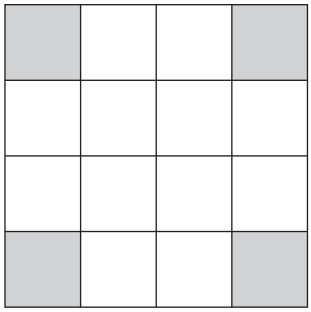
1



(a) Write down the order of rotational symmetry of this diagram.

..... [1]

(b) On the diagram, draw all the lines of symmetry. [2]

2 The probability that a train is late is 0.15 .

Write down the probability that the train is not late.

..... [1]

3 The stem-and-leaf diagram shows the number of hours that each of 16 students studied last week.

1	2	5	6	8	
2	0	1	1	7	9
3	2	3	4	5	
4	4	5	7		

Key: 1|2 represents 12 hours

Find

(a) the median,

..... h [1]

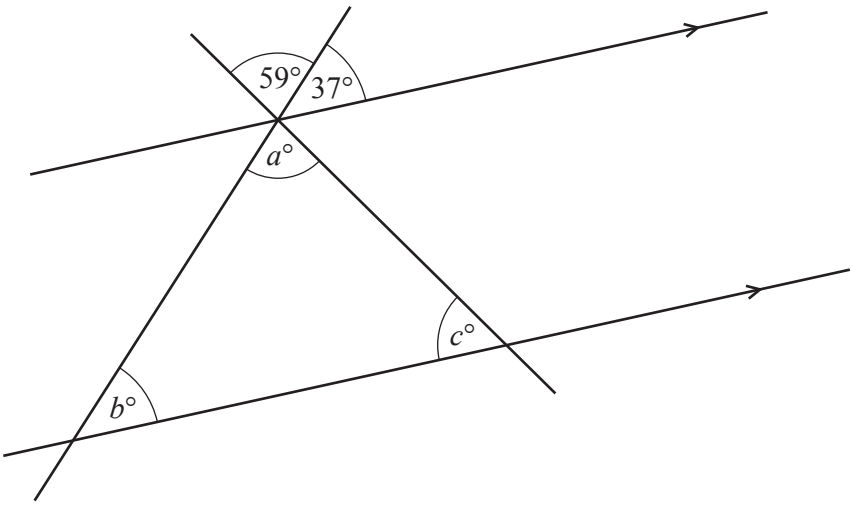
(b) the mode,

..... h [1]

(c) the range.

..... h [1]

4



NOT TO SCALE

The diagram shows two parallel lines intersected by two straight lines.

Find the values of a, b and c.

$a =$ .....

$b =$ .....

$c =$ ..... [3]

5 Work out.

(a) $\begin{pmatrix} 6 \\ -5 \end{pmatrix} + \begin{pmatrix} 8 \\ -1 \end{pmatrix}$

( ) [1]

(b) $3\begin{pmatrix} -4 \\ 7 \end{pmatrix}$

( ) [1]

6 **(a)** The nth term of a sequence is $n^2 + 3n$.

Find the first three terms of this sequence.

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

(b) These are the first five terms of a different sequence.

25 18 11 4 −3

Find the nth term of this sequence.

..... [2]

7 Solve the simultaneous equations.
You must show all your working.

$$2x + y = 3$$
$$x - 5y = 40$$

$x =$ .....

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

8 **Without using a calculator**, work out $1\frac{3}{8} - \frac{5}{6}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

9 A is the point $(5, -5)$ and B is the point $(9, 3)$.

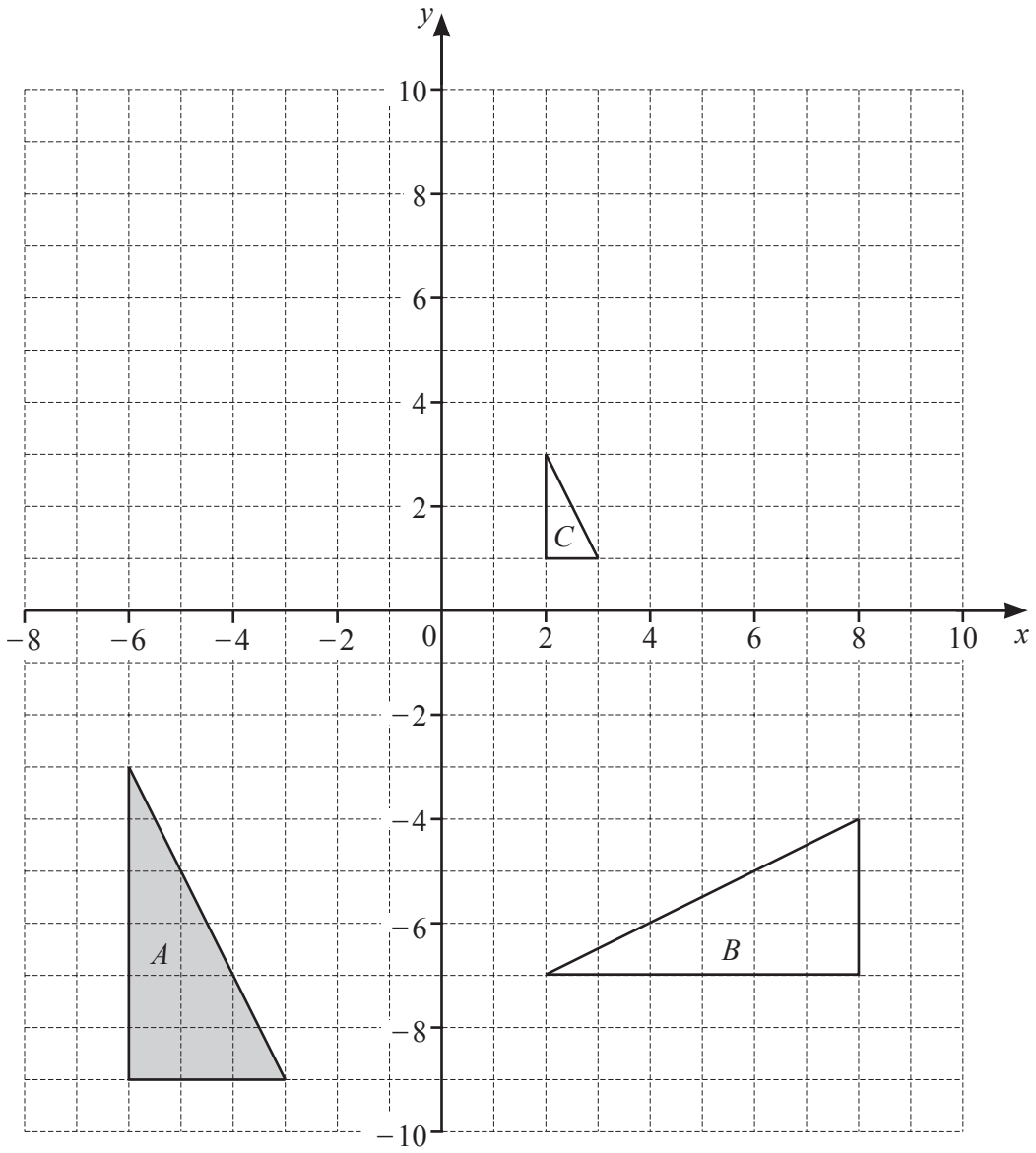
(a) Find the coordinates of the midpoint of AB.

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

(b) Find the length of AB.

..... [3]

10



(a) Describe fully the **single** transformation that maps

(i) triangle A onto triangle B,

.....

..... [3]

(ii) triangle A onto triangle C.

.....

..... [3]

(b) Draw the image of triangle A after a translation by the vector $\begin{pmatrix} 2 \\ 10 \end{pmatrix}$. [2]

11 **(a)** Simplify fully.

$(4ab^5)^4$

..... [2]

(b) $2p^{\frac{1}{3}} = 6$

Find the value of p.

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

(c) $81^2 \div 3^t = 9$

Find the value of t.

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

12 The profit a company makes decreases exponentially at a rate of 0.9% per year.
In 2014, the profit was \$9500.

Calculate the profit in 2019.

\$ ..... [2]

13 On a map, a lake has an area of $32\,\text{cm}^2$.
The scale of the map is 1 : 24 000.

Calculate the actual area of the lake.
Give your answer in km^2.

..... km^2 [2]

14 y is directly proportional to the square root of $(x-3)$.
When $x = 28$, $y = 20$.

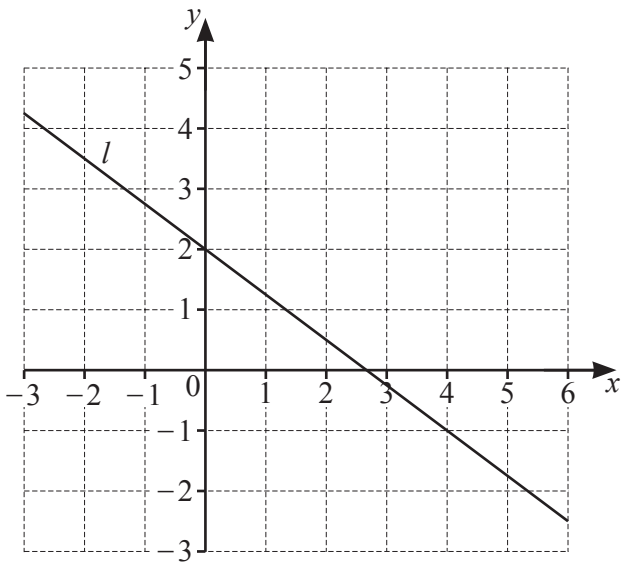
Find y when $x = 39$.

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

15 Make h the subject of the formula $2mh = g(1-h)$.

$h =$ ..... [4]

16



(a) Find the gradient of line l.

..... [2]

(b) Find the equation of line l in the form $y = mx + c$.

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

(c) Find the equation of the line that is perpendicular to line l and passes through the point $(12, -7)$. Give your answer in the form $y = mx + c$.

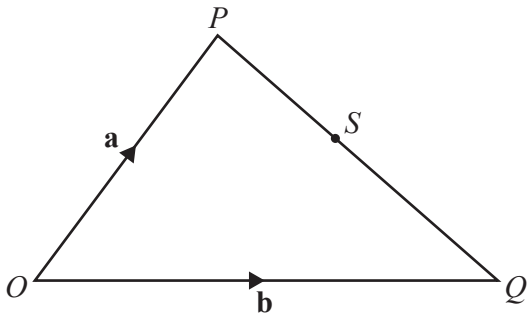
$y =$ ..... [3]

17 A bag contains 3 blue buttons, 8 white buttons and 5 red buttons.
Two buttons are picked at random from the bag, without replacement.

Work out the probability that the two buttons are either both red or both white.

..... [3]

18



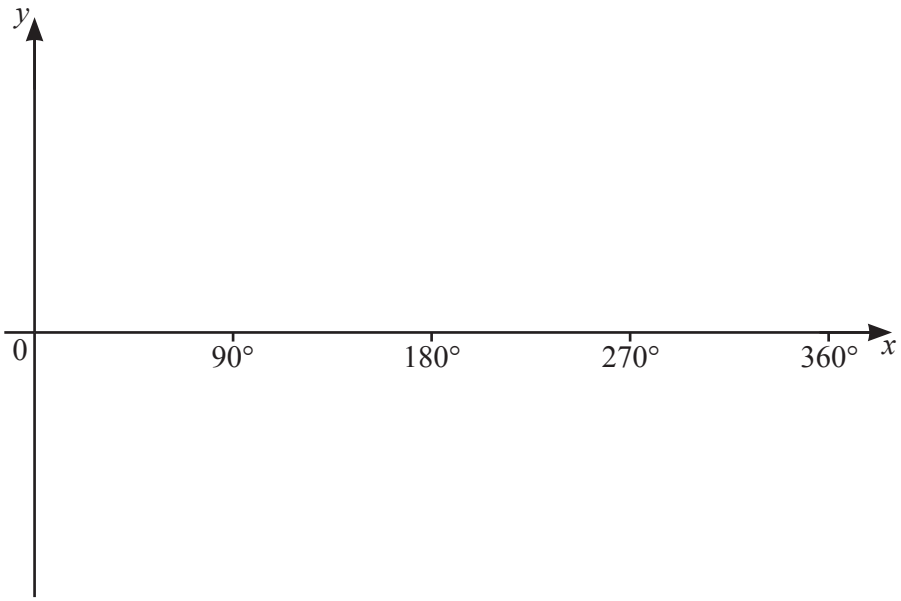
NOT TO SCALE

S is a point on PQ such that $PS : SQ = 4 : 5$.

Find $\overrightarrow{OS}$, in terms of **a** and **b**, in its simplest form.

$\overrightarrow{OS}$ = ... [2]

19 **(a)** Sketch the graph of $y = \tan x$ for $0° \leqslant x \leqslant 360°$.



[2]

(b) Solve the equation $5 \tan x = 1$ for $0° \leqslant x \leqslant 360°$.

$x =$ ..... or $x =$ ..... [2]

20 The distance between two towns is 600 km, correct to the nearest 10 km.
A car takes 8 hours 40 minutes, correct to the nearest 10 minutes, to travel this distance.

Calculate the lower bound for the average speed of the car in km/h.

..... km/h [3]