Cambridge O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER					

1322126159

MATHEMATICS (SYLLABUS D) **4024/11**

Paper 1 **May/June 2017**

2 hours

Candidates answer on the Question Paper.

Additional Materials: Geometrical instruments

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.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

If working is needed for any question it must be shown in the space below that question.
Omission of essential working will result in loss of marks.

ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 80.

This document consists of **19** printed pages and **1** blank page.

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ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER

1 **(a)** Evaluate 0.2×0.08 .

Answer ..... [1]

(b) Add one pair of brackets to make the statement below true.

$2 \times 3 + 4 \times 5 = 70$ [1]

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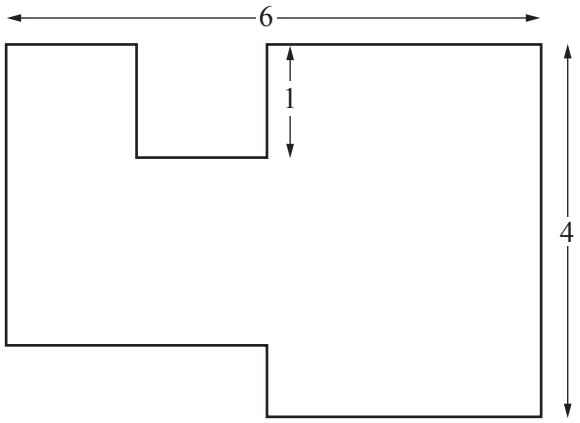
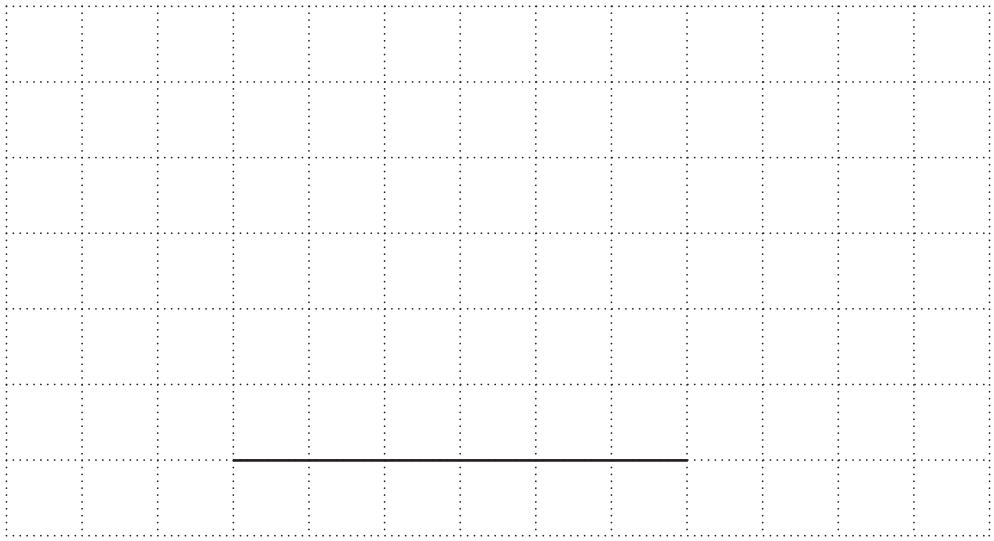
2 **(a)** Find the perimeter of the shape below.
All the angles are right angles.
All the lengths are in centimetres.



Answer ..... cm [1]

(b) On the grid below draw a trapezium with height 4 cm and area 18 cm^2.
One side of the trapezium has been drawn for you.



[1]

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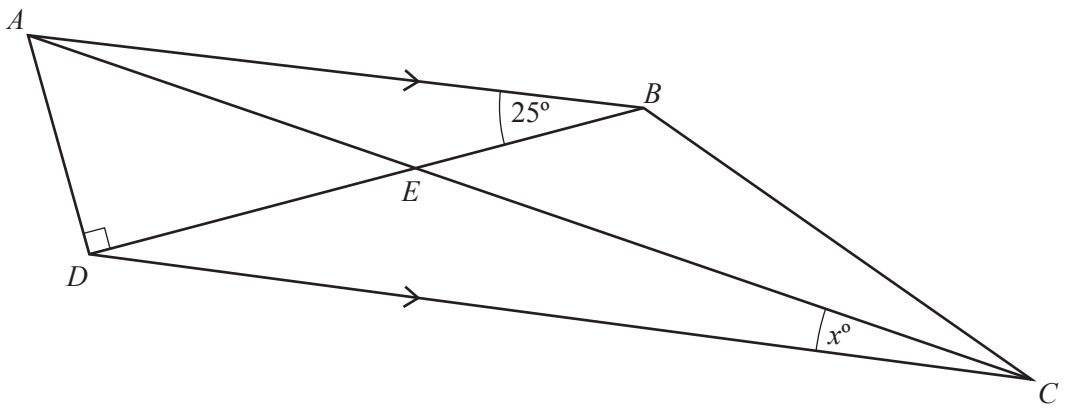

In the diagram AB is parallel to DC.
AC and BD intersect at E.

Triangle ADE is right-angled and isosceles with $AD = DE$.
$A\hat{B}D = 25º$.

Find x.

Answer $x =$ ..... [2]

---

4 **(a)** Express 36 as the product of its prime factors.

Answer ..... [1]

(b) Write down two prime numbers whose sum is 15.

Answer ..... [1]

---

5 Carl spent t minutes on his English homework.
He spent three times as long on his Mathematics homework as on his English homework.
He spent a total of 2 hours 20 minutes on his English and Mathematics homework.

Write down an equation to represent this information and hence find the value of t.

Answer $t =$ ..... [2]

---

6 Complete the sentences below which describe two different types of quadrilateral.

(a) A ..... has two pairs of equal sides and just one line of symmetry. [1]

(b) A .....has two pairs of equal sides, no line of symmetry and rotational symmetry of order 2. [1]

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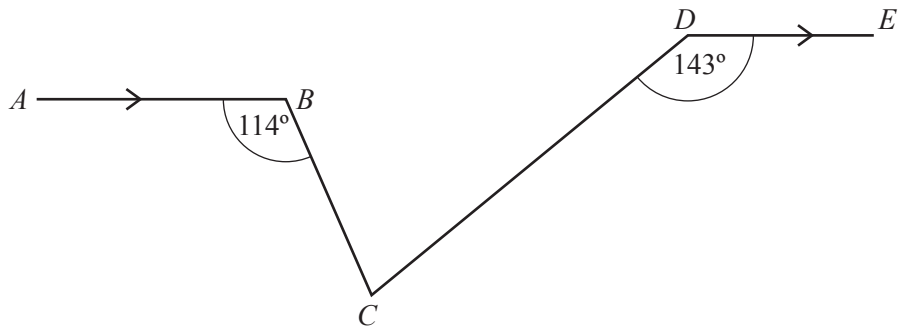

In the diagram AB is parallel to DE.

$A\hat{B}C = 114^\circ$ and $C\hat{D}E = 143^\circ$.

Find $B\hat{C}D$.

Answer $B\hat{C}D =$ ..... [2]

8 **(a)** A car travels at 84 km/h.

Calculate the number of metres that the car travels in one minute.

Answer ..... m [1]

(b) A runner completes a race in 12.3 seconds, correct to the nearest tenth of a second.

What is the lower bound for the runner's time?

Answer .....s [1]

---

9 A bag contains red and blue pegs.
There are 40 pegs in the bag.
The probability of choosing a red peg from the bag is 0.4 .

(a) Work out the number of red pegs in the bag.

Answer ..... [1]

(b) More red pegs are added to the bag.

Work out the number of red pegs that must be added to the bag so that the probability of choosing a **blue** peg is 0.2 .

Answer ..... [2]

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10 **(a)** Write 248.367

(i) correct to 2 decimal places,

Answer ..... [1]

(ii) correct to 2 significant figures.

Answer ..... [1]

(b) Estimate, correct to the nearest whole number, the value of $\sqrt[3]{8.36} + \sqrt[3]{63.58}$.

Answer ..... [1]

---

11 Solve the simultaneous equations.

$$2x + 3y = 5$$
$$3x - y = -9$$

Answer $x =$ .....

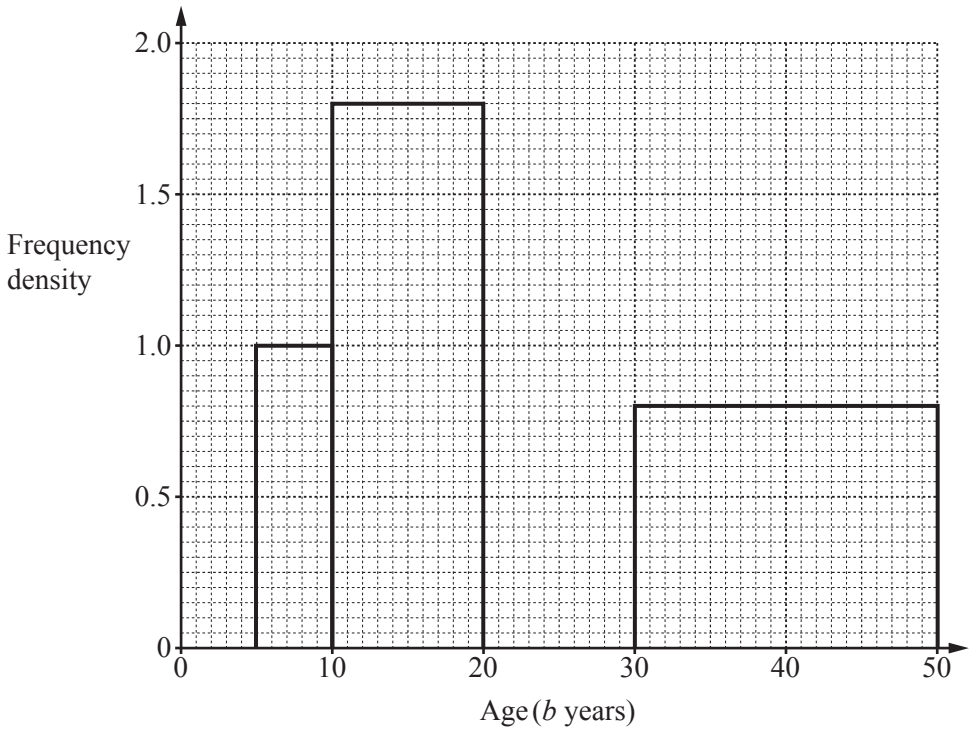
$y =$ ..... [3]

---

12 The ages of guests at a family party were recorded.
The results are summarised in the table.

Age (b years)	$5 < b \leqslant 10$	$10 < b \leqslant 20$	$20 < b \leqslant 30$	$30 < b \leqslant 50$
Frequency	p	18	14	q

The histogram below shows some of these results.



(a) Use the histogram to find the value of

(i) p,

Answer $p =$ ..... [1]

(ii) q.

Answer $q =$ ..... [1]

(b) Complete the histogram. [1]

13 **(a)** Evaluate $\frac{3}{5} - \frac{1}{8}$.

Answer ..... [1]

(b) Find A where $A \times \frac{3}{7} = \frac{2}{5}$.

Answer $A =$ ..... [1]

(c) Find the fraction which is exactly halfway between $\frac{5}{8}$ and $\frac{2}{3}$.

Answer ..... [1]

---

14 **(a)** Write 0.000 186 in standard form.

Answer ..... [1]

(b) $s = 1.3 \times 10^7$ $t = 8 \times 10^8$

Giving each answer in standard form, find

(i) t^2,

Answer ..... [1]

(ii) $t - s$.

Answer ..... [2]

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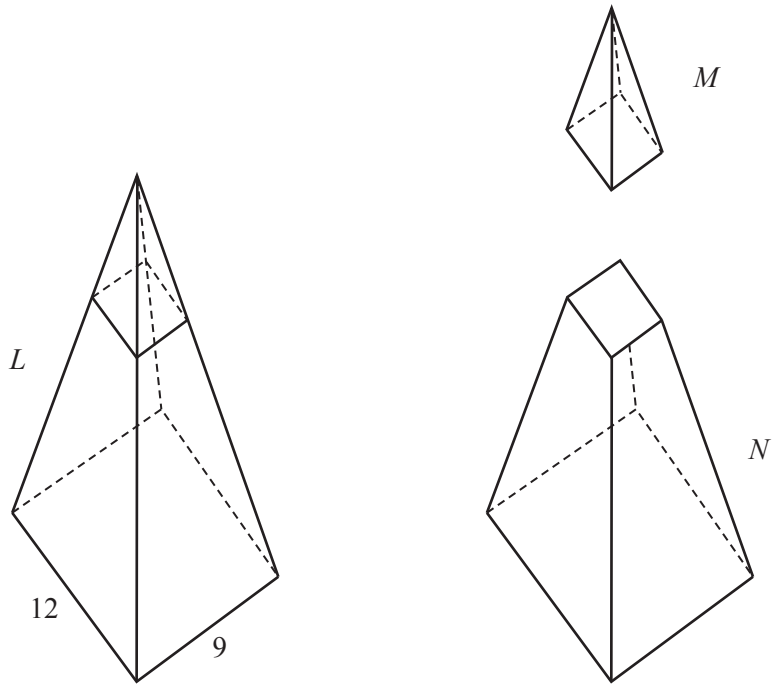
15 **[Volume of a pyramid = $\frac{1}{3}$ × base area × perpendicular height]**



The diagrams show a solid pyramid L cut into two parts, M and N, by a plane parallel to its base.
The base of pyramid L is a rectangle 9 cm by 12 cm.
The perpendicular height of pyramid L is 30 cm.

(a) Work out the volume of pyramid L.

Answer ..... cm^3 [1]

(b) The perpendicular height of pyramid M is $\frac{1}{3}$ of the perpendicular height of pyramid L.

(i) Express the volume of M as a fraction of the volume of L.

Answer ..... [1]

(ii) Calculate the volume of the solid N.

Answer ..... cm^3 [2]

16 **(a)** Given that $a = 3$ and $b = -7$, evaluate

(i) $2a - b$,

Answer ..... [1]

(ii) $a^2 + b^2$.

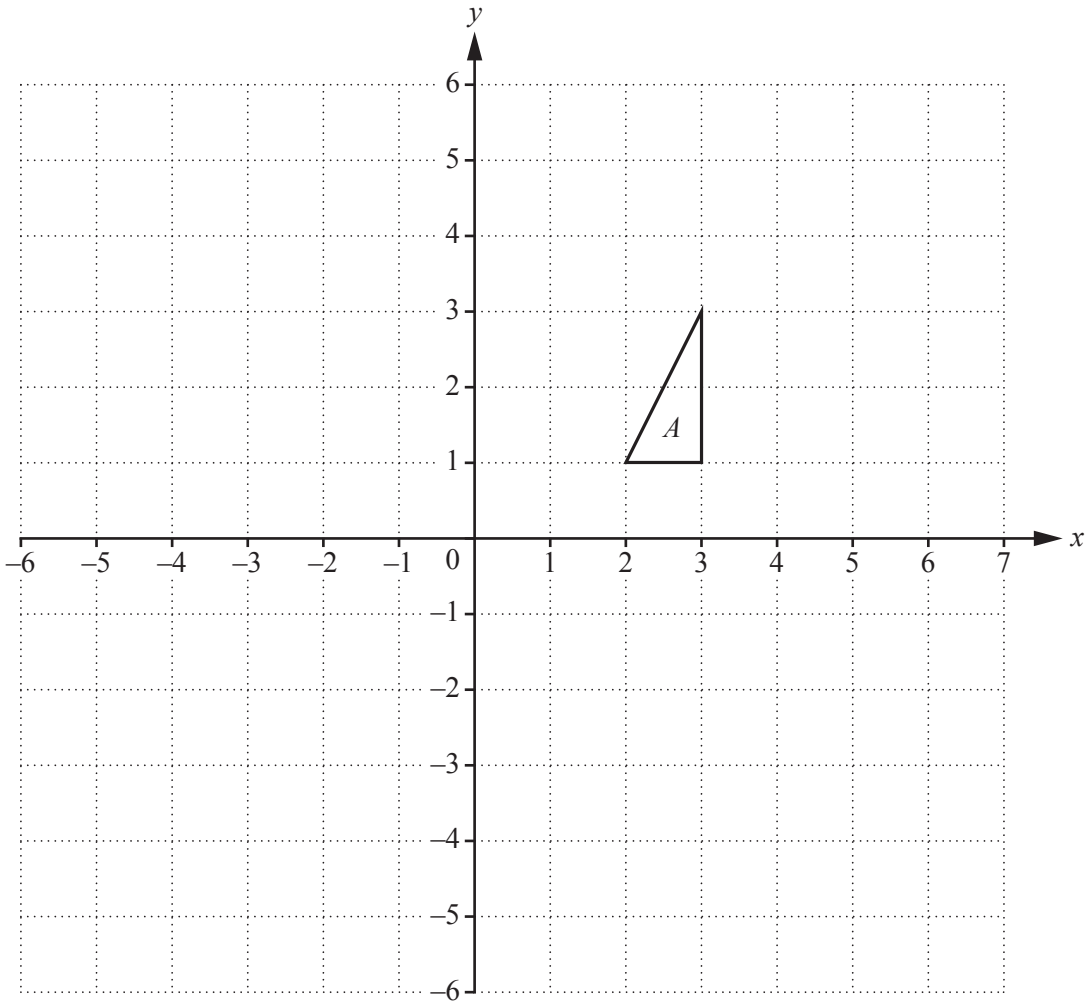
Answer ..... [1]

(b) $$A = 2r^2 + 5$$

Rearrange the formula to make r the subject.

Answer $r =$ ..... [2]

17 The diagram shows triangle A.



(a) Triangle B is the image of triangle A after reflection in the line $y = -1$.

Draw and label triangle B on the diagram. [1]

(b) Triangle C is the image of triangle A after a stretch, stretch factor 2 with the y-axis invariant.

(i) Draw and label triangle C on the diagram. [2]

(ii) Find the matrix representing the transformation that maps triangle A onto triangle C.

Answer $\begin{pmatrix} & \\ & \end{pmatrix}$ [1]

18 **(a)** Evaluate

(i) 3^{-2},

Answer ..... [1]

(ii) $125^{\frac{2}{3}}$.

Answer ..... [1]

(b) Simplify $\left(\frac{2a^2b^5}{18a^4b}\right)^{\frac{1}{2}}$.

Answer ..... [2]

19 **(a)** 6 square metres of carpet cost \$258.

Work out the cost of 10 square metres.

Answer \$ ..... [1]

(b)

1 dirham = \$0.30

Amin changes \$90 into dirhams.

Calculate the number of dirhams that Amin receives.

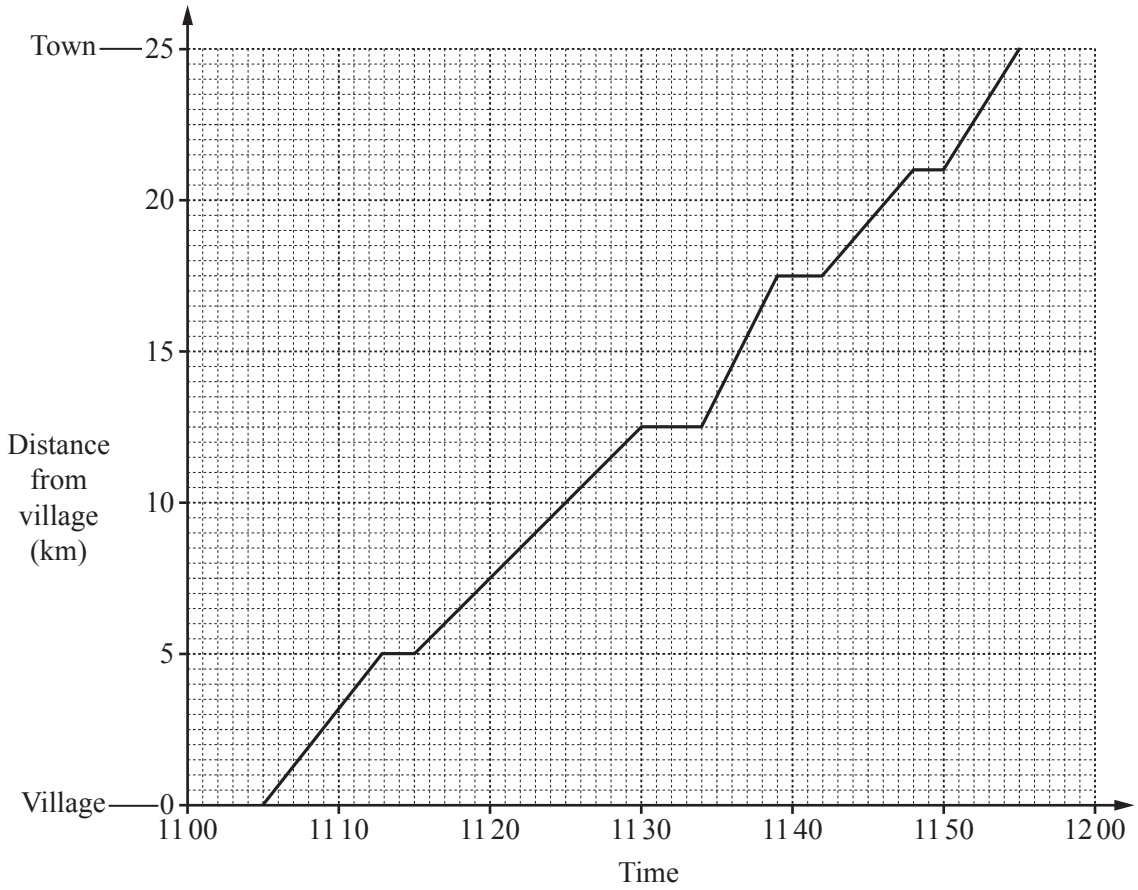
Answer ..... [1]

(c) Sabah is filling a tank with water.
It takes 20 minutes to fill the empty tank when the water flows at a rate of 2.4 litres/minute.

Calculate the time it will take to fill the empty tank if the water flows at a rate of 4 litres/minute.

Answer .....minutes [2]

20



The distance-time graph shows the journey of a red bus travelling from a village to a town.

(a) Find the total length of time for which the bus is stopped during the journey.

Answer .....minutes [1]

(b) Find the average speed of the bus over the **whole** journey from the village to the town.

Answer ..... km/h [1]

(c) A yellow bus leaves the **town** at 11 25 and travels non-stop along the same road to the village at a constant speed of 50 km/h.

(i) On the graph draw the distance-time graph for the yellow bus. [1]

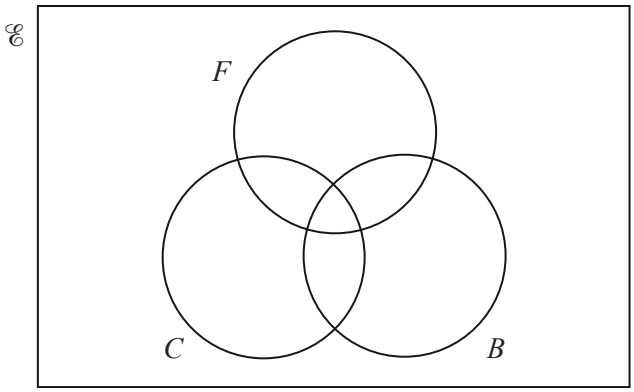
(ii) At what time does the yellow bus meet the red bus?

Answer ..... [1]

21 **(a)** In a sports club 24 members play basketball (B),
28 play cricket (C),
16 play football (F),
9 play basketball and cricket,
11 play cricket and football and
6 play basketball and football.

Five members play all three games and **eight** members play none of these games.

(i) Complete the Venn diagram to show this information.

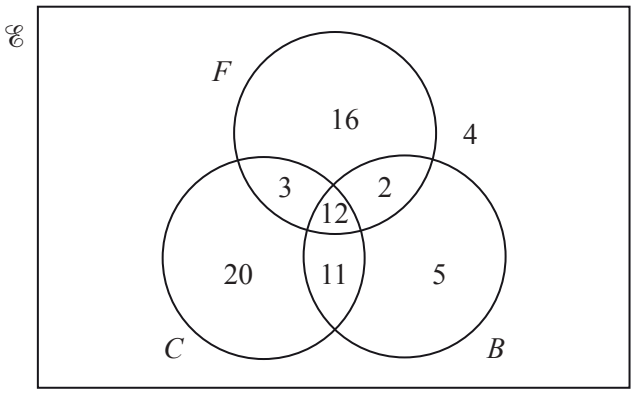


[2]

(ii) Hence work out the **total** number of members in the club.

Answer ..... [1]

(b) In another sports club, the number of members playing basketball (B), cricket (C) and football (F) are shown in the Venn diagram below.



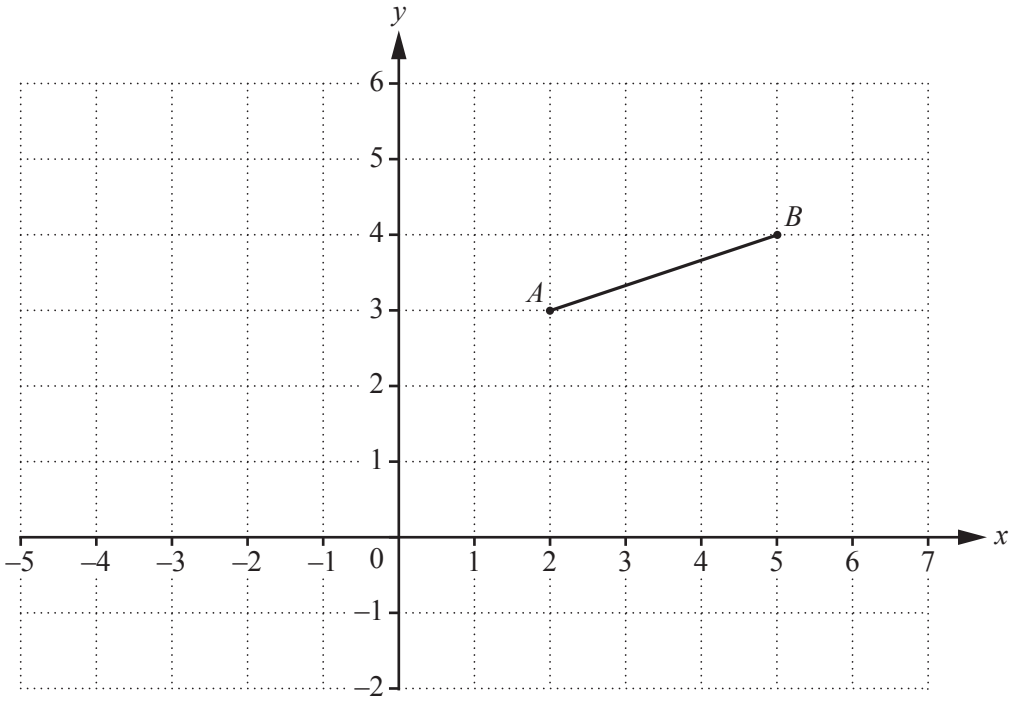
(i) Find n(F').

Answer ..... [1]

(ii) Find $n\big((F \cup C) \cap B'\big)$.

Answer ..... [1]

22



The diagram shows a line segment AB joining A (2, 3) and B (5, 4) .

(a) Find the coordinates of the midpoint of AB.

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

(b) AB is mapped onto CD by the translation $\begin{pmatrix} -3 \\ 1 \end{pmatrix}$.

Find the coordinates of C.

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

(c) AB is mapped on to FG by a rotation of 90º clockwise with centre (1, 4).

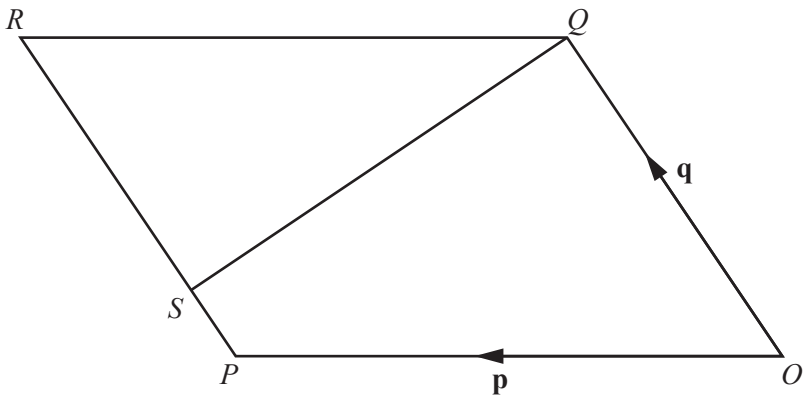
Find the coordinates of G.

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

(d) Find the equation of AB.

Answer ..... [2]

23



$OPRQ$ is a parallelogram and S is a point on PR such that $PS : SR = 1 : 3$.

$\overrightarrow{OP} = \mathbf{p}$ and $\overrightarrow{OQ} = \mathbf{q}$.

(a) **(i)** Express $\overrightarrow{PQ}$ in terms of **p** and/or **q**.

Answer ..... [1]

(ii) Express $\overrightarrow{QS}$, as simply as possible, in terms of **p** and/or **q**.

Answer ..... [1]

(b) T is a point on QS extended such that $\overrightarrow{QT} = \frac{4}{3}\overrightarrow{QS}$.

(i) Express $\overrightarrow{PT}$, as simply as possible, in terms of **p** and/or **q**.

Answer ..... [2]

(ii) What can you conclude about the points O, P and T ?

..... [1]

24 **(a)** Solve $\frac{6}{x+1} = \frac{5}{x-3}$.

Answer $x =$ ..... [2]

(b) $f(x) = x - 3$ $g(x) = x^2 + 1$

(i) Find $f(-5)$.

Answer ..... [1]

(ii) Find m given that $g(m-3) = 17$.

Answer $m =$ ..... or ..... [3]

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