Write your name here:

Surname:	Other Names:

Mathematics
Practice Papers Set 1
Paper 1 (Non Calculator)
Higher Tier
Time: 1 hour 30 minutes

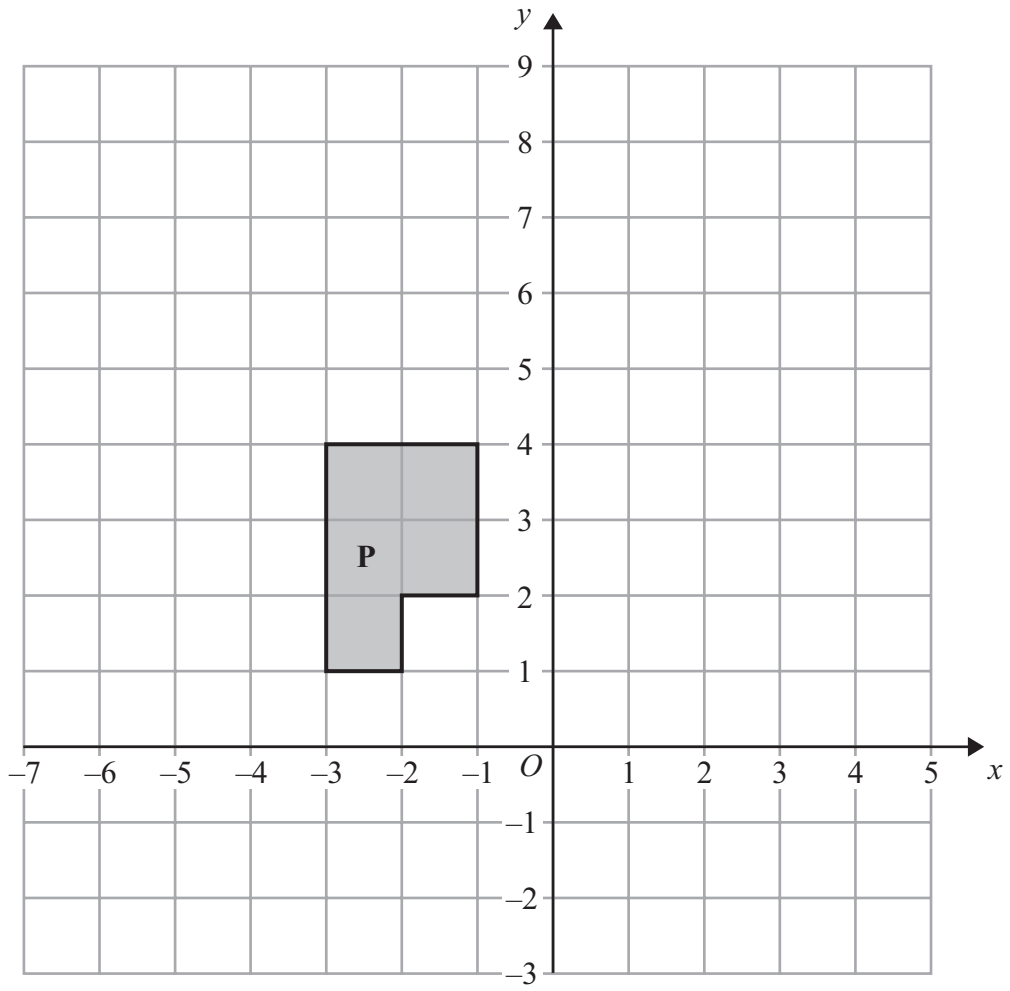
You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser

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.
- Answer the questions in the spaces provided
– there may be more space than you need.
- **Calculators may not be used.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information
- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
– use this as a guide as to how much time to spend on each question.

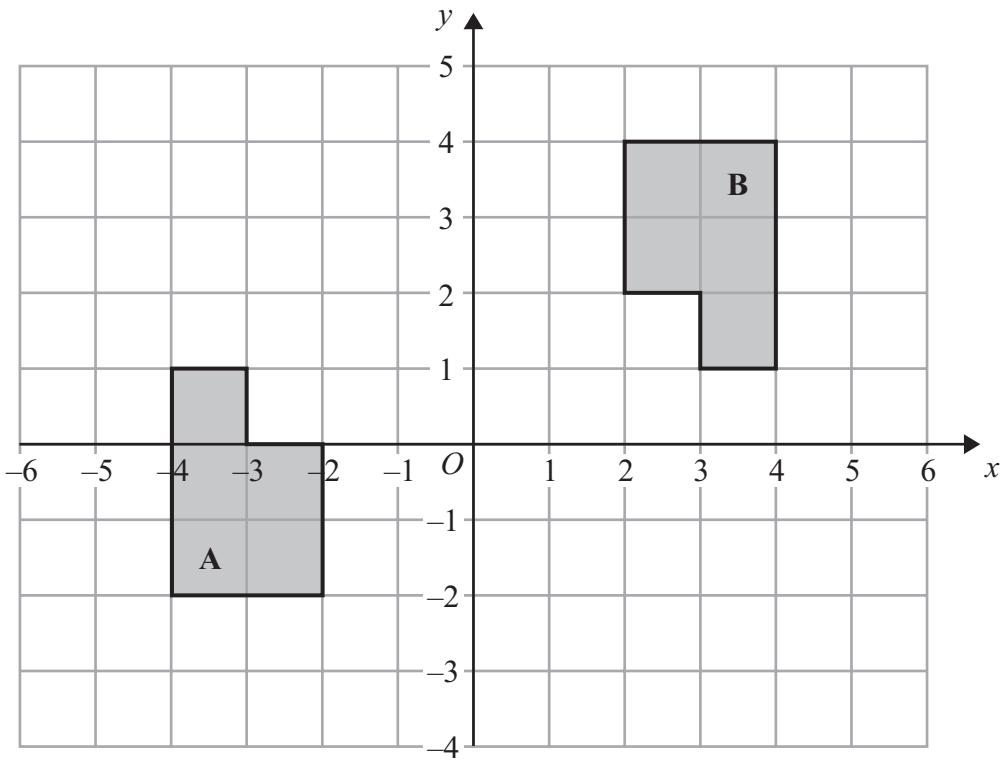
Advice
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

1



(a) Translate shape **P** by the vector $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$

(2)



(b) Describe fully the single transformation that maps shape **A** onto shape **B**.

.....

.....

(3)

(Total for Question 1 is 5 marks)

2 Margaret has some goats.
The goats produce an average total of 21.7 litres of milk per day for 280 days.
Margaret sells the milk in $\frac{1}{2}$ litre bottles.
Work out an estimate for the total number of bottles that Margaret will be able to fill with the milk.

You must show clearly how you got your estimate.

.....

(Total for Question 2 is 3 marks)

3 Matt and Dan cycle around a cycle track.

Each lap Matt cycles takes him 50 seconds.
Each lap Dan cycles takes him 80 seconds.

Dan and Matt start cycling at the same time at the start line.

Work out how many laps they will each have cycled when they are next at the start line together.

Matt ..... laps

Dan ..... laps

(Total for Question 3 is 3 marks)

4 The diagram shows a garden in the shape of a rectangle.

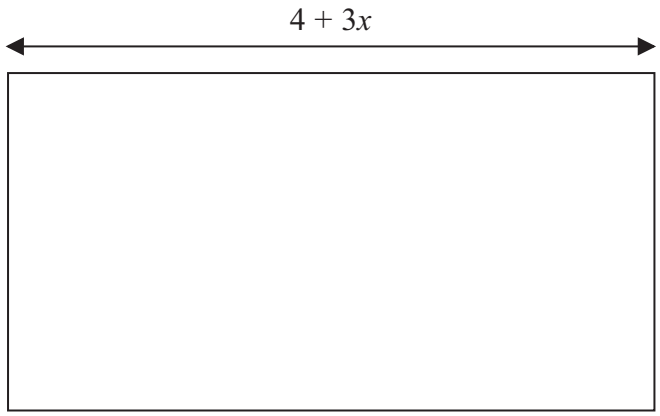


Diagram **NOT** accurately drawn

All measurements are in metres.
The perimeter of the garden is 32 metres.

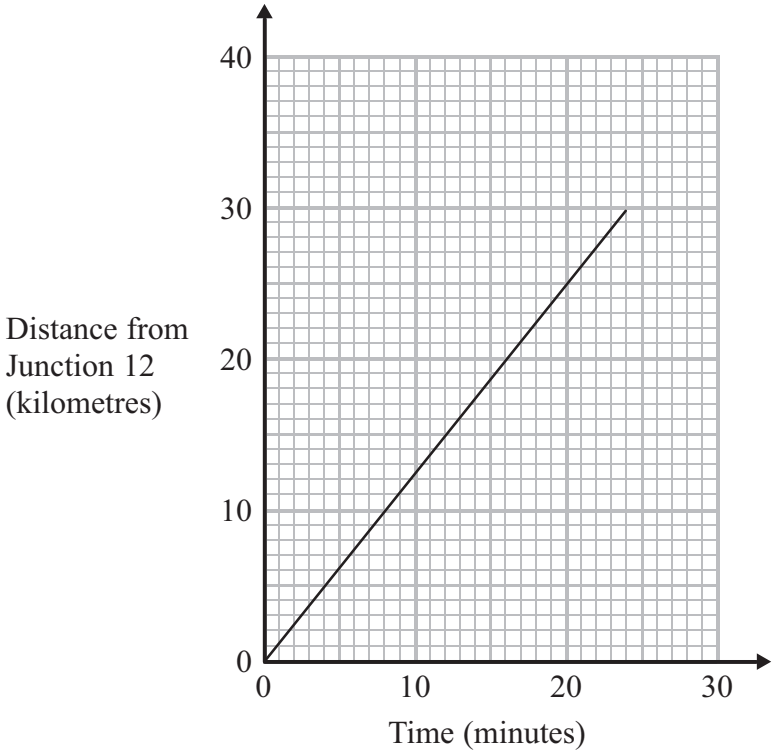
Work out the value of x

.....

(Total for Question 4 is 4 marks)

5 Debbie drove from Junction 12 to Junction 13 on a motorway.

The travel graph shows Debbie's journey.



Ian also drove from Junction 12 to Junction 13 on the same motorway.
He drove at an average speed of 66 km/hour.

Who had the faster average speed, Debbie or Ian?
You must explain your answer.

(Total for Question 5 is 4 marks)

6 The normal price of a television is reduced by 30% in a sale.

The sale price of the television is £350

Work out the normal price of the television.

£.....

(Total for Question 6 is 3 marks)

7 Sumeet has a pond in the shape of a prism.

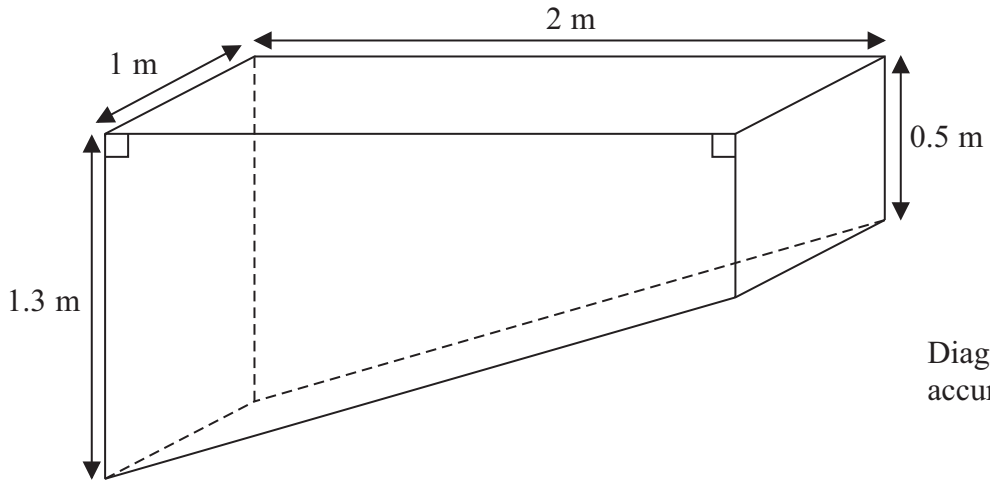


Diagram **NOT** accurately drawn

The pond is completely full of water.
Sumeet wants to empty the pond so he can clean it.
Sumeet uses a pump to empty the pond.

The volume of water in the pond decreases at a constant rate.
The level of the water in the pond goes down by 20 cm in the first 30 minutes.

Work out how much more time Sumeet has to wait for the pump to empty the pond completely.

.....

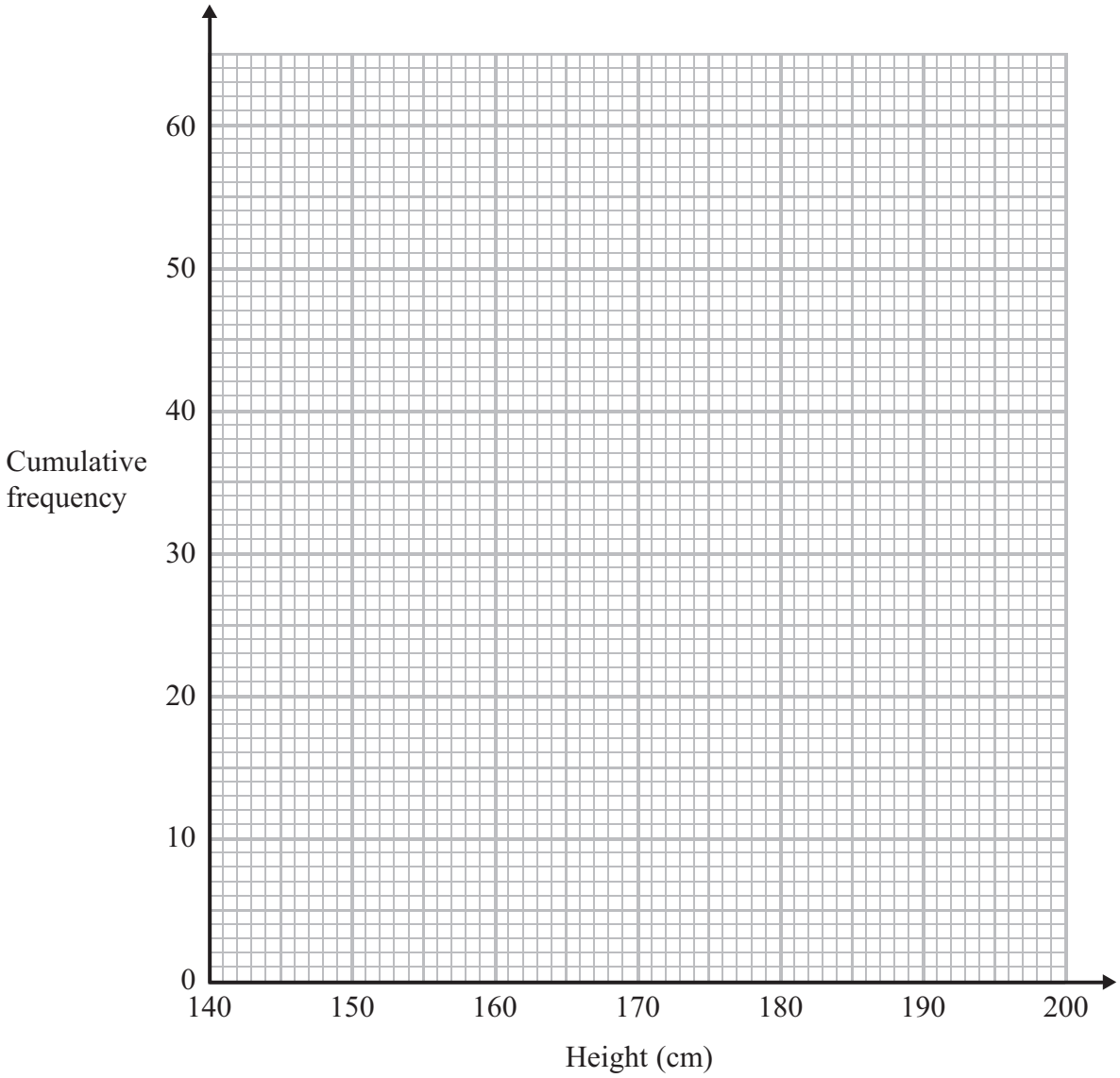
(Total for Question 7 is 6 marks)

8 The table below shows information about the heights of 60 students.

Height (x cm)	**Number of students**
$140 < x \leqslant 150$	4
$150 < x \leqslant 160$	5
$160 < x \leqslant 170$	16
$170 < x \leqslant 180$	27
$180 < x \leqslant 190$	5
$190 < x \leqslant 200$	3

(a) On the grid opposite, draw a cumulative frequency graph for the information in the table.

(3)



(b) Find an estimate

(i) for the median,

..... cm

(ii) for the interquartile range.

..... cm

(3)

(Total for Question 8 is 6 marks)

9 Solve the simultaneous equations

$$4x + 7y = 1$$
$$3x + 10y = 15$$

$x =$ .....

$y =$ .....

(Total for Question 9 is 4 marks)

10 Write these numbers in order of size.
Start with the smallest number.

5^{-1} 0.5 –5 5^{0}

.....

(Total for Question 10 is 2 marks)

11 **P** and **Q** are two triangular prisms that are mathematically similar.

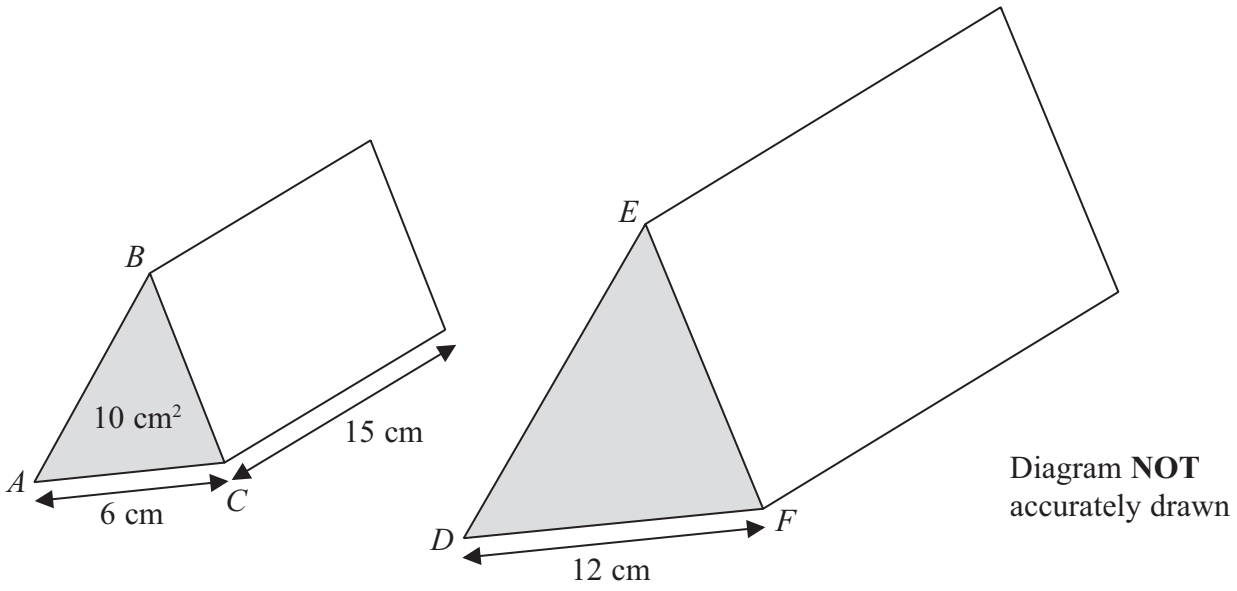


Diagram **NOT** accurately drawn

Prism P **Prism Q**

Prism **P** has triangle *ABC* as its cross section.
Prism **Q** has triangle *DEF* as its cross section.

AC = 6 cm
DF = 12 cm

The area of the cross section of prism **P** is 10 cm^2.
The length of prism **P** is 15 cm.

Work out the volume of prism **Q**.

.....

(Total for Question 11 is 4 marks)

12 The braking distance, d metres, for a car to stop is directly proportional to the square of its speed v km/h.

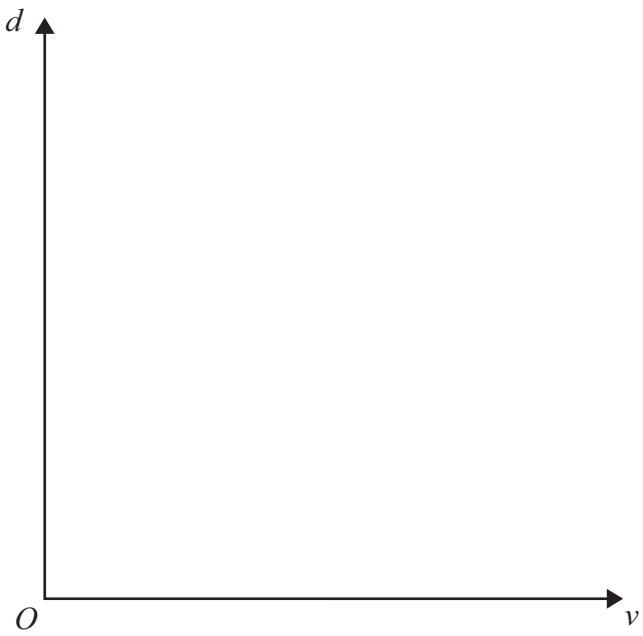
for a car travelling at 30 km/h the braking distance is 6 metres.

(a) Find a formula for d in terms of v.

$d =$ .....

(3)

(b) Sketch the graph of d against v.



(1)

(c) Calculate the value of d when $v = 60$

.....

(2)

(d) Calculate the value of v when $d = 96$

.....

(2)

(Total for Question 12 is 8 marks)

13 (a) Simplify $(3\sqrt{5})^2$

.....

(1)

(b) Express $\sqrt{98} + \sqrt{18}$ in the form $n\sqrt{2}$ where n is an integer.

.....

(2)

(c) Rationalise the denominator of $\dfrac{1}{5 - \sqrt{2}}$

Give your answer in the form $\dfrac{a + \sqrt{b}}{c}$ where a, b and c are integers.

.....

(2)

(Total for Question 13 is 5 marks)

14 (a) Solve $7 - 2w < 4$

.....

(2)

(b) Solve $x^2 + 3x - 10 \leqslant 0$

.....

(3)

(Total for Question 14 is 5 marks)

15 Find an expression for the nth term of this quadratic series.

6 10 16 24 34

.....

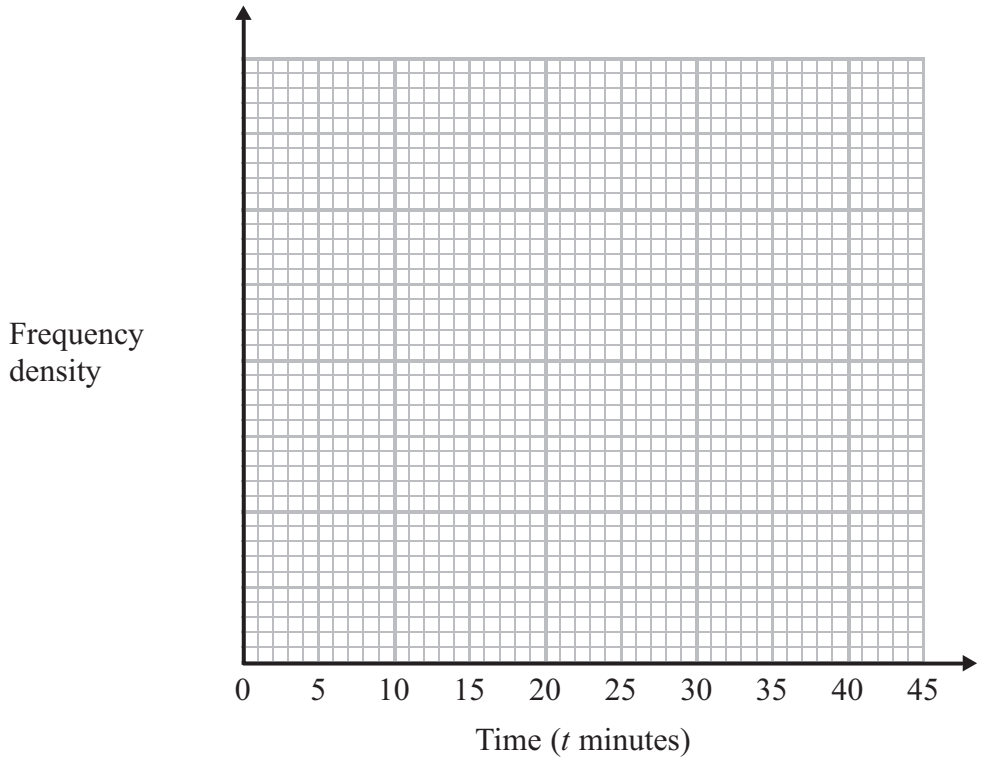
(Total for Question 15 is 3 marks)

16 Bill works for a computer service centre.

The table shows some information about the length of time, t minutes, of the phone calls Bill had.

Time (t minutes)	$0 < t \leqslant 10$	$10 < t \leqslant 15$	$15 < t \leqslant 20$	$20 < t \leqslant 30$	$30 < t \leqslant 45$
Number of calls	12	15	13	18	3

On the grid, draw a histogram to show this information.



(Total for Question 16 is 3 marks)

17 Fiza has 10 coins in a bag.
There are three £1 coins and seven 50 pence coins.

Fiza takes at random, 3 coins from the bag.

Work out the probability that she takes exactly £2.50

.....

(Total for Question 17 is 4 marks)

18

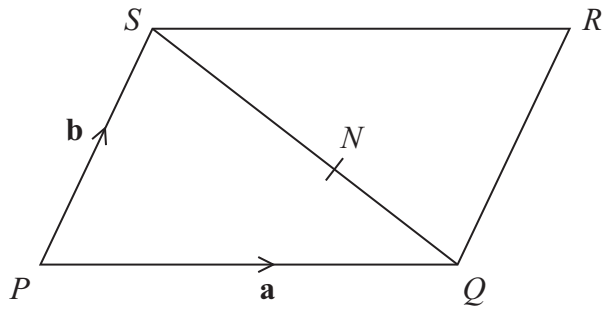


Diagram **NOT** accurately drawn

PQRS is a parallelogram.
N is the point on *SQ* such that $SN : NQ = 3 : 2$
$\overrightarrow{PQ} = \mathbf{a}$
$\overrightarrow{PS} = \mathbf{b}$

(a) Write down, in terms of **a** and **b**, an expression for $\overrightarrow{SQ}$.

.....

(1)

(b) Express $\overrightarrow{NR}$ in terms of **a** and **b**.

.....

(3)

(Total for Question 18 is 4 marks)

19 The expression $x^2 - 8x + 21$ can be written in the form $(x - a)^2 + b$ for all values of x.

(a) Find the value of a and the value of b.

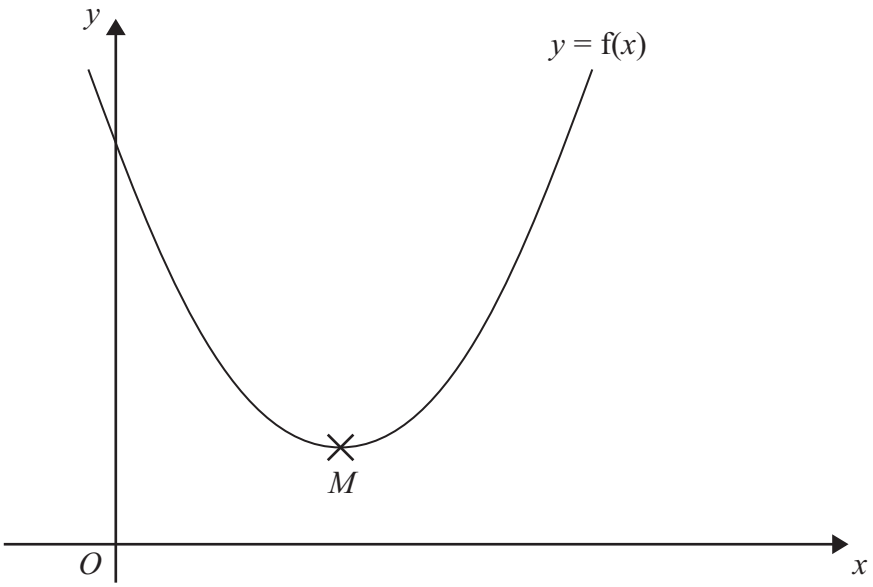
$a =$ .....

$b =$ .....

(3)

The equation of a curve is $y = f(x)$ where $f(x) = x^2 - 8x + 21$

The diagram shows part of a sketch of the graph of $y = f(x)$.



The minimum point of the curve is M.

(b) Write down the coordinates of M.

(..... , ...)

(1)

(Total for Question 19 is 4 marks)