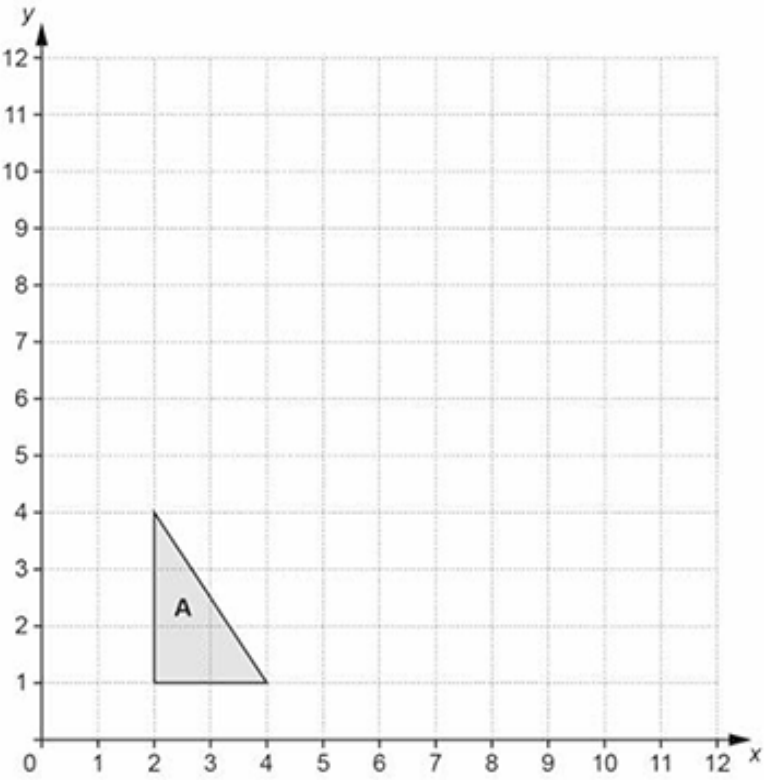
1(a). Triangle **A** is drawn on the grid below.



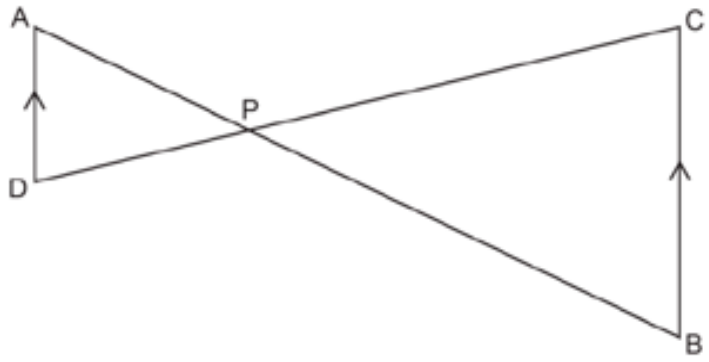
Enlarge triangle **A** by scale factor 3 with centre of enlargement (1, 1), to create triangle B.
Draw triangle **B**.

[3]

(b). Complete the description of the **single** transformation that maps triangle **B** back to triangle **A**.

Enlargement by scale factor _____ with centre of enlargement _____ **[2]**

2. The diagram shows two straight lines AB and DC that intersect at P. DA is parallel to BC.



Complete these statements to show that triangle PAD is similar to triangle PBC.

Angle DAP = angle CBP because they are alternate angles

Angle DPA = angle ..... because they are ..... angles

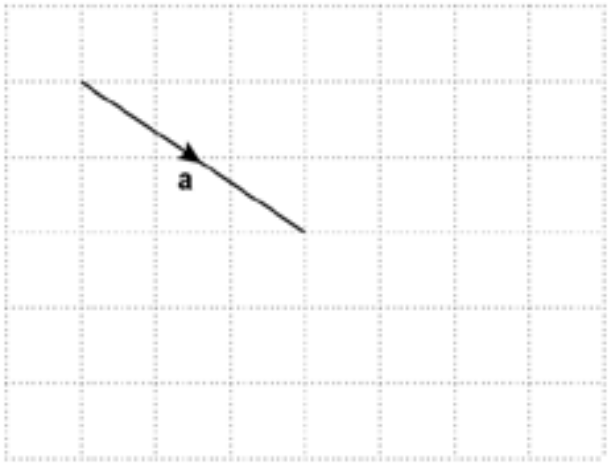
Angle ..... = angle ..... because they are ..... angles

Triangle PAD is similar to triangle PBC because

---

[4]

3(a). Vector **a** is drawn on this grid.

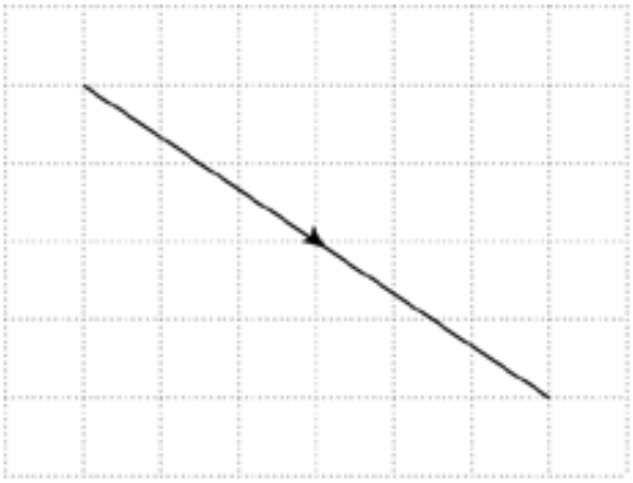


Write vector **a** as a column vector.

( )

[2]

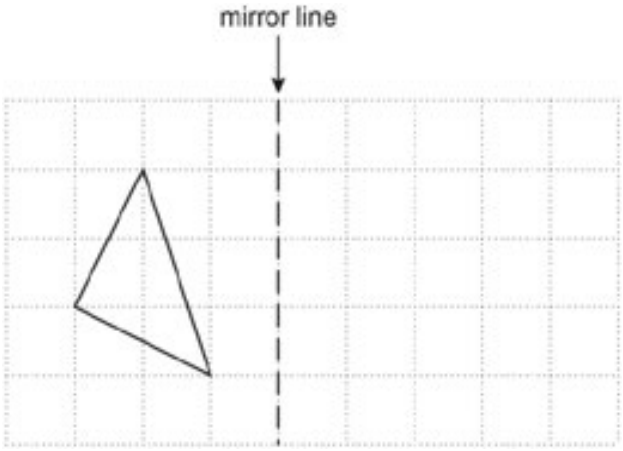
(b). Another vector is drawn on this grid.



Write this vector in terms of **a**.

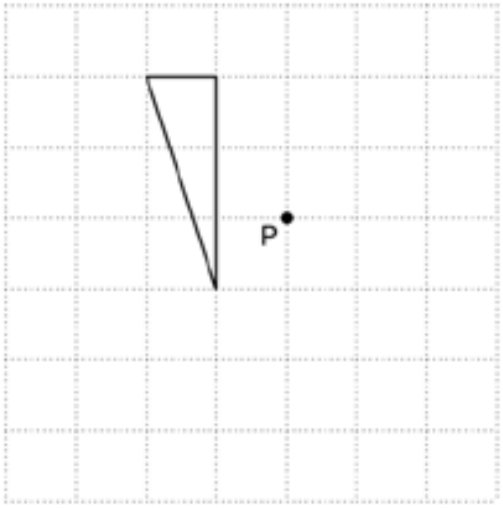
..... **[1]**

4(a). Reflect the triangle in the mirror line.



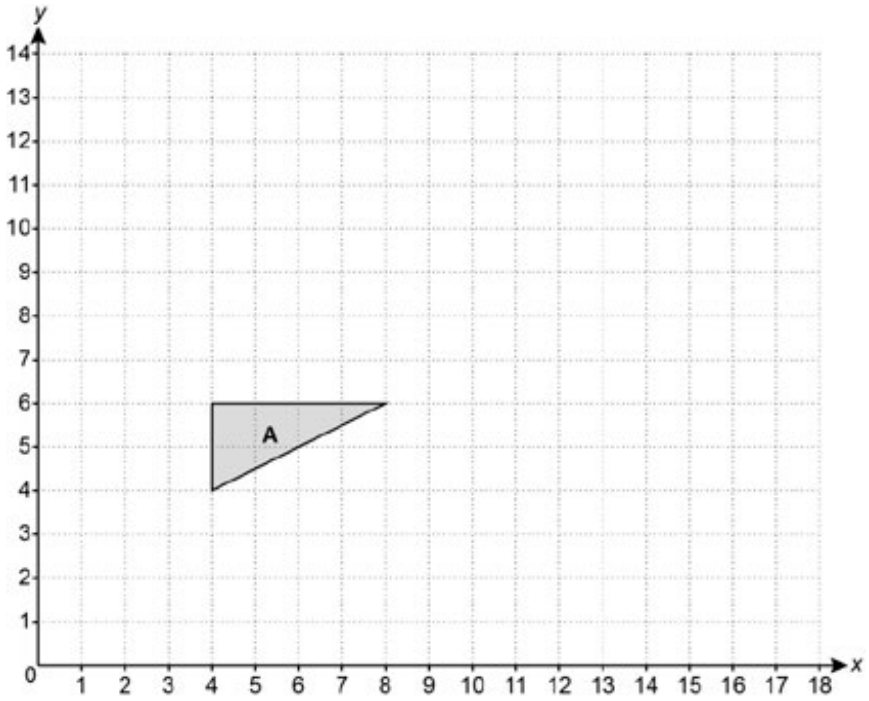
[2]

(b). Rotate the triangle 90° clockwise around the point P.



[2]

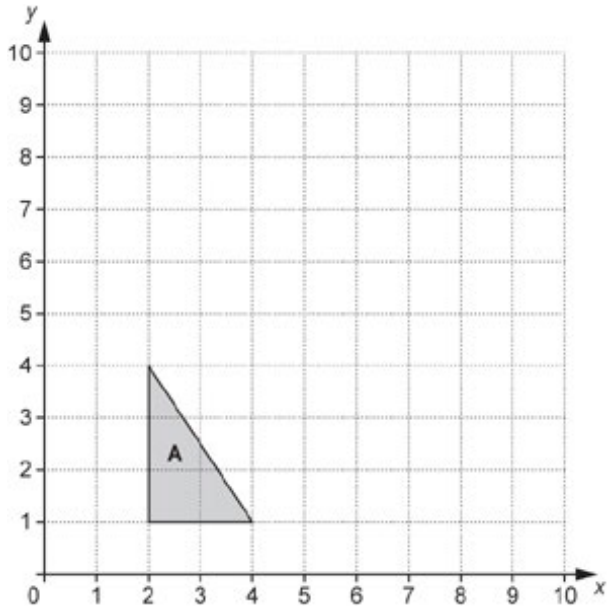
5. Triangle **A** is drawn on the grid below.



Enlarge triangle **A** with scale factor $\frac{1}{2}$ and centre of enlargement (0, 0).

[3]

6(a). Triangle **A** is drawn on the grid below.



Enlarge triangle **A** by scale factor 2 with centre of enlargement (0, 1), to create triangle **B**.
Draw triangle **B**.

[3]

(b). Complete the description of the **single** transformation that maps triangle **B** back to triangle **A.**

Enlargement by scale factor ..... with centre of enlargement .....

[2]

7(a). The measurements, in centimetres, of two triangles are shown in the table.

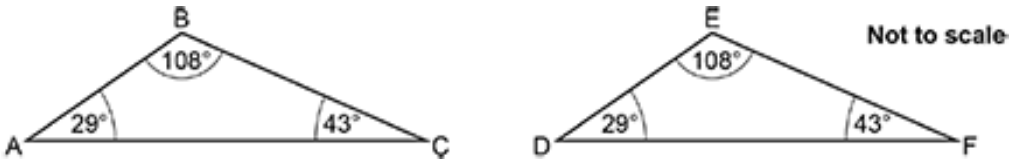
	Side 1	**Side 2**	**Side 3**
Triangle 1	4	5.8	7.5
Triangle 2	8.8	12.76	16.5

Are the two triangles mathematically similar?
Show how you decide.

_____ because _____

_____ **[3]**

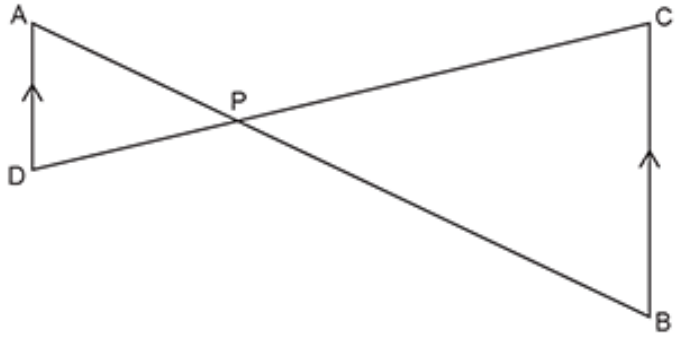
(b). Are these two triangles definitely congruent?
Give a reason.



_____ because _____

_____ **[1]**

8. The diagram shows two straight lines AB and DC that intersect at P.
DA is parallel to BC.



Complete these statements to show that triangle PAD is similar to triangle PBC.

Angle ADP = angle BCP because they are alternate angles

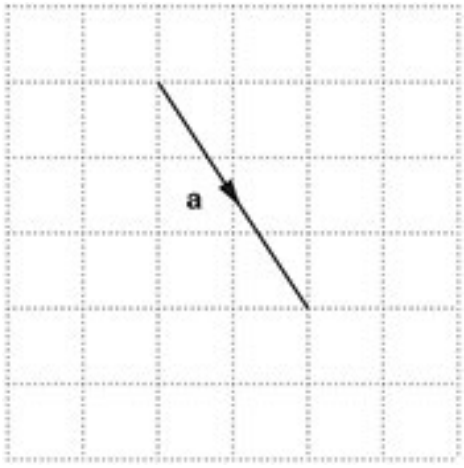
Angle APD = angle ..... because they are ..... angles

Angle ..... = angle ..... because they are ..... angles

Triangle PAD is similar to triangle PBC because _____

_____ **[4]**

9(a). Vector **a** is drawn on this grid.

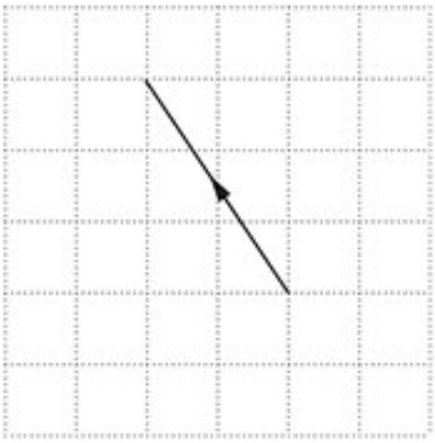


Write vector **a** as a column vector.

( )

[2]

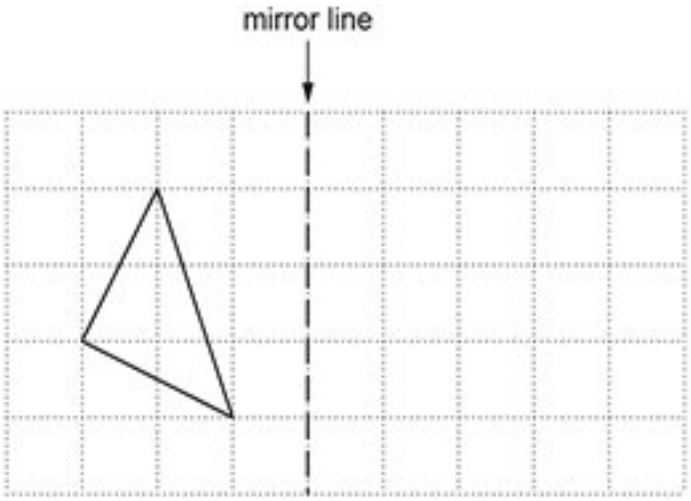
(b). Another vector is drawn on this grid.



Write this vector in terms of **a**.

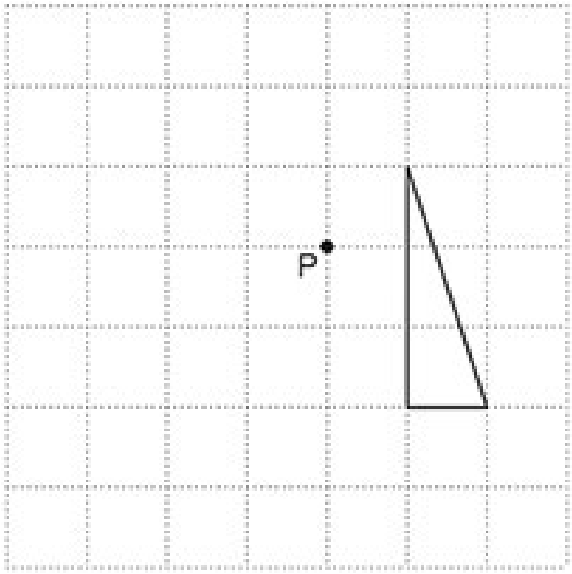
..... **[1]**

10(a). Reflect the triangle in the mirror line.



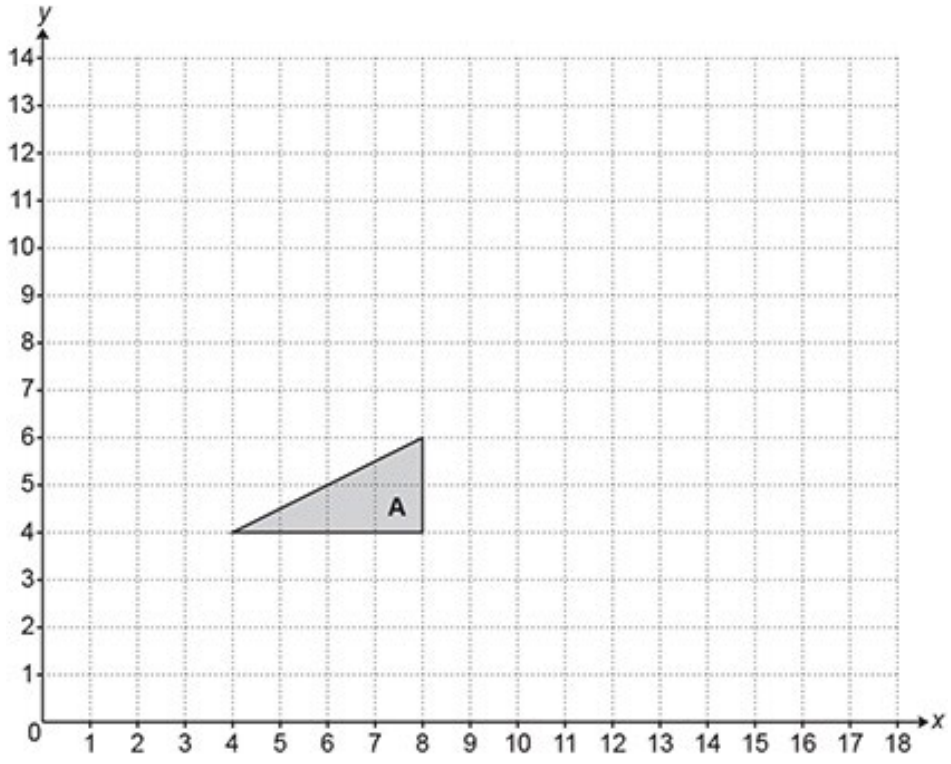
[2]

(b). Rotate the triangle 90° anticlockwise around the point P.



[2]

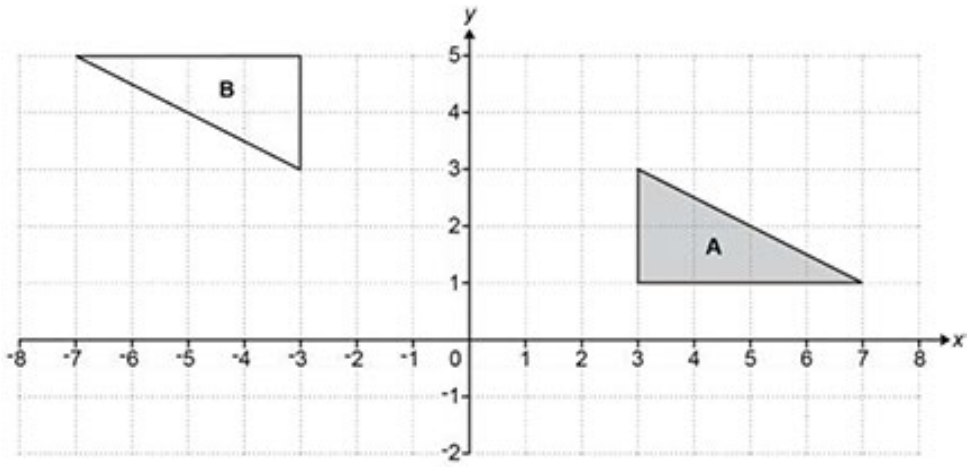
11. Triangle **A** is drawn on the grid below.



Enlarge triangle **A** with scale factor $\frac{1}{2}$ and centre of enlargement (0, 0).

[3]

12. Triangle **A** and triangle **B** are drawn on the coordinate grid.



Describe fully the **single** transformation that maps triangle **A** onto triangle **B**.

[3]

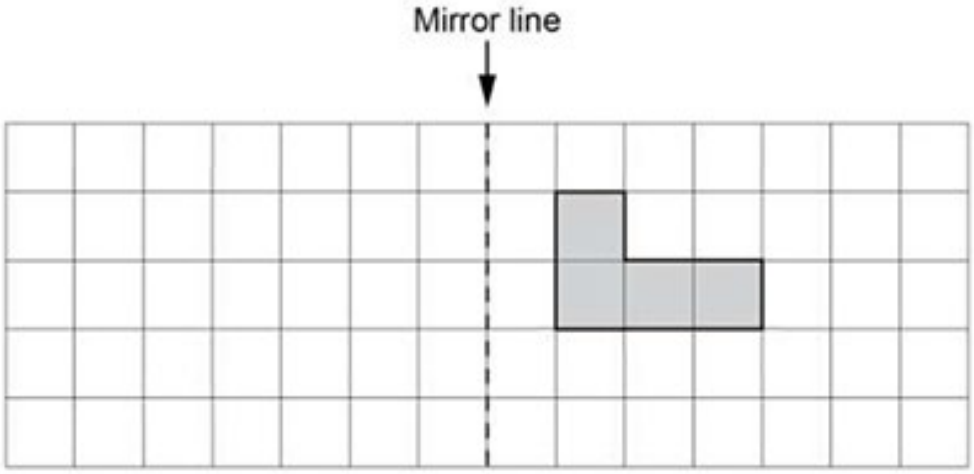
13. $\overrightarrow{PQ} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ and $\overrightarrow{QR} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$.

Work out $\overrightarrow{PR}$.

( )

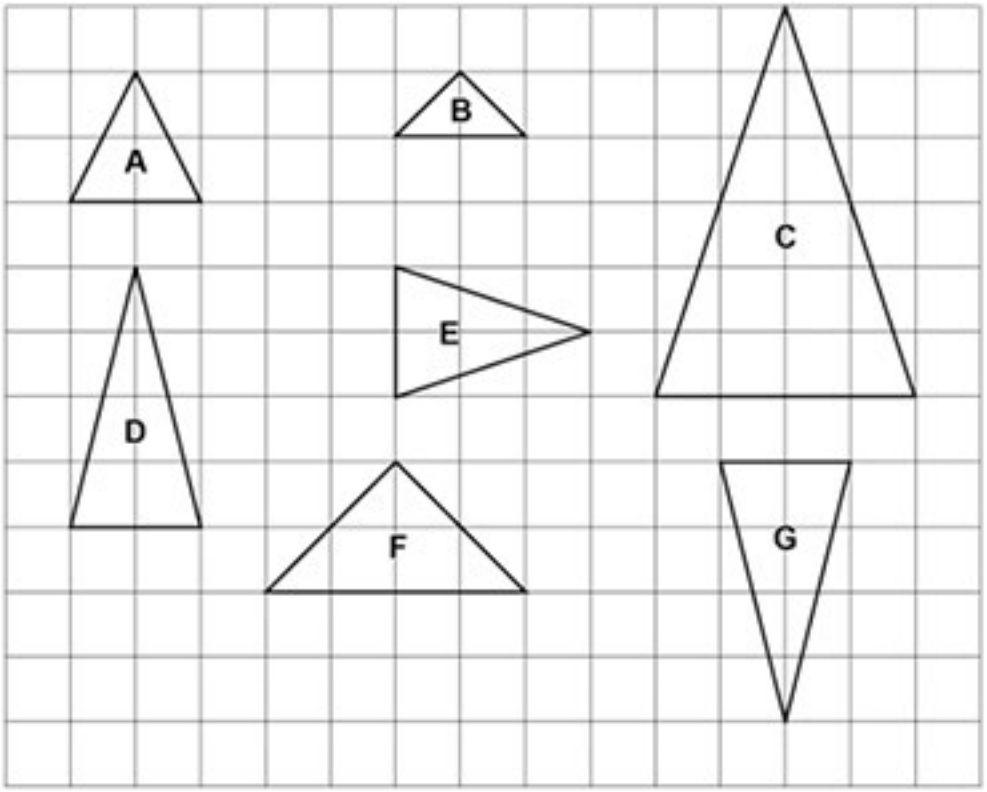
[2]

14. Reflect this shape in the mirror line.



[2]

15. On the grid are seven triangles, labelled **A** to **G**.



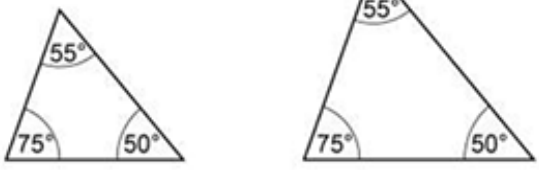
Complete each statement by writing the letter of the correct triangle.

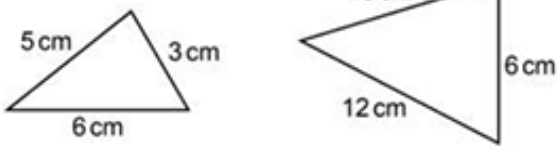
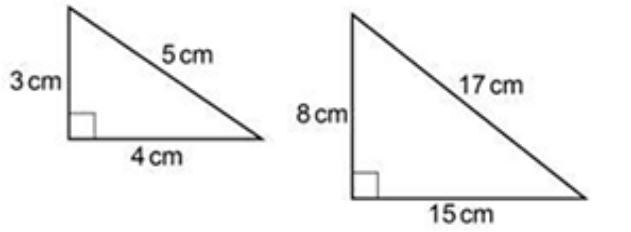
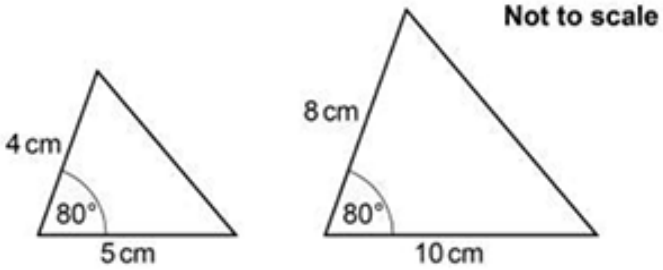
Triangle **D** is congruent to triangle …….

Triangle **C** is mathematically similar to triangle ……..…**[2]**

16. The table shows four pairs of triangles.

For each pair, decide whether the two triangles are mathematically similar.
Write each answer, yes or no, in the second column of the table.

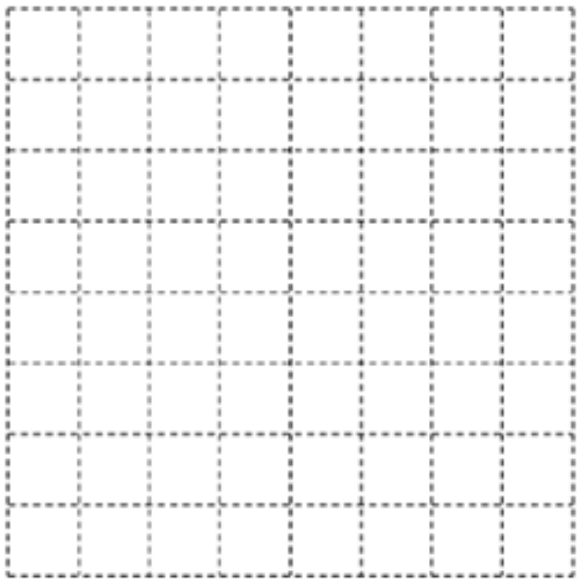
Triangles	**Mathematically similar? (yes/no)**
Not to scale 	.....

Not to scale 	.....
Not to scale 	.....
Not to scale 	.....

[2]

17(a). Vector **a** = $\begin{pmatrix} 1 \\ 3 \end{pmatrix}$ and vector **b** = $\begin{pmatrix} 2 \\ -4 \end{pmatrix}$.

On the grid, draw vector **a** + **b**.

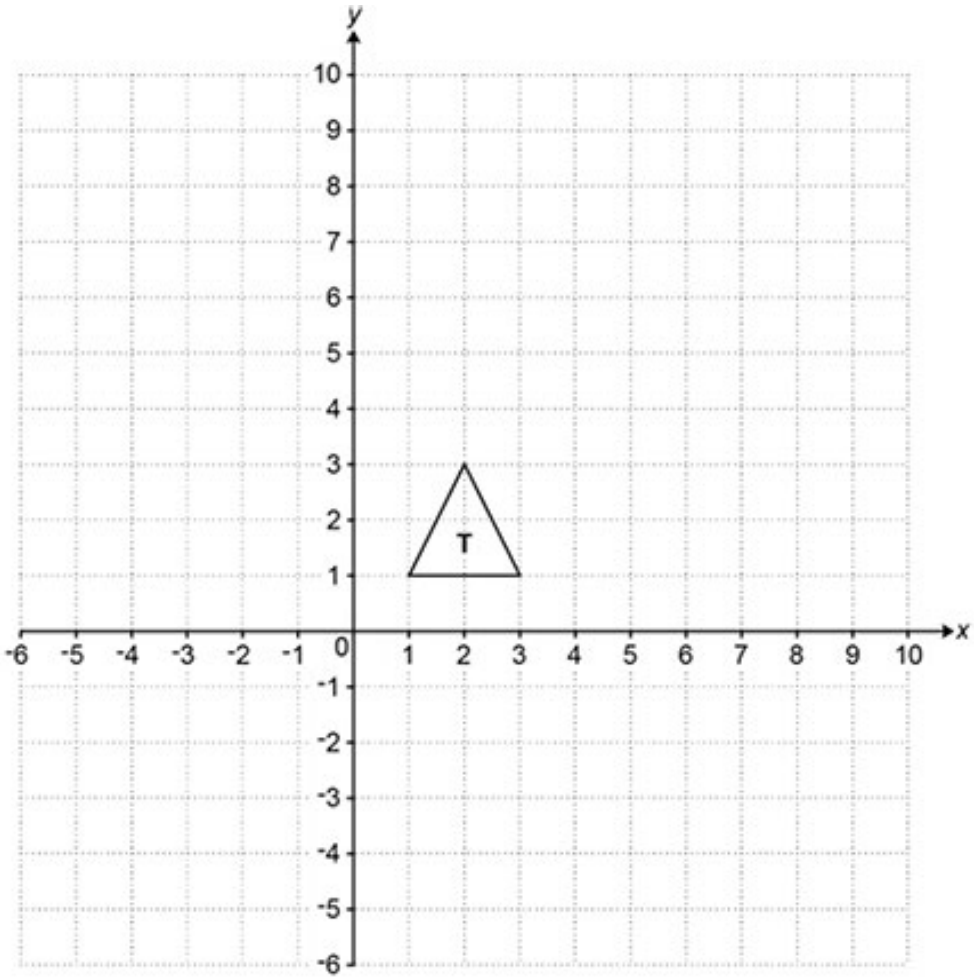


[2]

(b). On the grid, draw vector **a**.

[1]

18(a). Triangle **T** is drawn on a coordinate grid.



Triangle **T** is reflected in the line $x = {}^{-}1$ to give triangle **C**.

Draw and label triangle **C** on the grid.

[2]

(b). Triangle **A** is translated by $\begin{pmatrix} -3 \\ -6 \end{pmatrix}$ to give triangle **T**.

Draw and label triangle **A** on the grid.

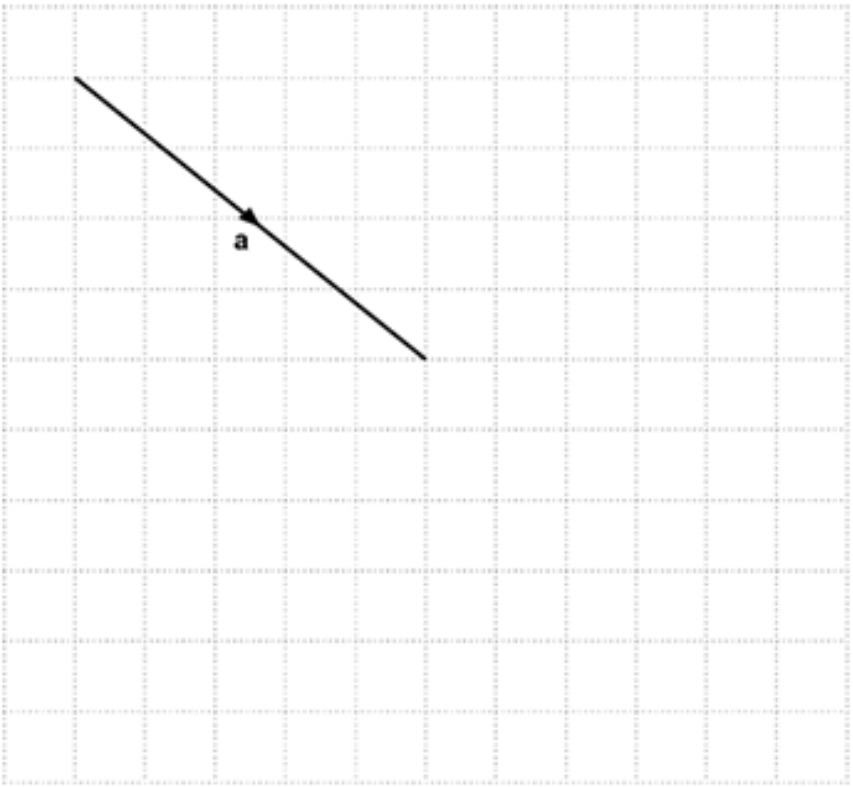
[2]

(c). Triangle **T** is rotated through 90° clockwise about (0, 0) to give triangle **B**.

Draw and label triangle **B** on the grid.

[2]

19(a). Vector **a** is drawn on this grid.



Write vector **a** as a column vector.

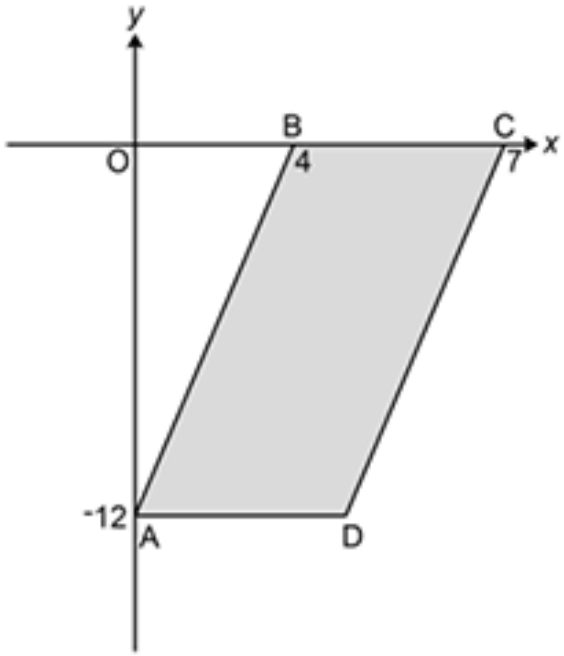
( )

…… **[2]**

(b). On the grid above, draw the vector $\bar{\mathbf{a}}$.

[1]

20. The graph shows a parallelogram ABCD.



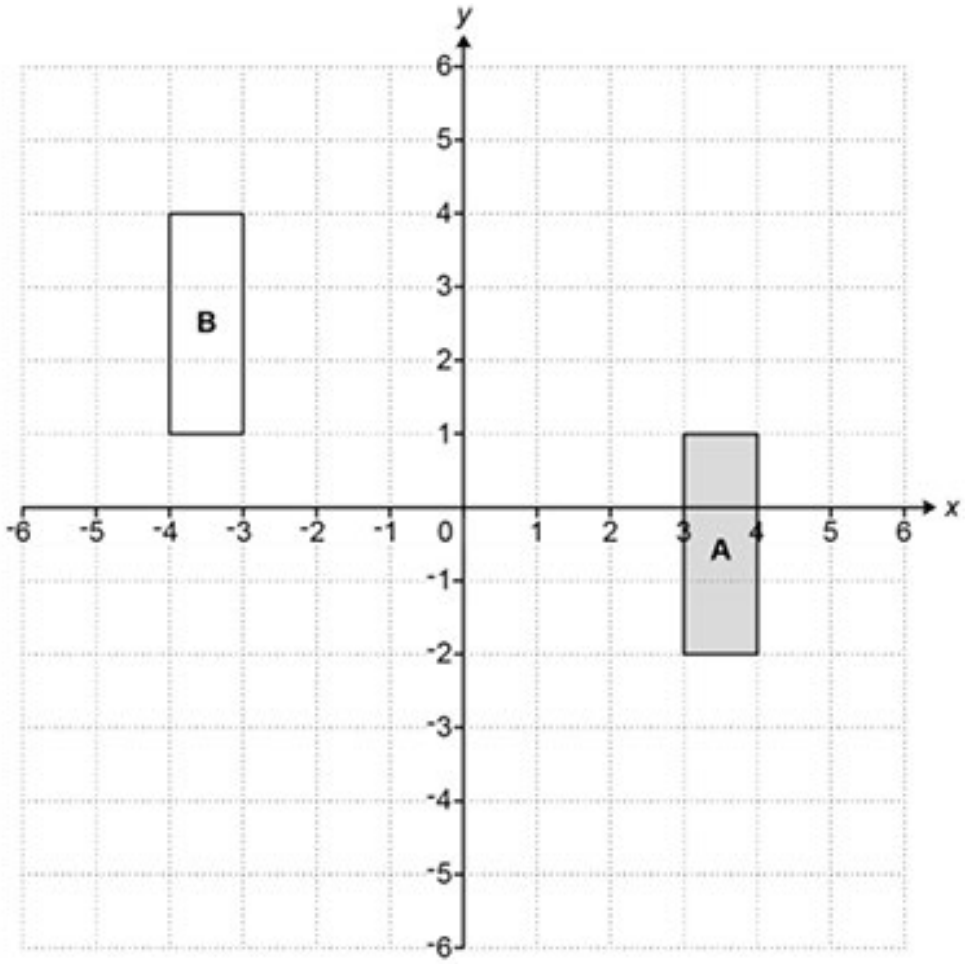
Not to scale

A has coordinates (0, ⁻12), B has coordinates (4, 0) and C has coordinates (7, 0).

Find the equation of the line that passes through the points C and D, giving your answer in the form $y = mx + c$.
You must show your working.

…….…….…… **[5]**

21. Rectangle **A** and rectangle **B** are drawn on the coordinate grid.



Describe fully **two** different **single** transformations that map rectangle **A** onto rectangle **B**.

1 _____

_____

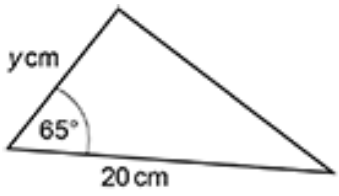
_____

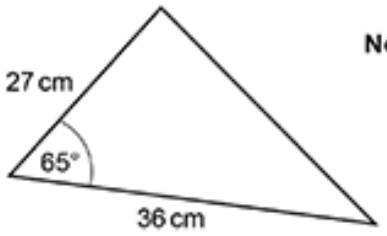
2 _____

_____

[6]

22. These two triangles are mathematically similar.





Work out the value of y.

y = ... **[2]**

23(a). The measurements, in centimetres, of two triangles are shown in the table.

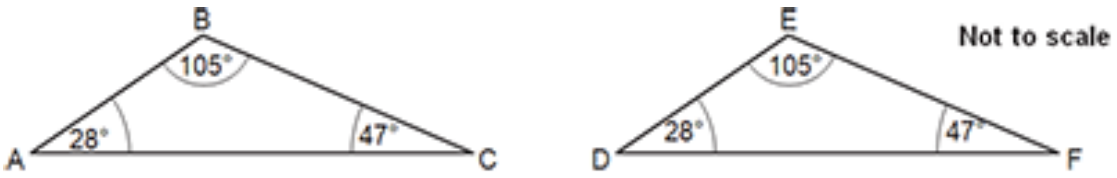
	Side 1	Side 2	Side 3
Triangle 1	2.5	3.2	4
Triangle 2	7	8.96	11.2

Are the two triangles mathematically similar?
Show how you decide.

_____ because _____

_____ **[2]**

(b). Are these two triangles definitely congruent?
Give a reason.

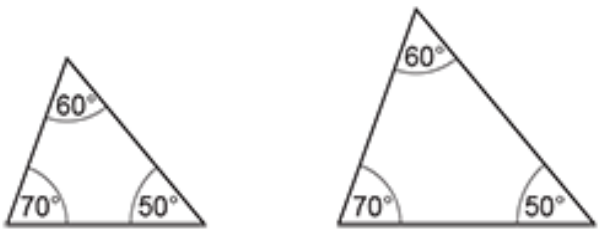
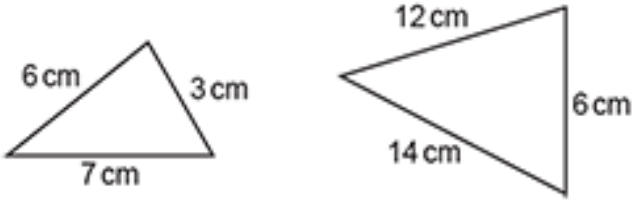
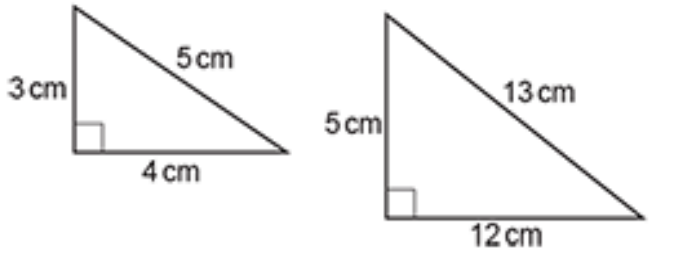
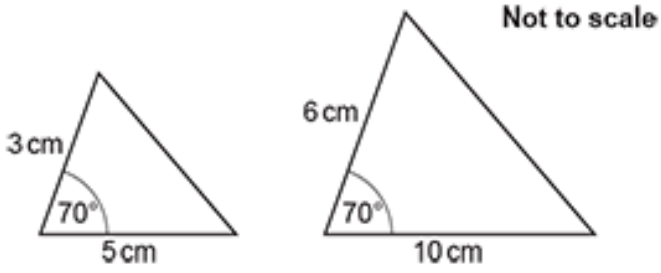


_____ because _____

_____ **[1]**

24. The table shows four pairs of triangles.

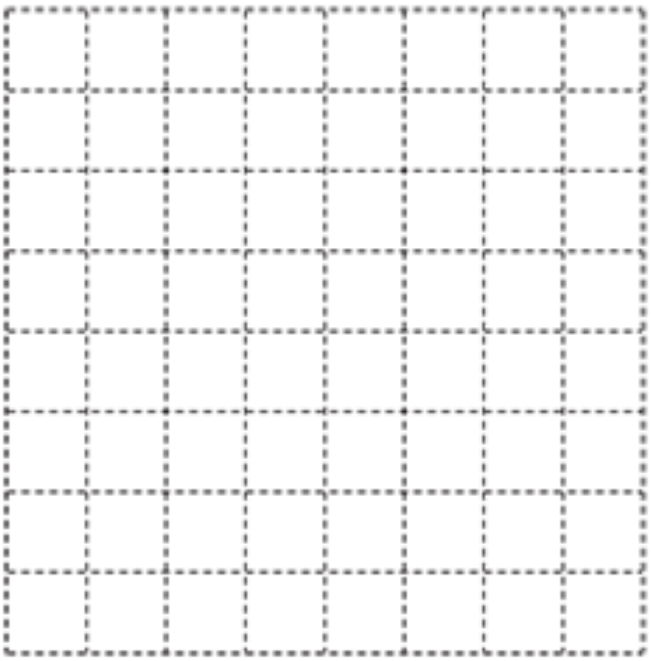
For each pair, decide whether the two triangles are mathematically similar.
Write each answer, yes or no, in the second column of the table.

Triangles	Mathematically similar? (yes/no)
Not to scale 	
Not to scale 	
Not to scale 	
Not to scale 	

[2]

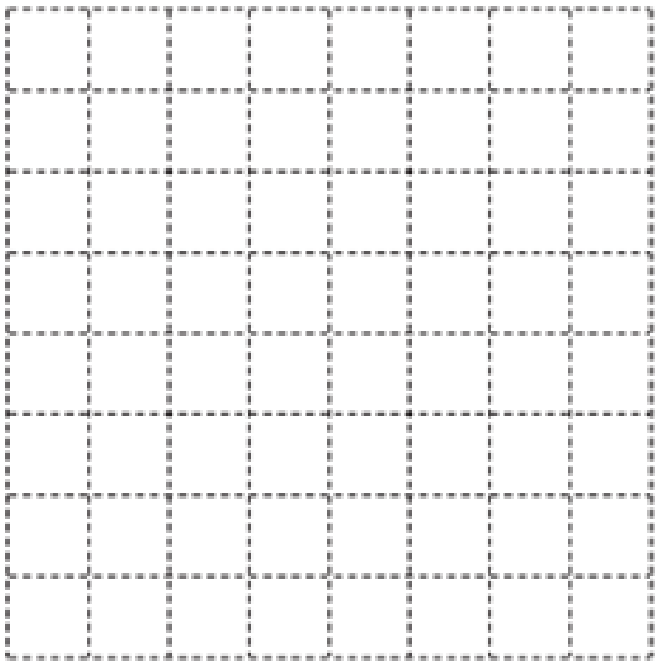
25(a). Vector $\mathbf{a} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ and vector $\mathbf{b} = \begin{pmatrix} 1 \\ -4 \end{pmatrix}$.

On the grid, draw vector **a**.



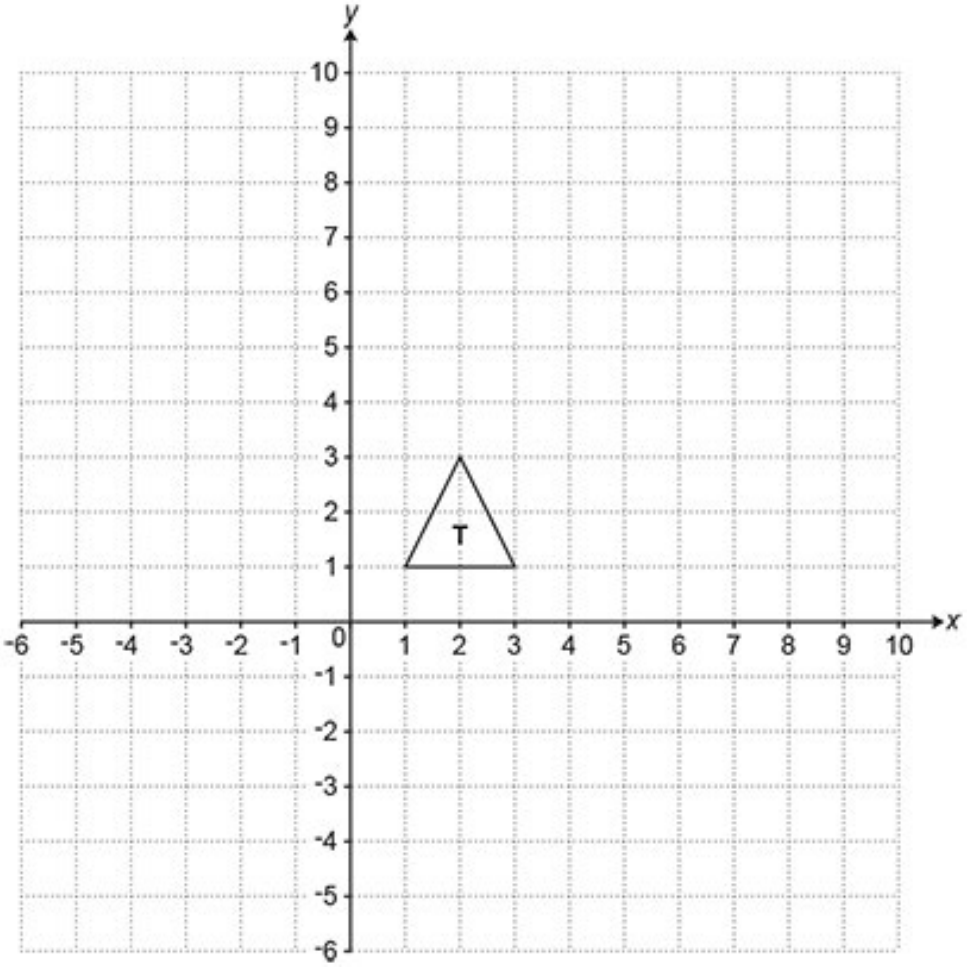
[1]

(b). On the grid, draw vector **a** + **b**.



[2]

26(a). Triangle T is drawn on a coordinate grid.



Triangle **A** is translated by $\begin{pmatrix} 6 \\ -3 \end{pmatrix}$ to give triangle **T**.

Draw and label triangle **A** on the grid.

[2]

(b). Triangle **T** is rotated through 90° anticlockwise about (0, 0) to give triangle **B**.

Draw and label triangle **B** on the grid.

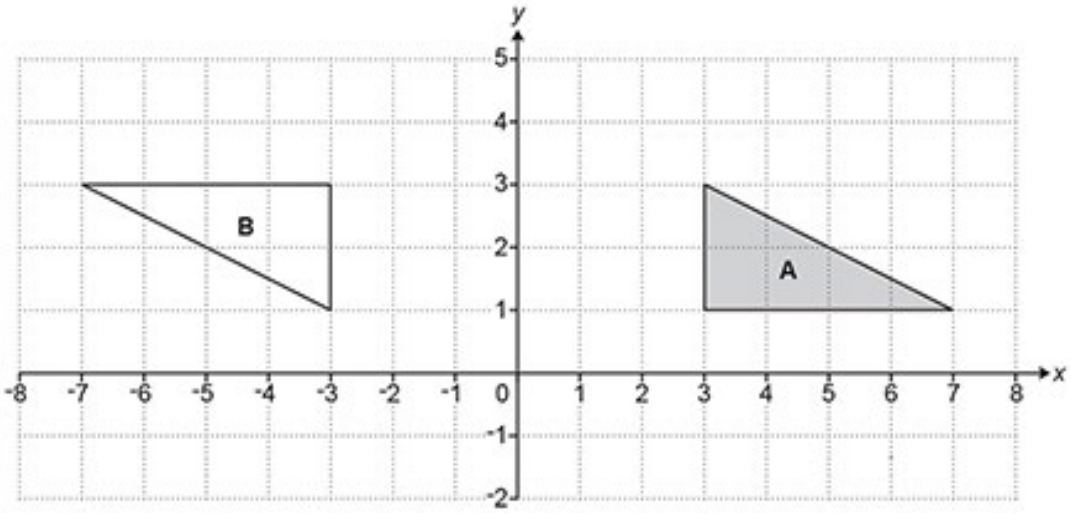
[2]

(c). Triangle **T** is reflected in the line $y = -1$ to give triangle **C**.

Draw and label triangle **C** on the grid.

[2]

27. Triangle **A** and triangle **B** are drawn on the coordinate grid.



Describe fully the single transformation that maps triangle **A** onto triangle **B**.

---

[3]

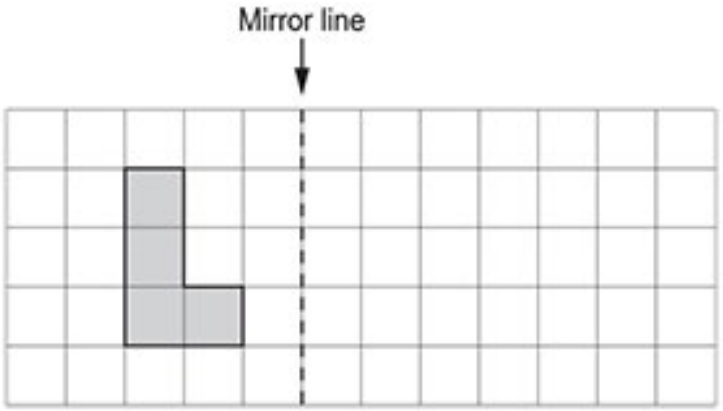
28. $\overrightarrow{PQ} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ and $\overrightarrow{QR} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$

Work out $\overrightarrow{PR}$.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$

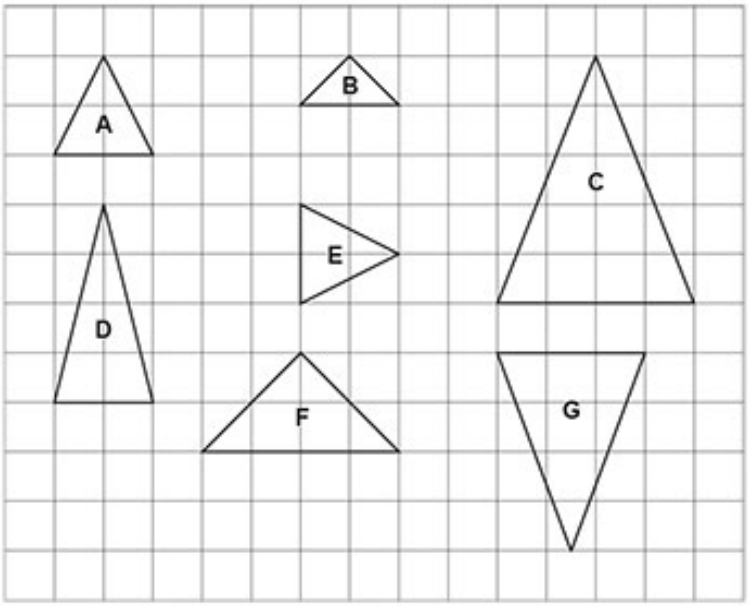
[2]

29. Reflect this shape in the mirror line.



[2]

30. On the grid are seven triangles, labelled **A** to **G**.

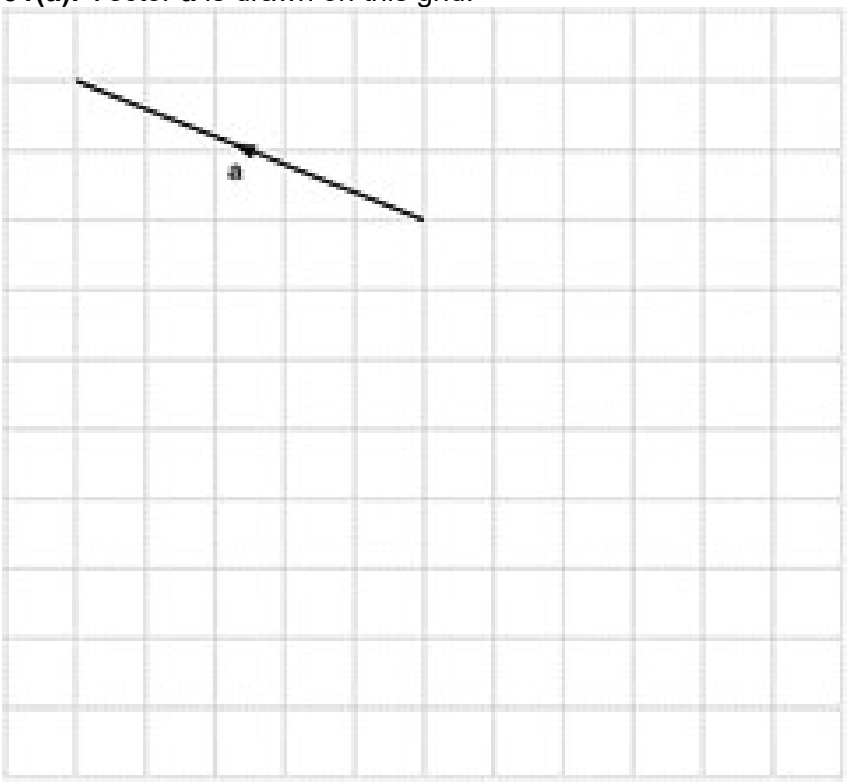


Complete each statement by writing the letter of the correct triangle.

Triangle **A** is congruent to triangle .....

Triangle **B** is mathematically similar to triangle ..... **[2]**

31(a). Vector **a** is drawn on this grid.



Write vector **a** as a column vector.

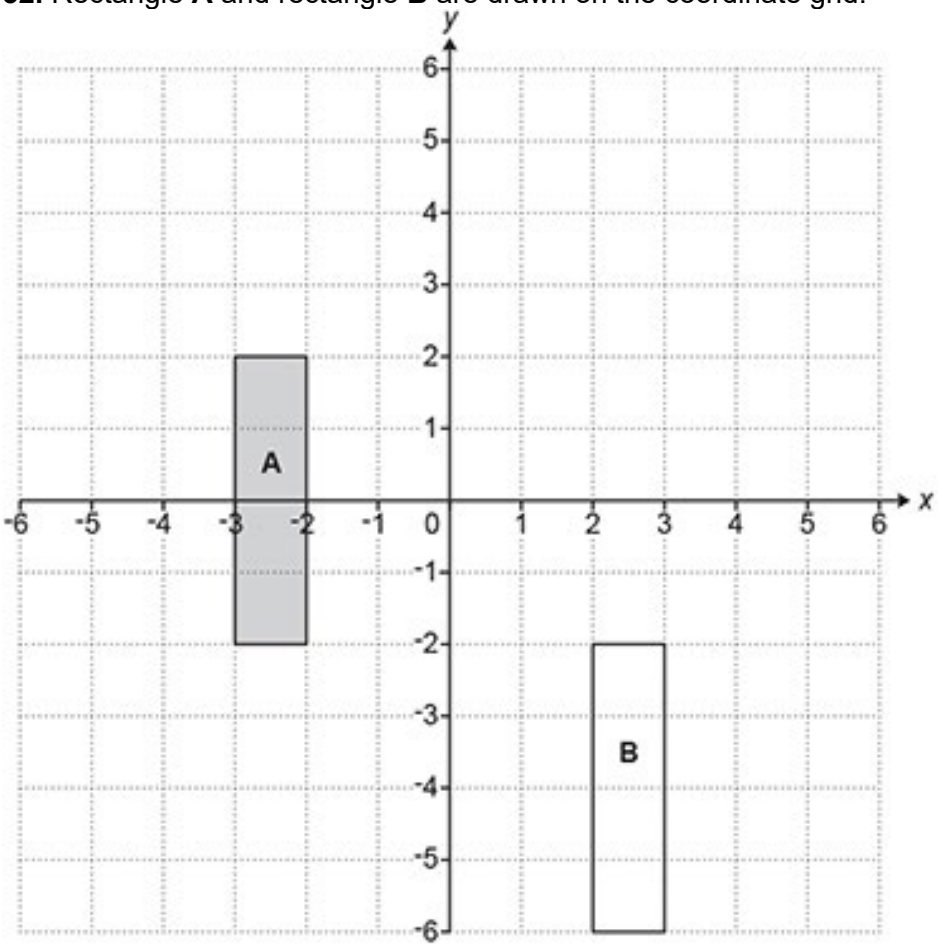
( )

.....**[2]**

(b).

On the grid above, draw the vector ¯ **a**. **[1]**

32. Rectangle **A** and rectangle **B** are drawn on the coordinate grid.



Describe fully **two** different **single** transformations that map rectangle **A** onto rectangle **B**.

1 _____

_____

_____

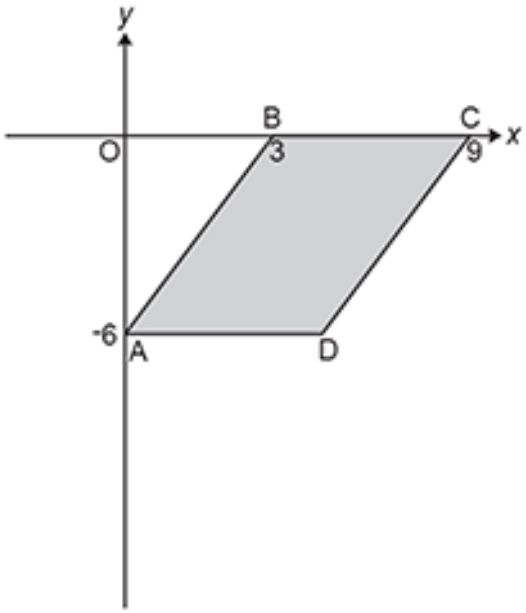
2 _____

_____

_____

[6]

33. The graph shows a parallelogram ABCD.



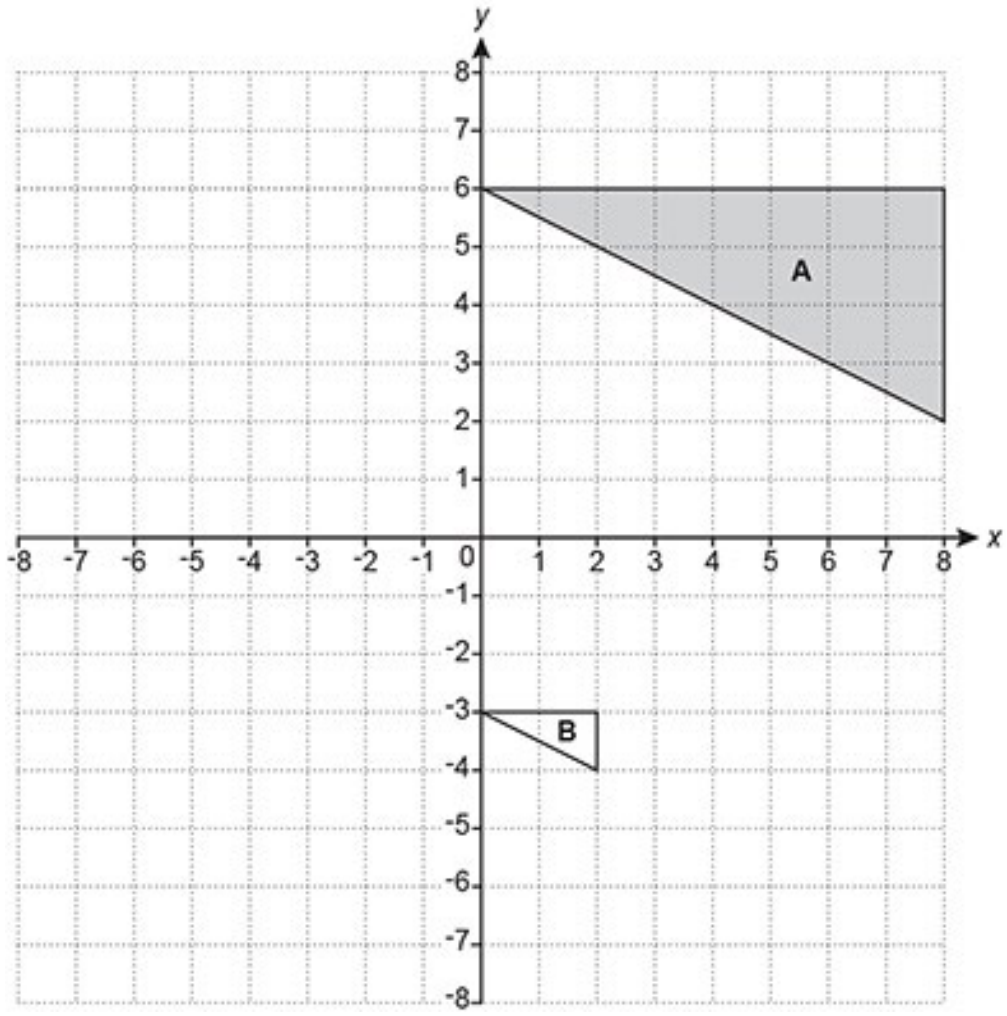
Not to scale

A has coordinates (0, ⁻6), B has coordinates (3, 0) and C has coordinates (9, 0).

Find the equation of the line that passes through the points C and D, giving your answer in the form $y = mx + c$.
You must show your working.

..... **[5]**

34(a). Triangle **A** and triangle **B** are drawn on the coordinate grid.



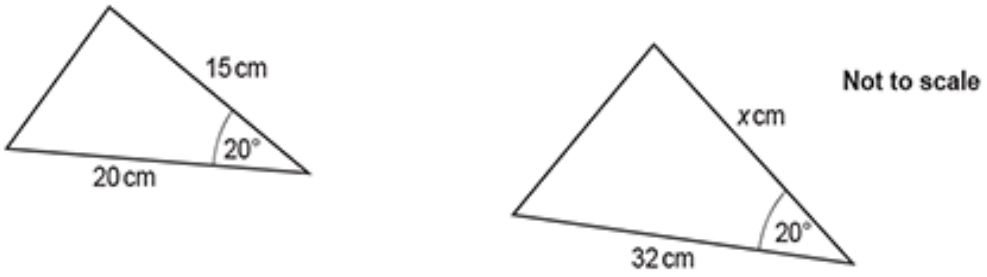
Reflect triangle **A** in the line $x = 0$.

[2]

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

---**[3]**

35. These two triangles are mathematically similar.



Work out the value of x.

x = ... **[2]**

END OF QUESTION PAPER