3}\pi r^3$

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Answer **all** the questions.

1 **(a)** Write $\frac{2}{5}$ as a decimal.

..... [1]

(b) Write $\frac{9}{16}$ as a percentage.

.....% [1]

(c) Work out $68.52 - 3.41 \times 7.9$.

..... [2]

(d) Write down a factor of 17.

..... [1]

(e) Write $\frac{28}{49}$ in its simplest form.

..... [1]

(f) Write down the next two terms in this sequence.

81, 74, 67, 60, …

..... , ... [2]

(g) $380 is invested at a rate of 3% per year simple interest.

Work out the interest at the end of 4 years.

$ ..... [2]

(h) Cupcakes cost $1.30 each.

Find the largest number of these cupcakes that can be bought with $10.

..... [2]

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2 Benji has 15 bags of potatoes.
The number of potatoes in each bag is shown below.

38	36	42	36	36
41	40	38	37	39
39	40	37	38	36

(a) Complete the frequency table.

Number of potatoes	36	37	38	39	40	41	42
Frequency	4						

[2]

(b) For the number of potatoes, find

(i) the range,

..... [1]

(ii) the mode,

..... [1]

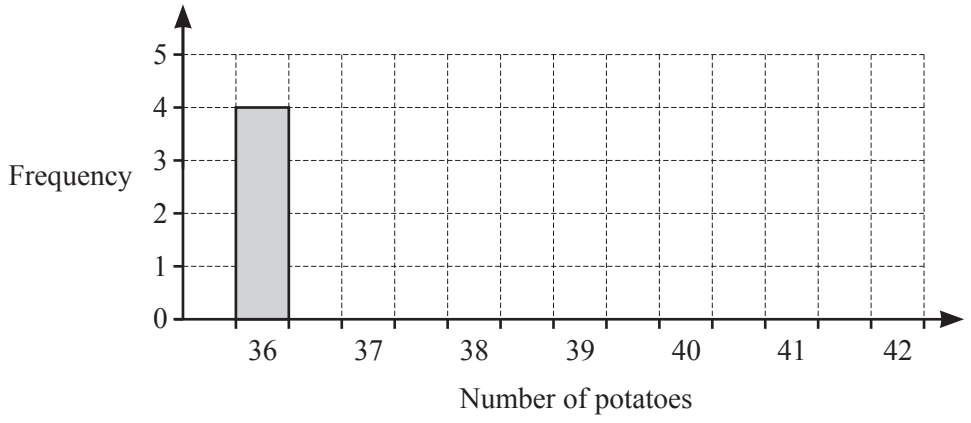
(iii) the median,

..... [1]

(iv) the mean.

..... [1]

(c) Complete the bar chart.

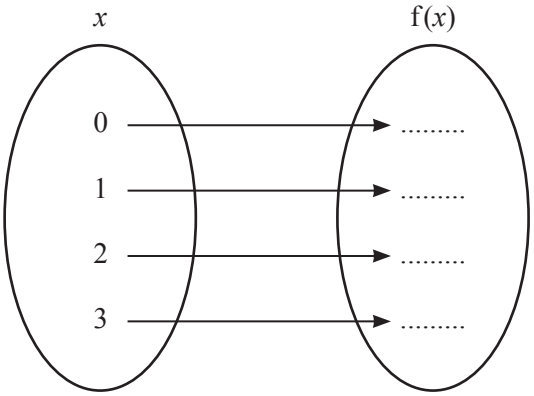


[2]

3 **(a)** Write sixty thousand and twenty in figures.

..... [1]

(b) Complete the mapping diagram for the function $f(x) = 3x - 4$.



[2]

(c) Write down a prime number between 35 and 45.

..... [1]

(d) $\frac{8}{15} = \frac{a}{75}$

Find the value of a.

$a =$ ..... [1]

(e) Write 6789 correct to the nearest 10.

..... [1]

(f) Write 189.436 correct to 2 decimal places.

..... [1]

(g) Write 3462

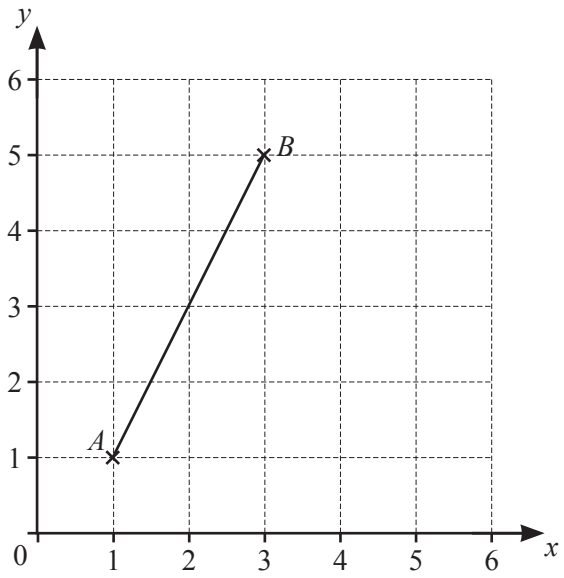
(i) correct to 3 significant figures,

..... [1]

(ii) in standard form.

..... [1]

4



The diagram shows two points, A and B, plotted on a 1 cm^2 grid.

(a) Write down the co-ordinates of point A and the co-ordinates of point B.

A (..... , ...)

B (..... , ...) [2]

(b) Calculate the length of AB.

..... cm [2]

(c) Find the co-ordinates of the midpoint of AB.

(..... , ...) [1]

(d) Find the gradient of AB.

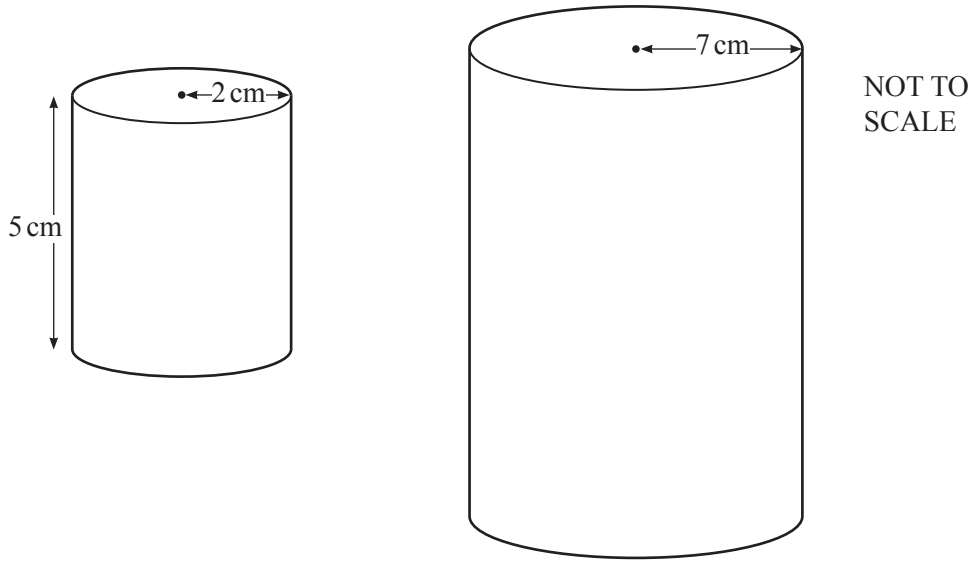
..... [2]

(e) Write down the equation of the line parallel to AB passing through (0, 3).

$y =$ ..... [2]

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5 Two cylindrical candles are mathematically similar.
The small candle has radius 2 cm and height 5 cm.
The large candle has radius 7 cm.



(a) Find the height of the large candle.

..... cm [2]

(b) The small candle burns for 4 hours and the large candle burns for 60 hours.

Write the ratio 4 : 60 in its simplest form.

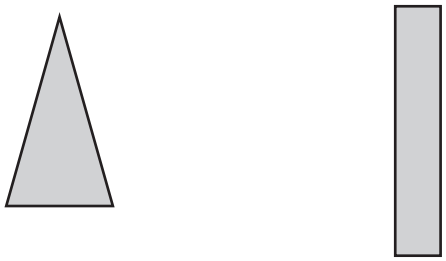
..... : ..... [1]

(c) The price of the large candle is $28.
In a sale, this price is reduced by 15%.

Find the sale price.

$..... [2]

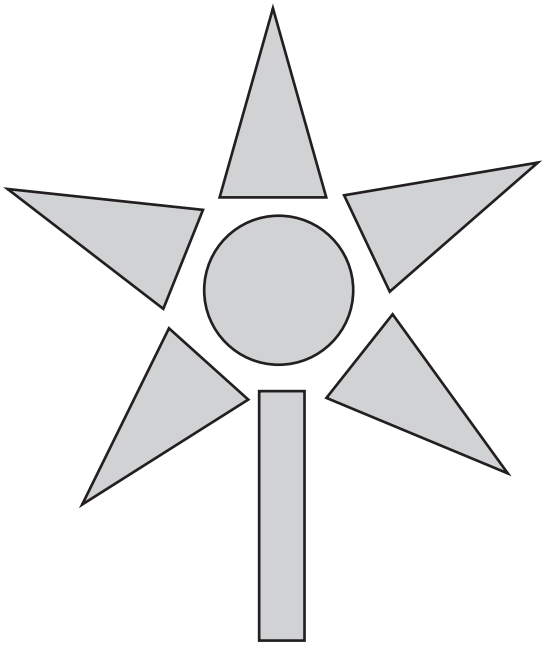
6 **(a)** For each diagram, draw all the lines of symmetry.



NOT TO SCALE

[3]

(b)



NOT TO SCALE

Simi makes a flower using some mathematical shapes.
The centre is a circle with radius 2 cm.
Each of the five petals is an isosceles triangle with base 2.3 cm and perpendicular height 4 cm.
The stem is a rectangle with length 6 cm and width 1 cm.

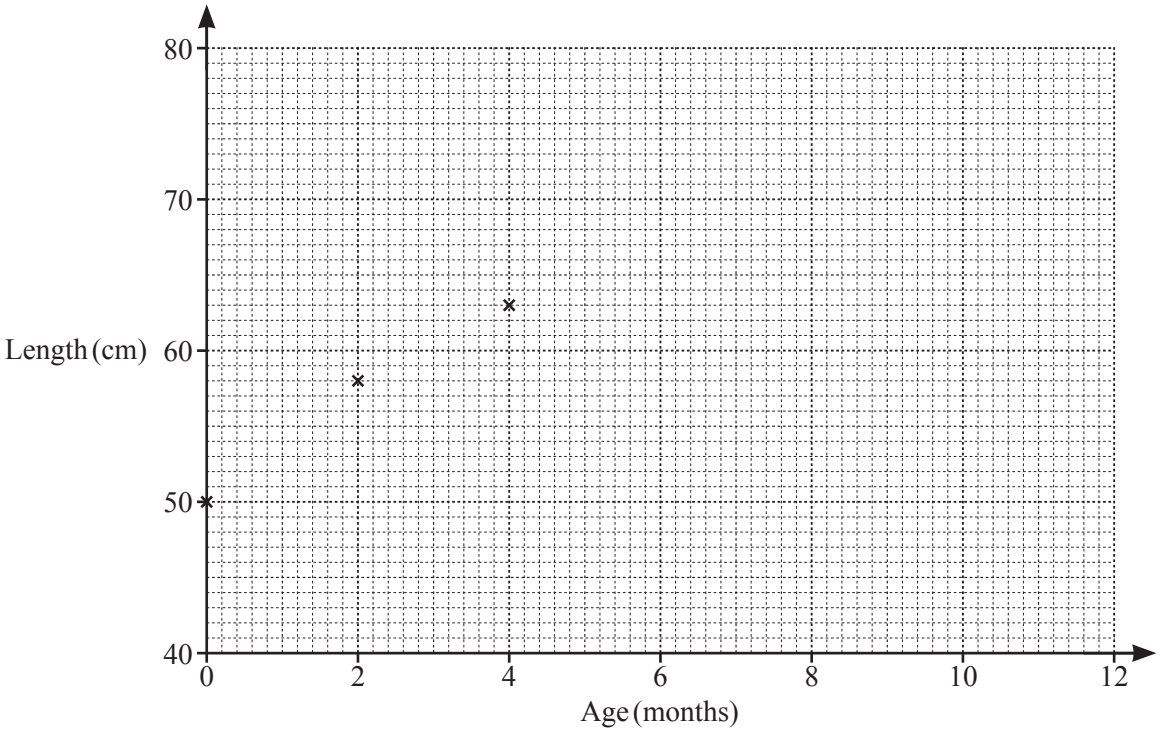
Find the total area shaded.

..... cm^2 [4]

7 The table shows the age, in months, and length, in centimetres, of seven babies.

Age (months)	0	2	4	5	9	10	12
Length (cm)	50	58	63	64	71	73	76

(a) Complete the scatter diagram to show this information.
The first three points have been plotted for you.



[2]

(b) Find.

(i) the mean age,

..... months [1]

(ii) the mean length.

..... cm [1]

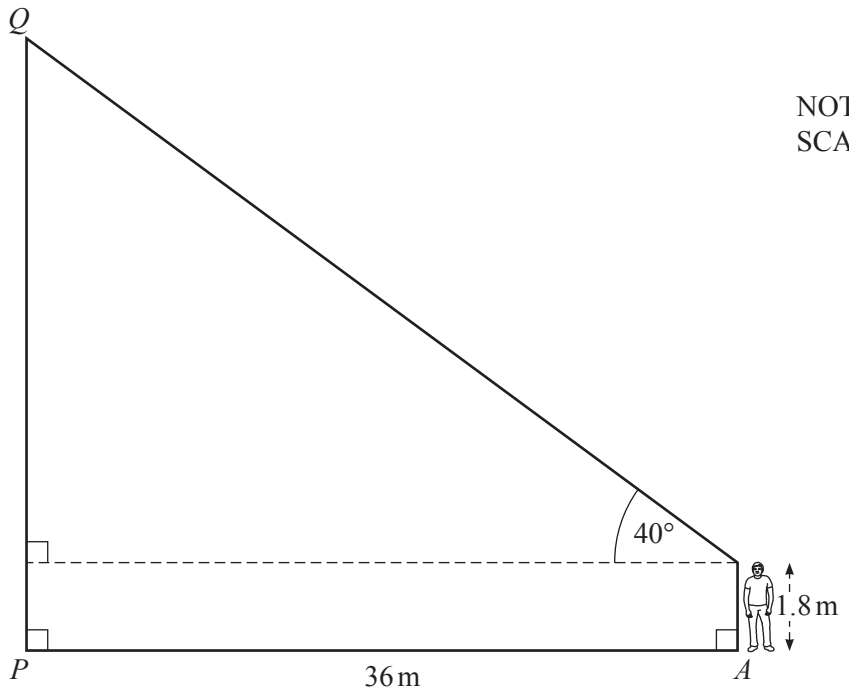
(c) On the scatter diagram, draw a line of best fit. [2]

(d) Use your line of best fit to find an estimate for the length of a baby aged 7 months.

..... cm [1]

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8 (a)



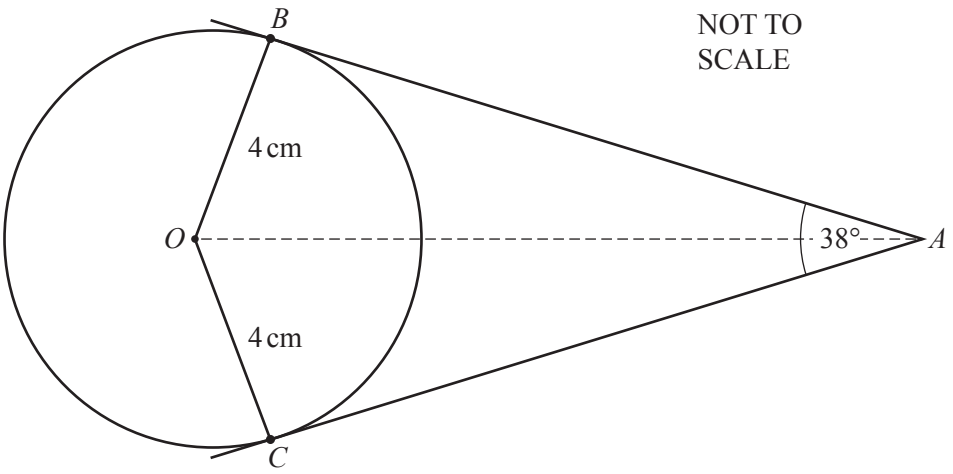
The diagram shows a vertical tower, PQ, standing on horizontal ground. Matthijs stands at point A. He is 1.8 m tall.

The base of the tower, P, is 36 m from point A.

Find the height of the tower.

..... m [3]

(b)



AB and *AC* are tangents to a circle with centre, *O*, and radius 4 cm.
Angle $BAC = 38°$.

(i) Write down the size of angle *OBA*.

Angle *OBA* = ... [1]

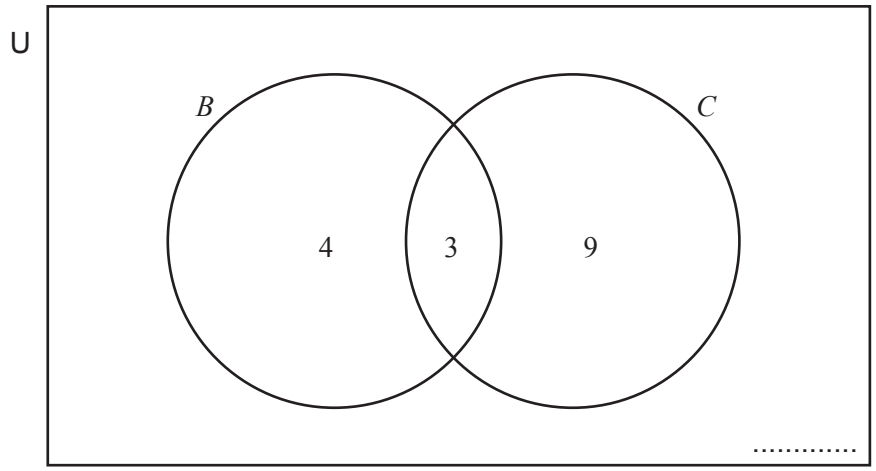
(ii) Find the size of angle *BOC*.

Angle *BOC* = ... [1]

(c) Use trigonometry to find the length of *OA*.

OA = ... cm [3]

9 20 people were asked if they liked banana milk shake, B, or chocolate milk shake, C.



(a) Complete the Venn diagram. [1]

(b) Write down $\mathrm{n}(B \cap C)$.

..... [1]

(c) One of these 20 people is chosen at random.

Find the probability that this person likes

(i) banana milk shake,

..... [1]

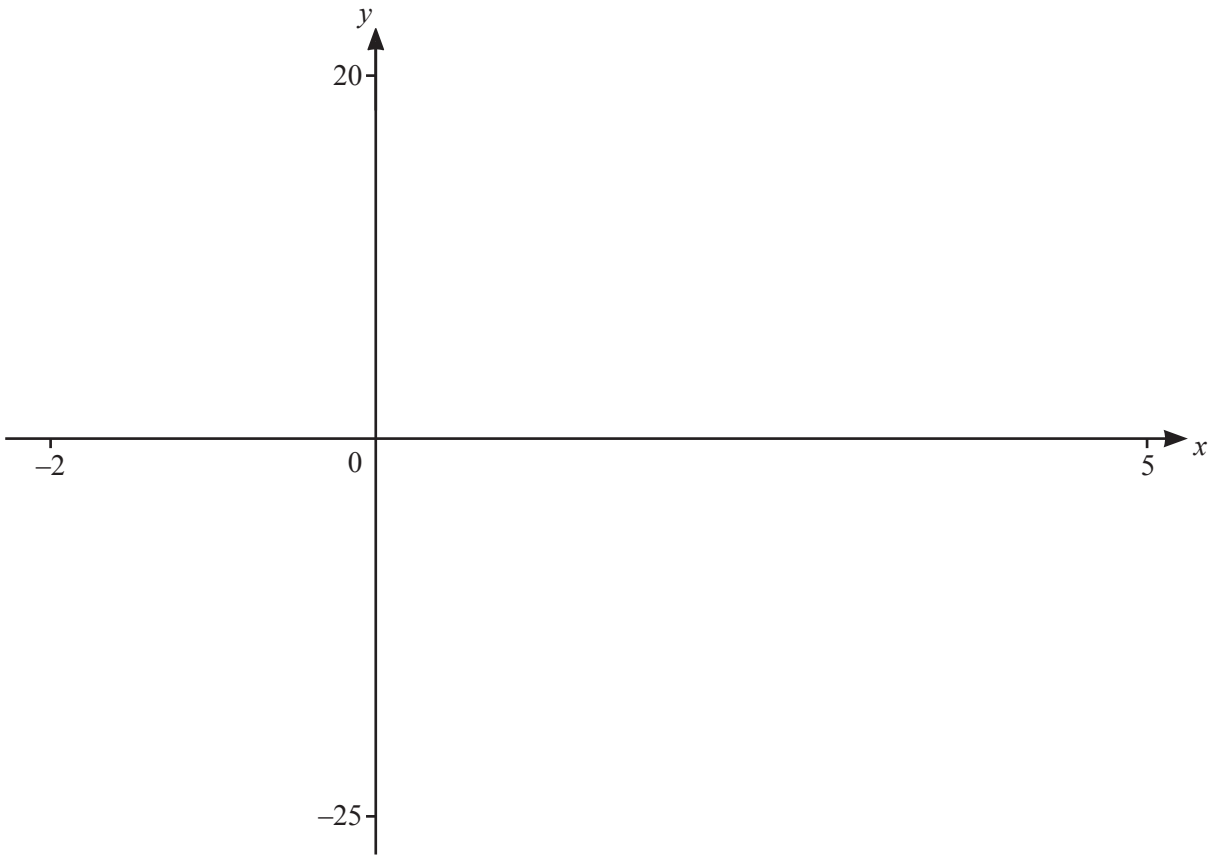
(ii) chocolate milk shake but not banana milk shake.

..... [1]

(d) On the Venn diagram, shade $C' \cap B$. [1]

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10



$f(x) = x^3 - 5x^2 + 2x + 8$

(a) On the diagram, sketch the graph of $y = f(x)$ for $-2 \leqslant x \leqslant 5$. [3]

(b) Write down the co-ordinates of the point where the curve crosses the y-axis.

(..... , ...) [1]

(c) Write down the co-ordinates of the three points where the curve crosses the x-axis.

(..... , ...), (..... , ...), (..... , ...) [2]

(d) Find the co-ordinates of the local maximum.

(..... , ...) [2]

(e) Find the number of times that the line $y = 9$ crosses the curve $y = f(x)$.

..... [1]

11 **(a)** Solve.

(i) $3y = 6$

$y =$ ..... [1]

(ii) $6y - 5 = 13$

$y =$ ..... [2]

(iii) $3 - y > 6$

..... [2]

(b) Expand and simplify.

$$(5y - 7)(3y - 4)$$

..... [2]

(c) $P = 2T - 6$

(i) Find the value of P when $T = 8$.

$P =$ ..... [1]

(ii) Rearrange the formula to make T the subject.

$T =$ ..... [2]

(d) Simplify. $\frac{2y}{3} + \frac{y}{5}$

..... [2]

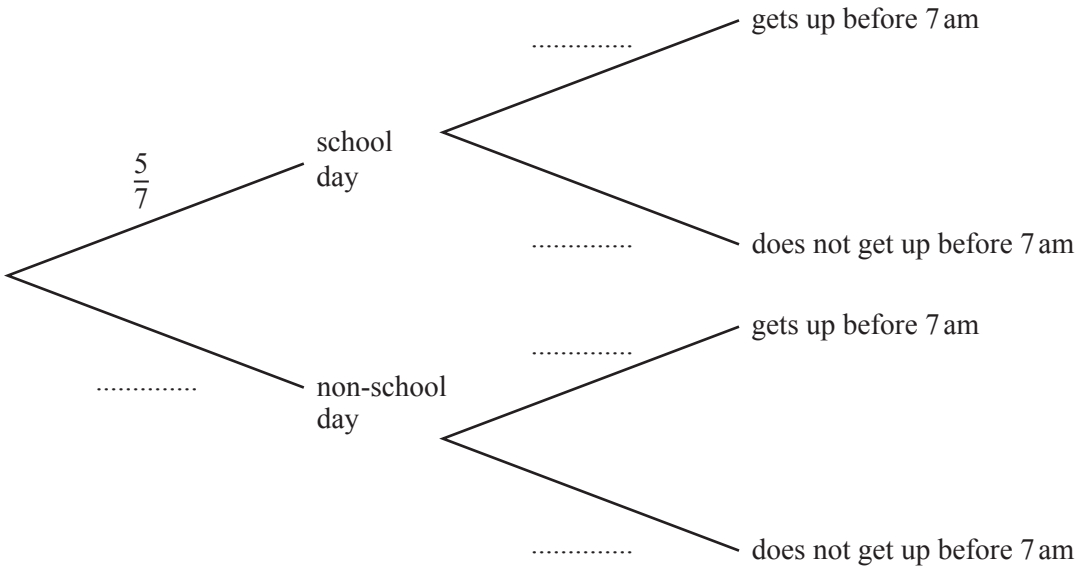
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12 Angie goes to school on 5 days each week.

On a school day, the probability that Angie gets up before 7 am is $\frac{9}{10}$.

On a non-school day, the probability that Angie gets up before 7 am is $\frac{1}{20}$.

(a) Complete the tree diagram.



[3]

(b) One day of the week is chosen at random.

Find the probability that the day is a non-school day and that Angie gets up before 7 am.

..... [2]

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