

# Maths Summer 2

## Year 9

# Blended Learning Booklet

Name:

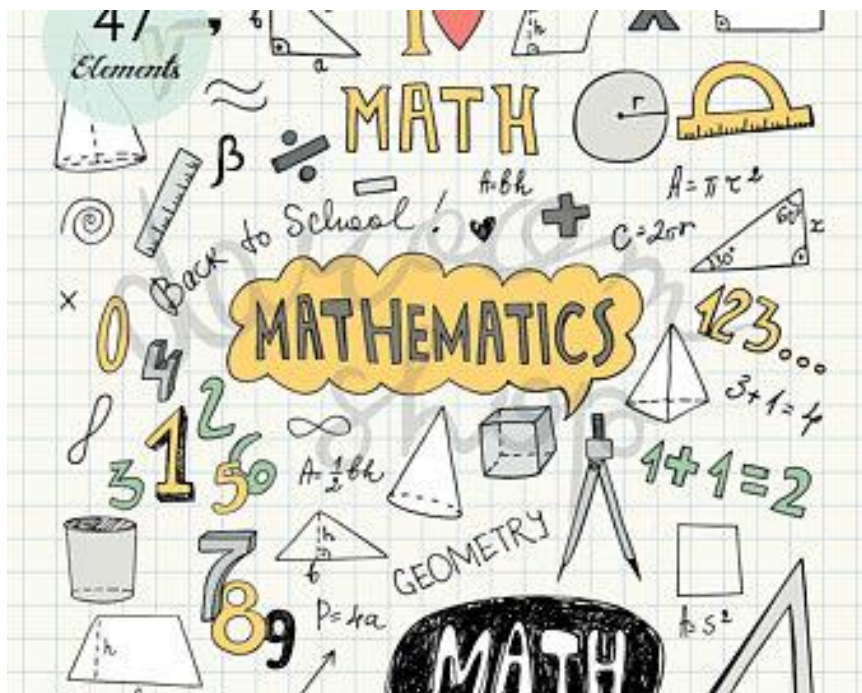
Form:

*Each week covers topics you would complete in your 3 Maths lessons that week. Write out the title and LI and then complete the tasks.*

*All video links are online using the ClassCharts link.*

*The Knowledge Organiser on page 4 has further practice questions and page numbers linking to your pocket revision guides for all the key information and examples to help you with this unit.*

*Upload all work onto ClassCharts for feedback.*



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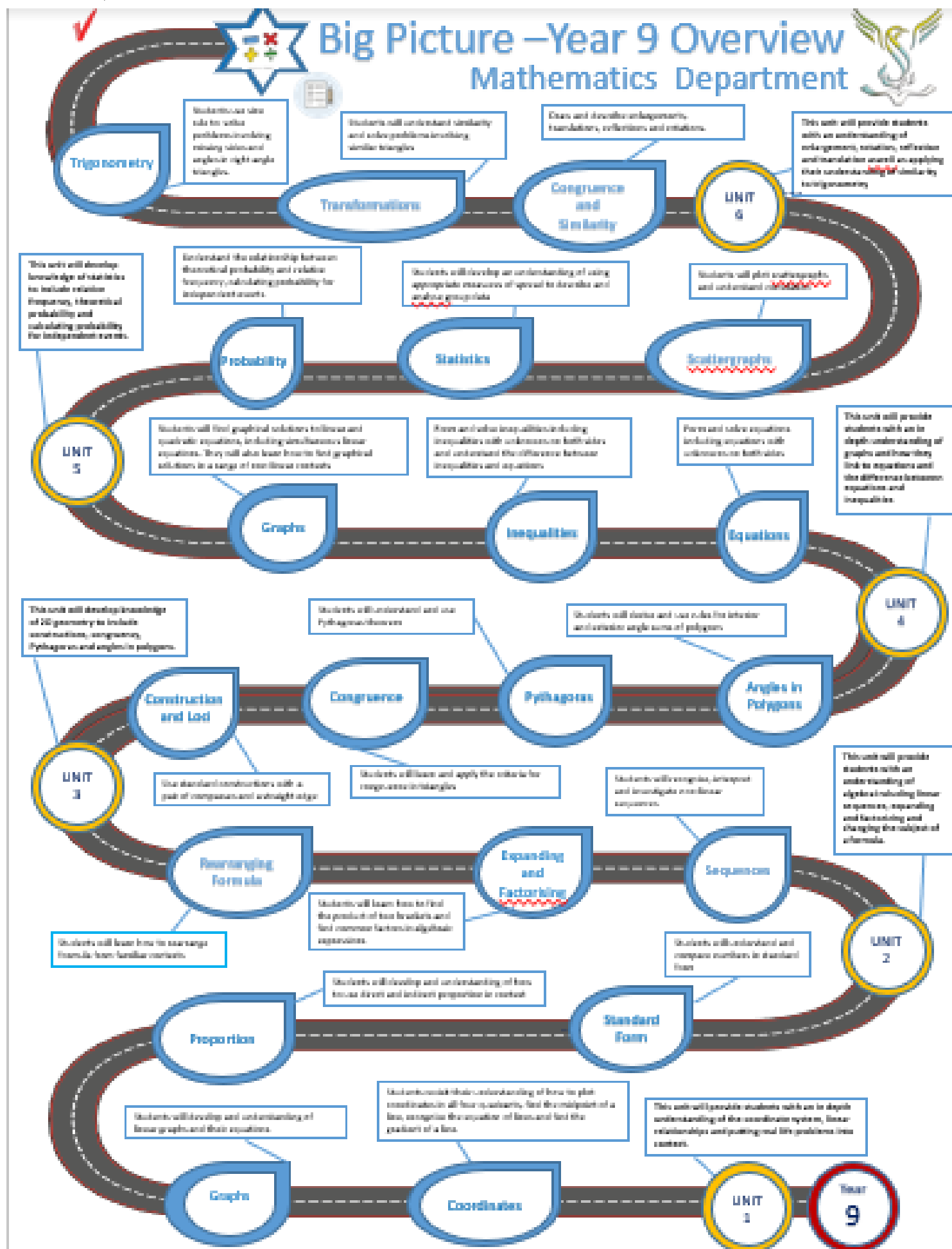
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**1**

Calculate a correct to 1 decimal place

1) 

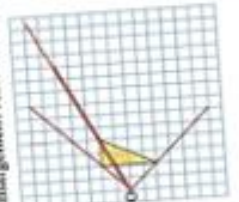
2) 

3) 

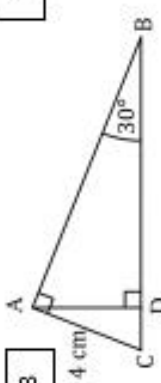
4) 

**2**

Enlargement scale factor 3




**3**



Find the length CB

**4**


Calculate the length of the missing side.





Give your answer correct to 2 decimal places


**5**

Calculate a correct to 1 decimal place

1) 


2) 


3) 


4) 


**6**

Calculate a correct to 1 decimal place

1) 


2) 

3) 

4) 


**7**

Scale factor 3



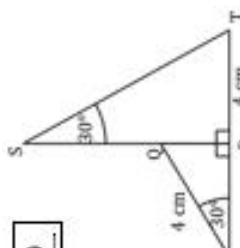
**8**

Calculate the length of the missing side.



Give your answer correct to 2 decimal places


**9**





Find length SQ showing your full working.


**10**

Calculate a correct to 1 decimal place

1) 


2) 

3) 

4) 

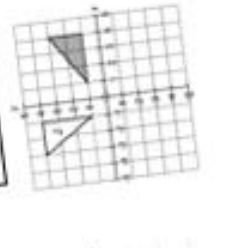
**11**

Rotate Shape A 180° about the point (2,0)



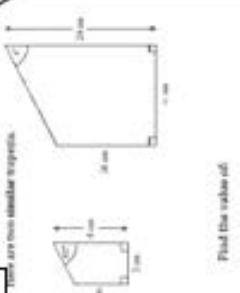
**12**

Define the transformation:



**13**

These are two similar shapes.



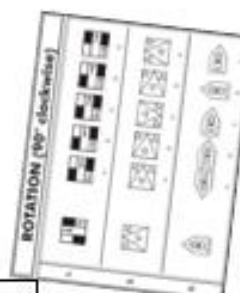
Find the value of:

x = \_\_\_\_\_

y = \_\_\_\_\_


**14**


ROTATION (90° clockwise)





**15**

Calculate a correct to 1 decimal place

1) 

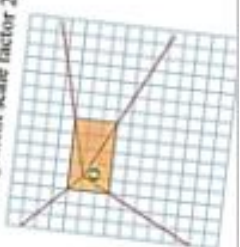
2) 

3) 

4) 

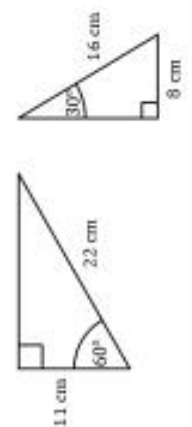
**16**

Enlargement scale factor 2

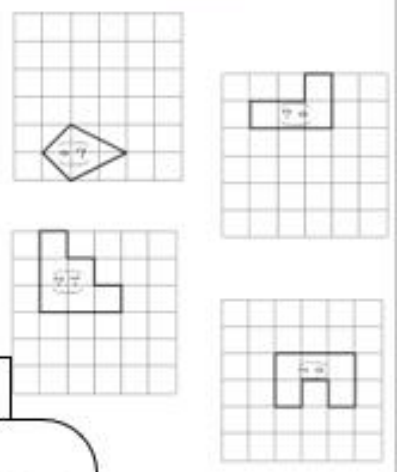


**17**

Explain why the two triangles below are similar.





**18**





**19**

Calculate a correct to 1 decimal place

1) 

2) 

3) 

4) 

## Week 1:

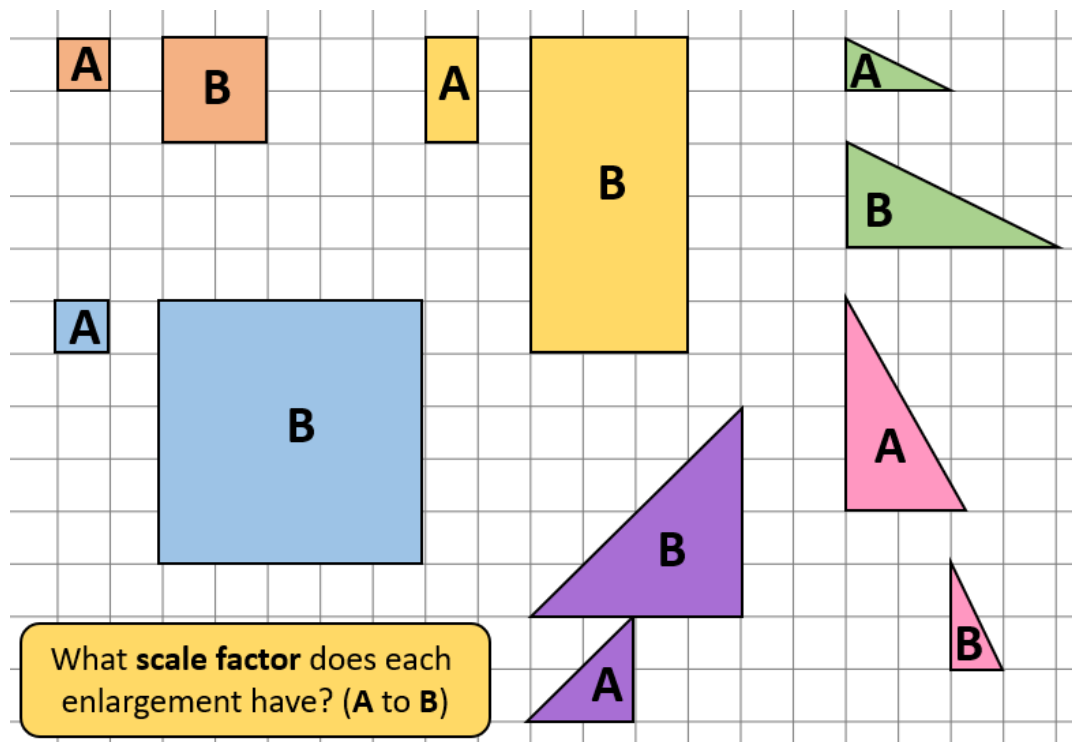
- **L1:** I can enlarge shapes from a given centre with coordinate grids
- **L1:** I can enlarge shapes from a given centre without coordinate grids

### Demonstration Videos:

Enlargements - <https://corbettmaths.com/2012/08/19/enlargements/>

### Tasks:

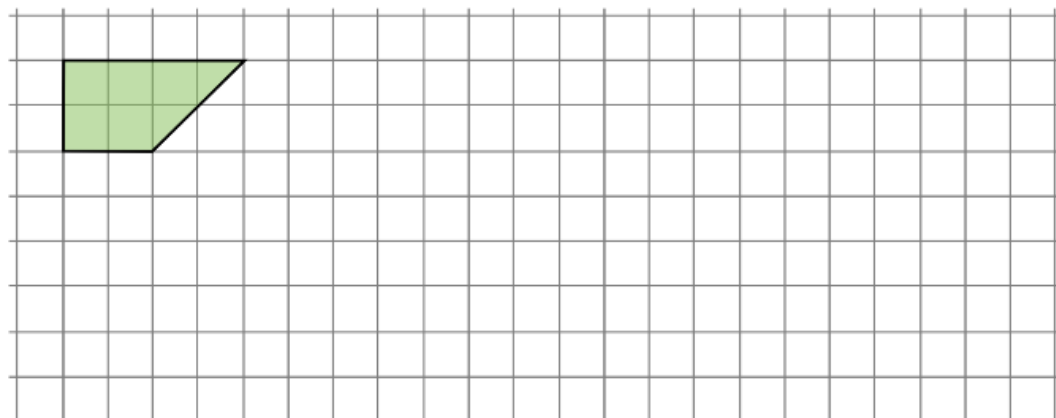
#### Task 1



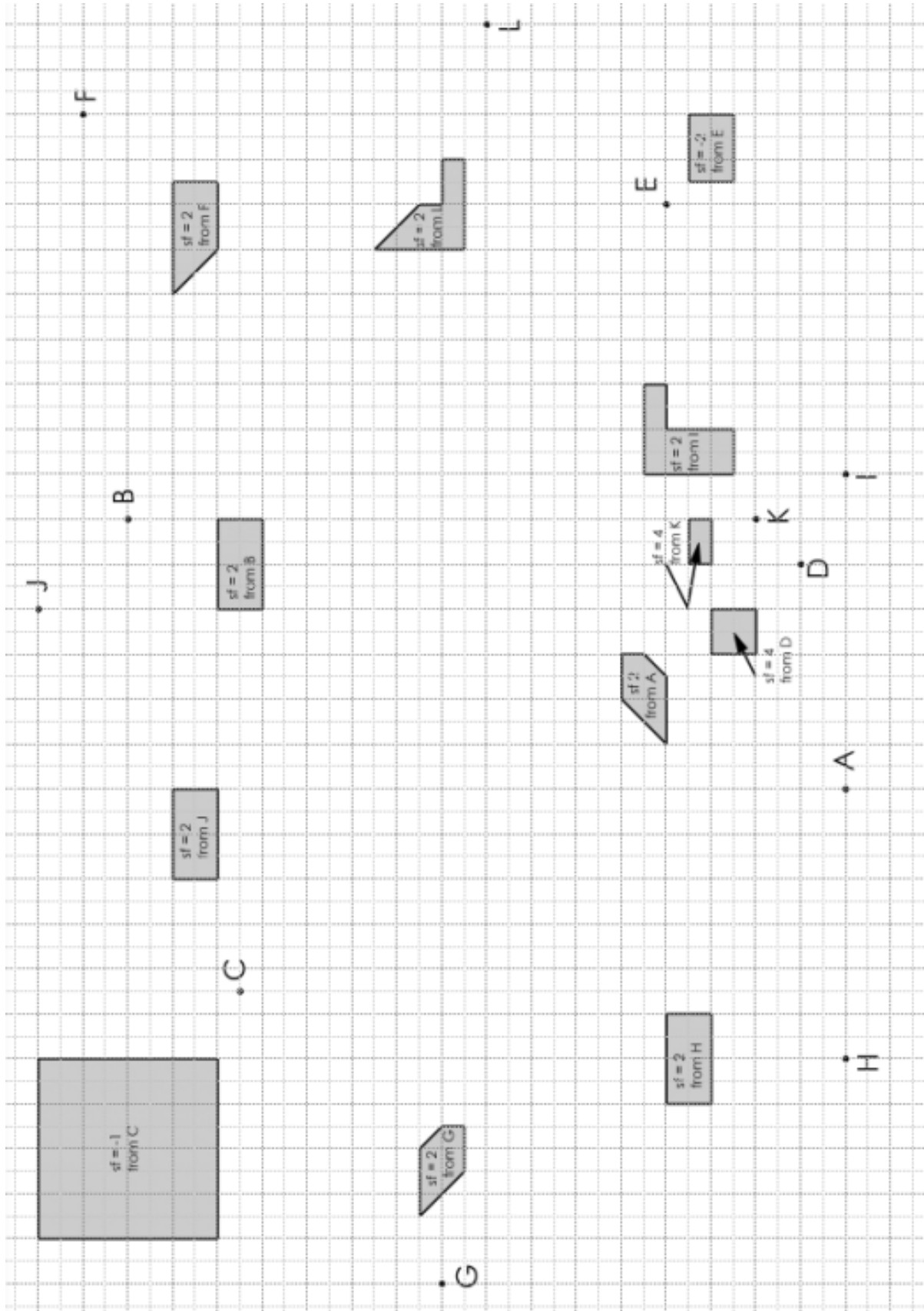
#### Task 2

**Draw separate enlargements of this shape using scale factor:**

- (a) 2      (b) 3      (c) 1      (d)  $\frac{1}{2}$       (e) 1.5



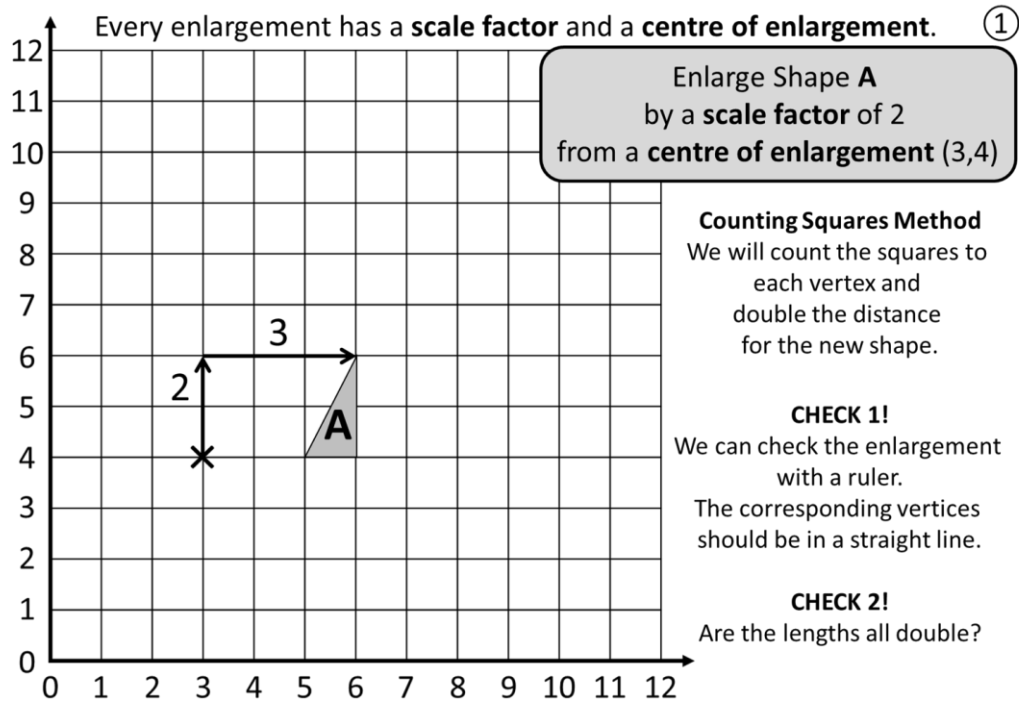
## Task 3







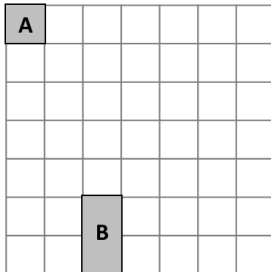
## Task 4



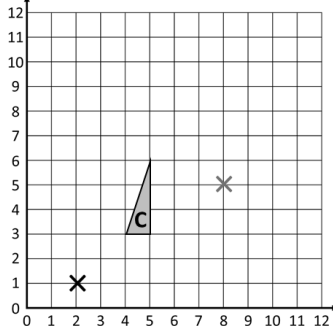
## Task 5

### Positive Enlargements

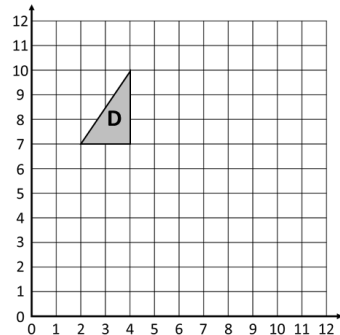
- 1) Enlarge shape A by a scale factor of 2.  
Label the new shape A'.  
Enlarge shape B by a scale factor of 3.  
Label the new shape B'.



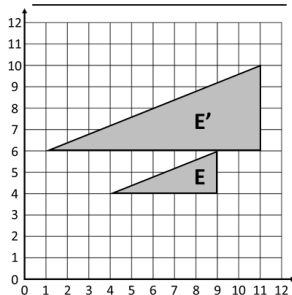
- 2) Enlarge shape C by a scale factor of 2,  
from centre of enlargement (2,1).  
Label the new shape C'.  
One of the new vertices has been done for you.



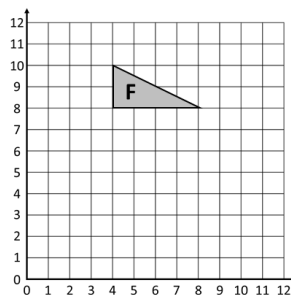
- 3) Enlarge shape D by a scale factor of 3,  
from centre of enlargement (2,10).  
Label the new shape D'.



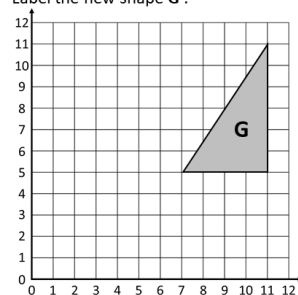
- 4) Describe the enlargement from shape E to E'.



- 5) Enlarge shape F by a scale factor of 2,  
from centre of enlargement (5,11).  
Label the new shape F'.



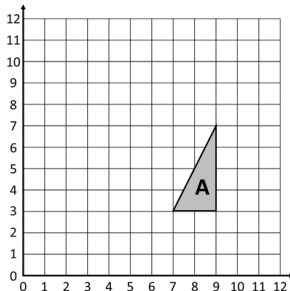
- 6) Enlarge shape G by a scale factor of  $\frac{1}{2}$ ,  
from centre of enlargement (3,1).  
Label the new shape G'.



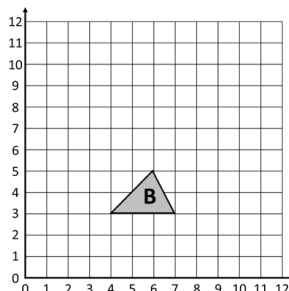
## Task 6

### Positive & Fractional Enlargements

- 1) Enlarge shape A by a scale factor of 2, from centre of enlargement (11,3). Label the new shape A'.

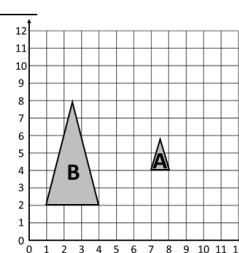
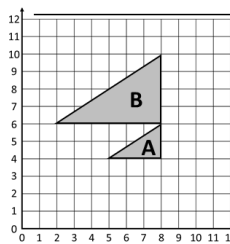


- 2) Enlarge shape B by a scale factor of 3, from centre of enlargement (5,2). Label the new shape B'.

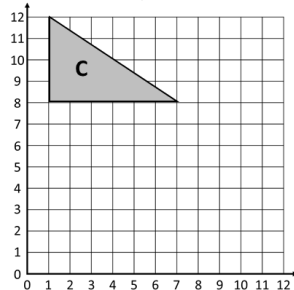


- 3) Describe these two enlargements of A to B

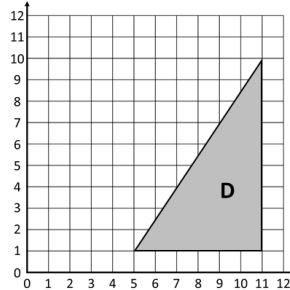
2



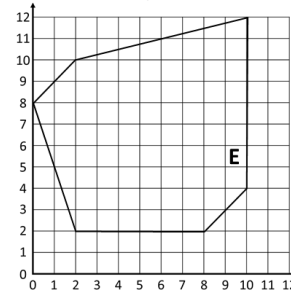
- 4) Enlarge shape C by a scale factor of  $\frac{1}{2}$ , from centre of enlargement (11,4). Label the new shape C'.



- 5) Enlarge shape D by a scale factor of  $\frac{1}{3}$ , from centre of enlargement (2,10). Label the new shape D'.



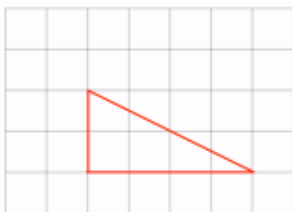
- 6) Enlarge shape E by a scale factor of  $\frac{1}{2}$ , from centre of enlargement (4,8). Label the new shape E'.



## Task 7

Question 2: Copy these shapes and then enlarge by the scale factor given.

(a)



Enlarge by scale factor 2

(b)



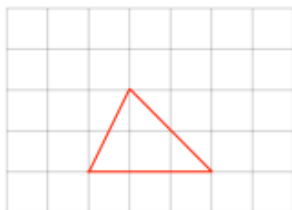
Enlarge by scale factor 3

(c)



Enlarge by scale factor 2

(d)



Enlarge by scale factor 2

(e)



Enlarge by scale factor 3

(f)



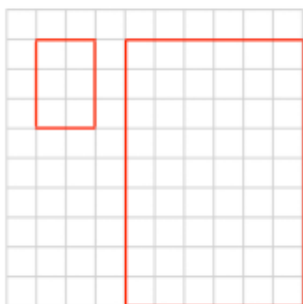
Enlarge by scale factor 2



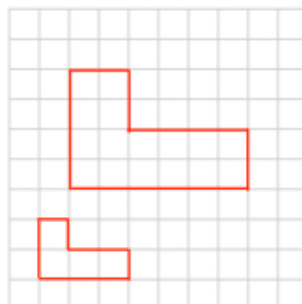
## Task 8

**Question 4:** Shown below is an object and its enlargement.  
For each, write down the scale factor of enlargement.

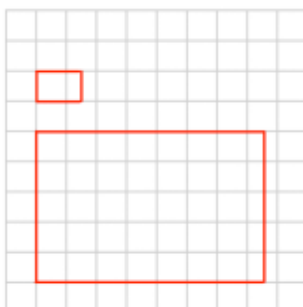
(a)



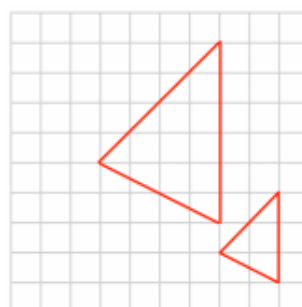
(b)



(c)

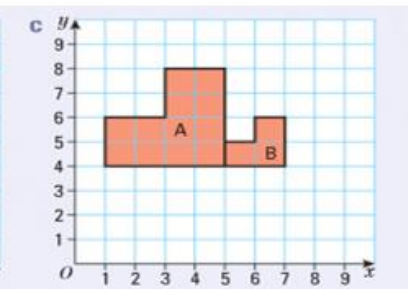
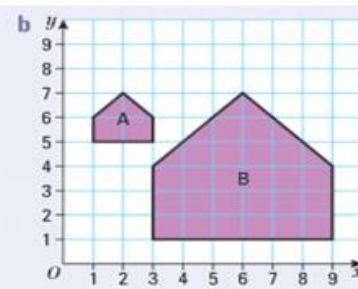
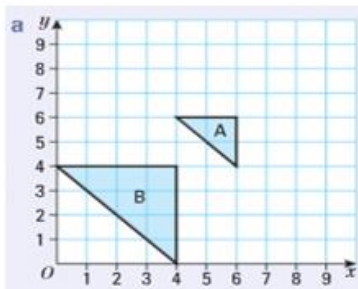
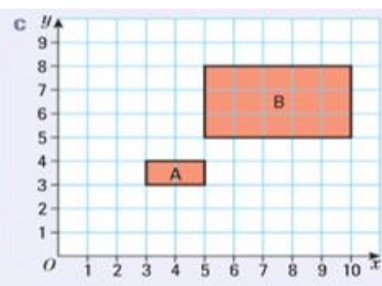
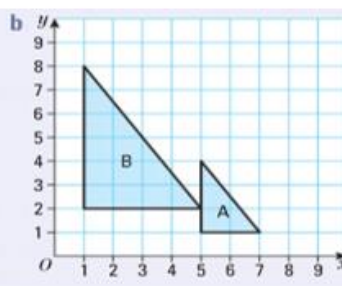
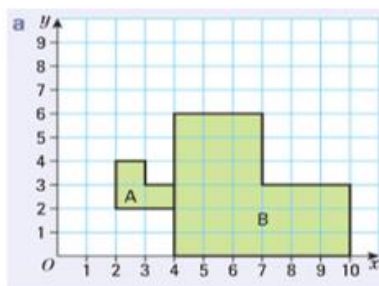


(d)



## Task 9

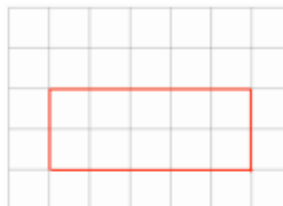
**Describing Enlargements.** Find the centre of enlargement and the scale factor for each.



## Task 10

Question 1: Shown is a rectangle drawn on a centimetre squared grid.

- Find the area of the rectangle.
- Enlarge the rectangle by scale factor 2 on centimetre squared paper.
- Find the area of the enlarged rectangle.
- How many times larger is the area of the enlarged rectangle than the original?



Question 2: Shown is a triangle drawn on a centimetre squared grid.

- Find the area of the triangle.
- Enlarge the triangle by scale factor 3 on centimetre squared paper.
- Find the area of the enlarged triangle.
- How many times larger is the area of the enlarged triangle than the original?



Question 3: Shown is a shape drawn on a centimetre squared grid.

Reg is going to enlarge the shape by scale factor 5.

- Without enlarging the shape, can you predict what the area of the enlarged shape will be?
- Enlarge the shape by scale factor 5 and check your prediction.



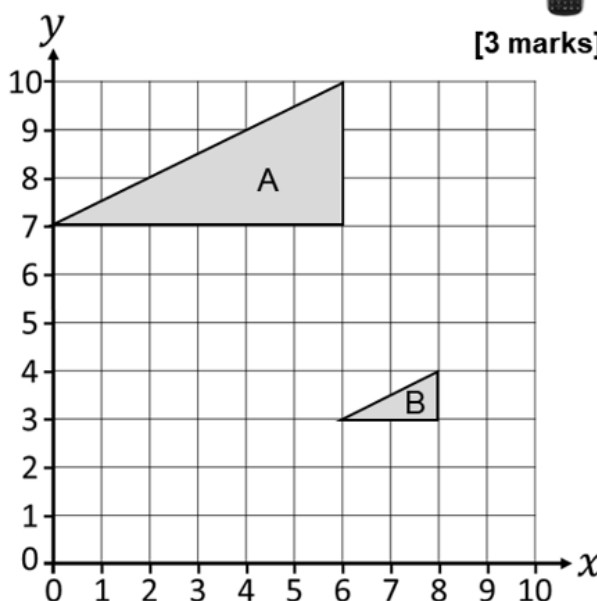
## Task 11

**GCSE** — AQA Foundation: November 2017 Paper 2, Q24



- 1 Describe fully the **single transformation** that maps triangle A to triangle B.

[3 marks]





## Week 2:

- **LI:** I can understand that the corresponding angles of similar shapes are equal
- **LI:** I can solve problems involving similar triangles

### Demonstration Videos:

<https://www.youtube.com/watch?v=6IVyQy9F3kU>

### Task 1

**DIGIT Puzzle**

How many ways can you complete this diagram of two similar triangles?

Scale Factor =

The diagram is not accurate. Sketch your own when you find solutions.

★ Use any digits  
★★ Use digits only once

**DIGIT Puzzle**

How many ways can you complete this diagram of two similar triangles?

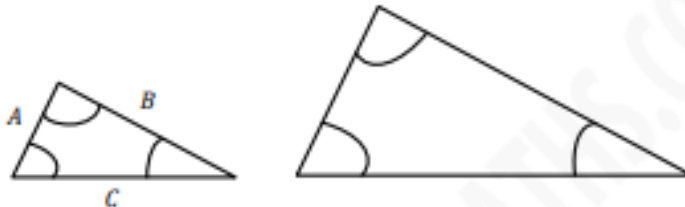
Scale Factor =

The diagram is not accurate. Sketch your own when you find a solution.

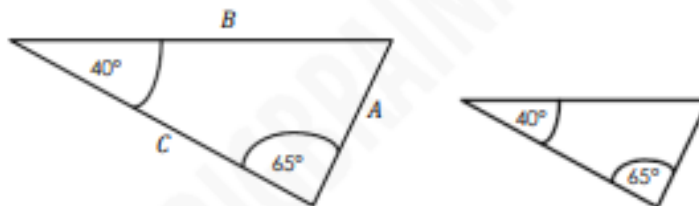
★ Use any digits  
★★ Use digits only once

### Task 2

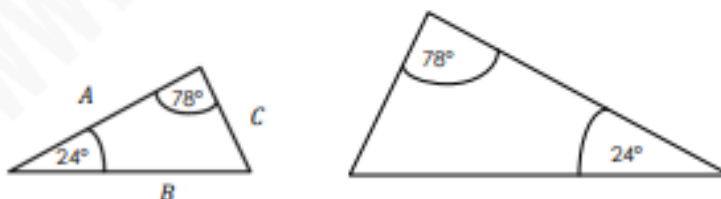
Q1 Label the angles that are the same on both triangles. Use the letters a, b and c. Label the identical lengths on the bigger triangle that match the sides on the smaller triangle. Use the labels A', B', and C'.



Q2 Label the identical lengths on the smaller triangle that match the sides on the bigger triangle. Use the labels A', B', and C'.



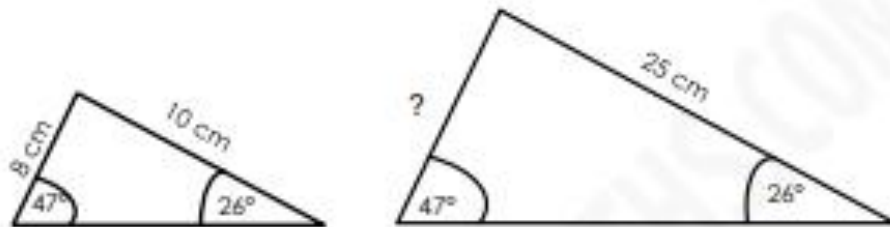
Q3 Label the sides on the bigger triangle that match the sides on the smaller triangle. Use the labels A', B' and C'.



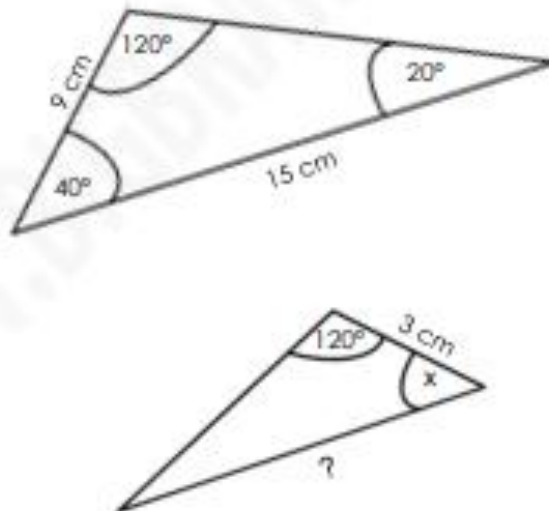


## Task 3

Q1 These two triangles are similar. Calculate the missing length and angle  $x$



Q2 These two triangles are similar. Calculate the missing length and angle  $x$

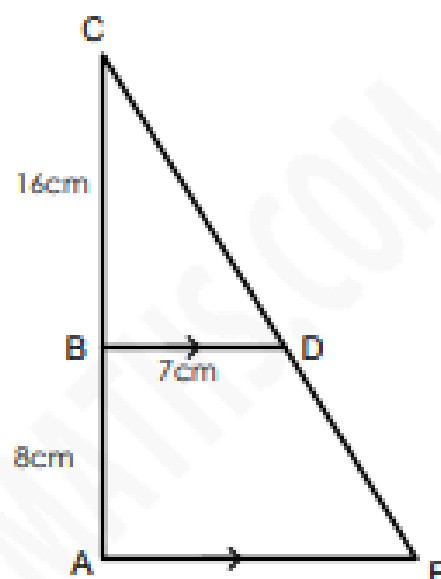


## Task 4

Q1

Triangles ACE and BCD are similar.  
 $AB = 8\text{ cm}$ ,  $BC = 16\text{ cm}$  and  $BD = 7\text{ cm}$

Find length AE

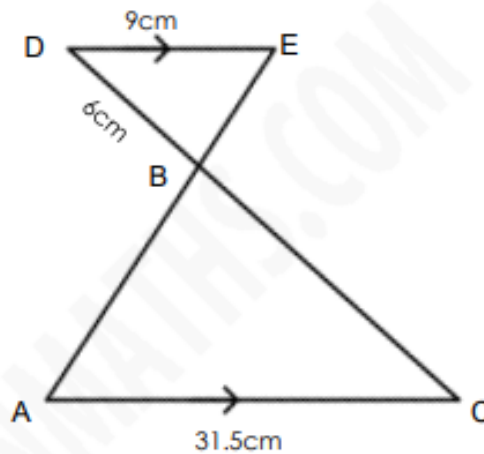


## Task 5

Q1

Triangles ABC and BDE are similar.  
 $AC = 31.5\text{cm}$ ,  $BD = 6\text{cm}$  and  $DE = 9\text{cm}$

Find length BC

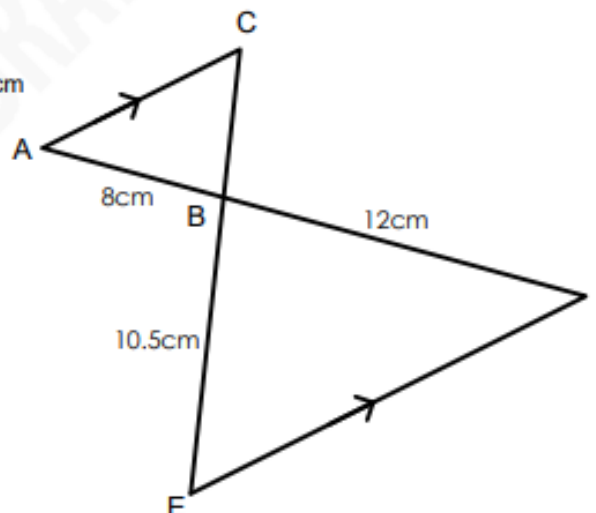


Q2



Triangles ABC and BDE are similar.  
 $AB = 8\text{cm}$ ,  $BD = 12\text{cm}$  and  $BE = 10.5\text{cm}$

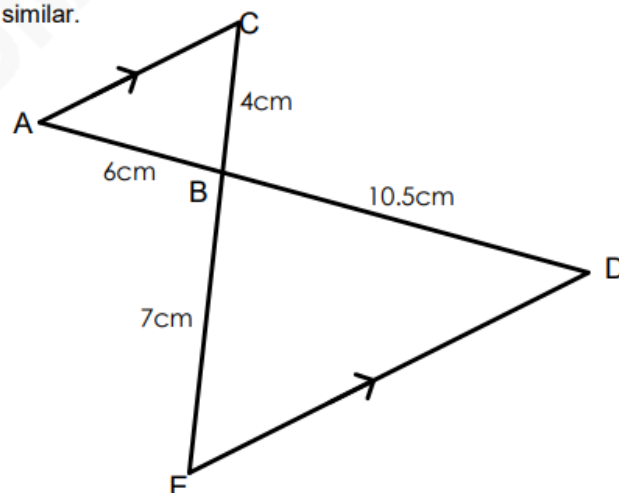
Find length BC



## Task 6

$AB = 6\text{cm}$ ,  $BC = 4\text{cm}$ ,  $BD = 10.5\text{cm}$  and  $BE = 7\text{cm}$

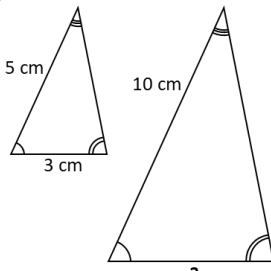
Prove that triangles ABC and BDE are similar.

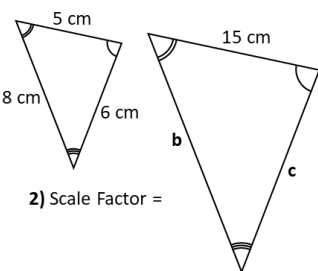


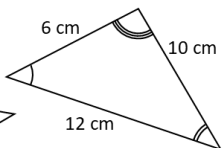


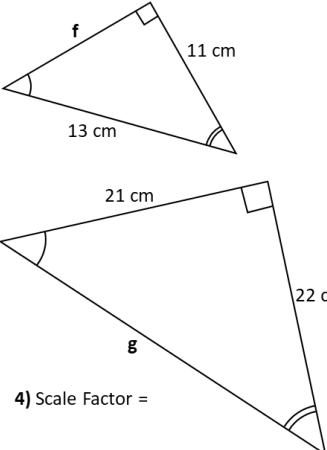
## Task 7

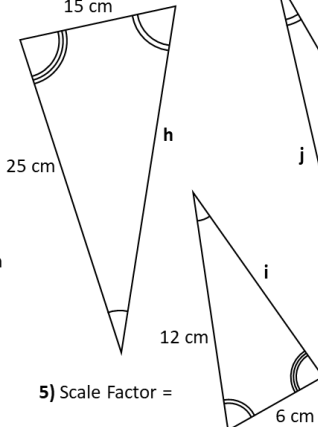
Calculate the **Scale Factor of Enlargement** (1 to 6) for each pair of triangles.  
Use scale factors to work out the missing lengths (a to n).

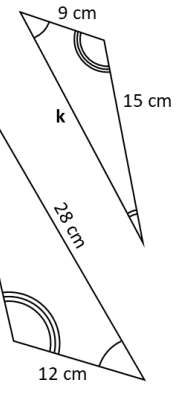
1) Scale Factor =   


2) Scale Factor =   


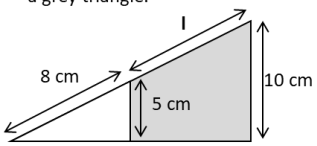
3) Scale Factor =   


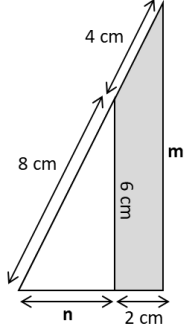
4) Scale Factor =   


5) Scale Factor =   


6) Scale Factor =   


These questions have a similar white triangle on top of a grey triangle.





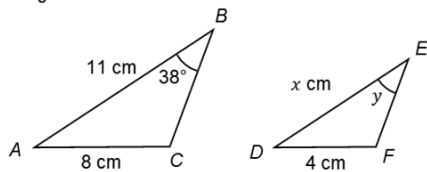
Not to scale.

## Task 8

**GCSE** — AQA Foundation: June 2017 Paper 3, Q16



1 Triangles  $ABC$  and  $DEF$  are similar.



Not drawn accurately

1 (a) Work out the value of  $x$ .

[2 marks]

Answer \_\_\_\_\_

1 (b) Write down the size of angle  $y$ .

[1 mark]

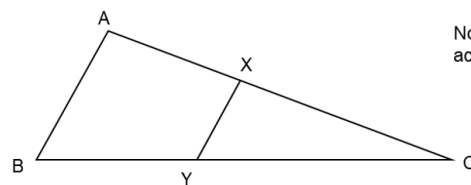
Answer \_\_\_\_\_

degrees

**GCSE** — AQA Higher: May 2017 Paper 1, Q22



1  $ABC$  and  $XYC$  are similar triangles.



Not drawn accurately

Which of these is equivalent to  $\frac{XC}{AC}$  ?

[1 mark]

Circle your answer.

$\frac{BY}{YC}$

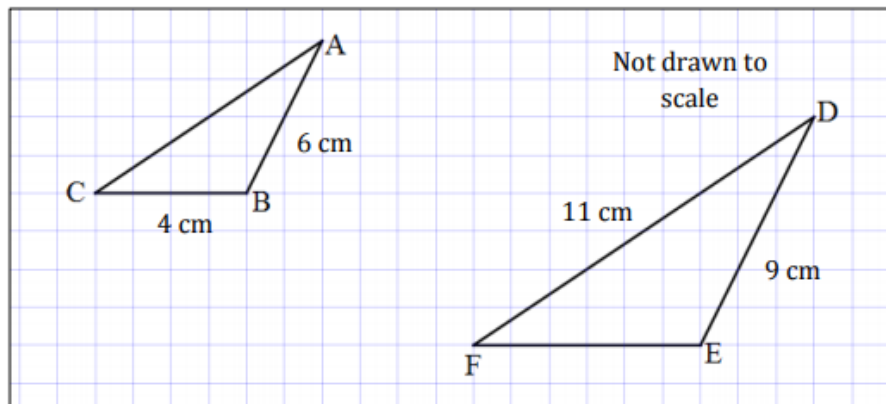
$\frac{AB}{XY}$

$\frac{BC}{YC}$

$\frac{XY}{AB}$

## Task 9

Triangle ABC and DEF are similar.



- a) Triangle DEF is an enlargement of triangle ABC.  
What is the scale factor of this enlargement?

.....

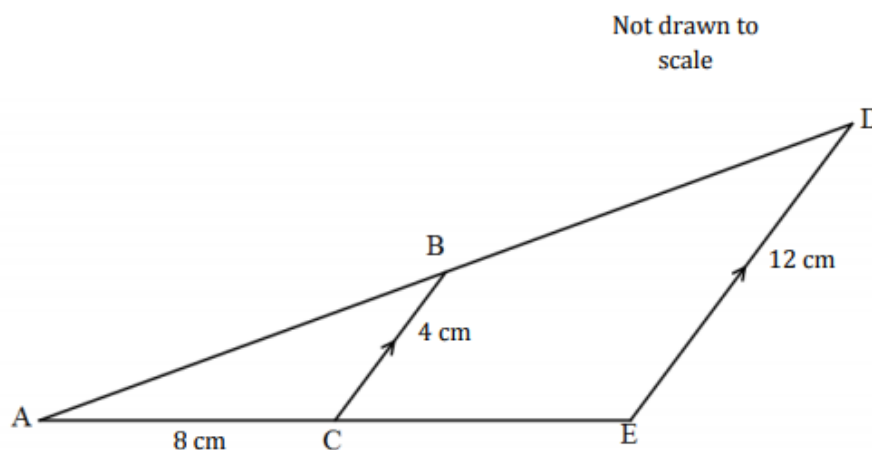
- b) Work out the length of the side EF.

.....

- c) What is the length of the side AC?

## Task 10

In the diagram, BC is parallel to DE.



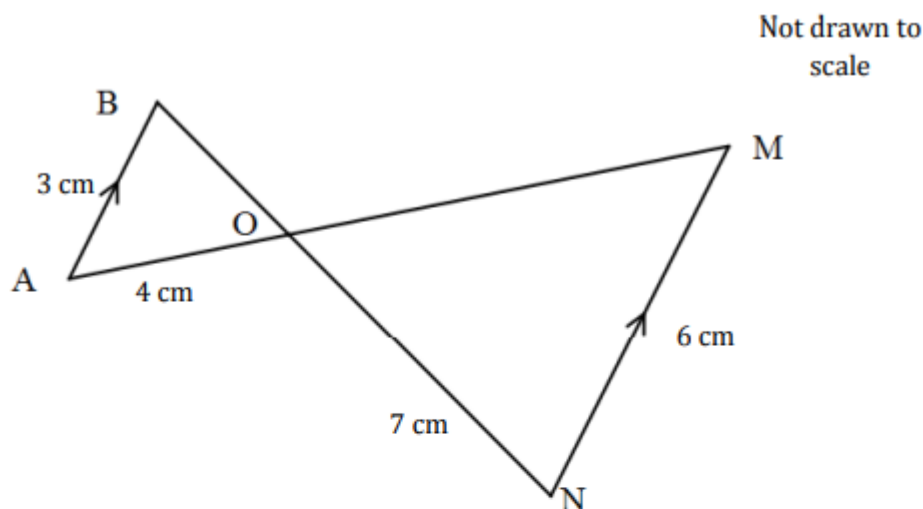
- a) Explain why triangle ABC is similar to ADE

.....  
.....

- b) Find the length CE



## Task 11



- a) Explain why triangle MNO is similar to triangle ABO.

.....

.....

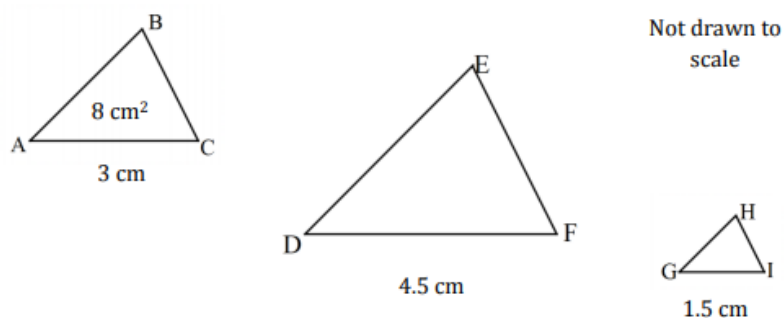
- b) Calculate the length of OM

.....

- c) Calculate the length of OB

## Task 12

$\triangle ABC$  is similar to  $\triangle DEF$  and  $\triangle GHI$ .



- a) What is the scale factor that AC is multiplied by to give DF? .....
- b) What is the scale factor that the **area** of  $\triangle ABC$  is multiplied by to give the **area** of  $\triangle DEF$ ?  
.....
- c) What are the areas of  $\triangle DEF$  and  $\triangle GHI$ ? .....

## Week 3:

- **L1:** I can translate a shape by a given vector
- **L1:** I can reflect a shape in a line, including on coordinate axes

### Demonstration Videos:

<https://corbettmaths.com/2012/08/10/transformations-translations/>

<https://corbettmaths.com/2012/08/19/reflections/>

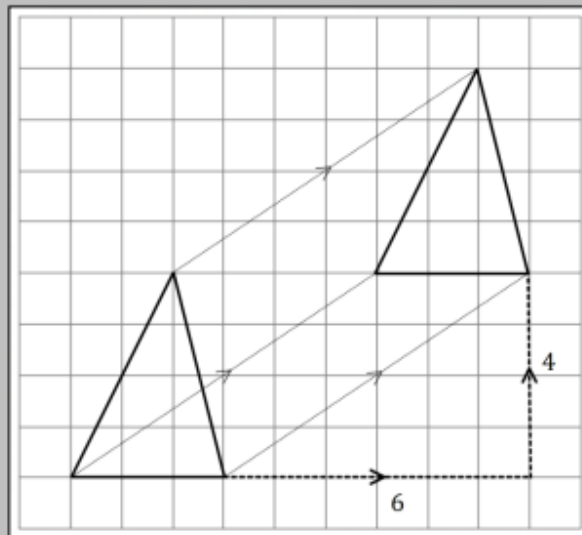
### Concept corner

A **translation** is a transformation for which **every point on an object is moved by the same amount in the same direction.**

Here every point has been moved 6 units to the right and 4 units up.

The translation is described by the vector

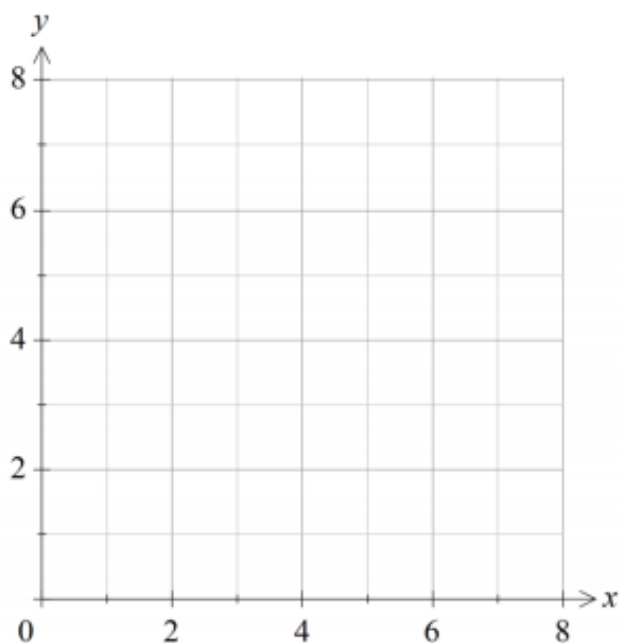
$$\begin{pmatrix} 6 \\ 4 \end{pmatrix}$$



### Task 1

Draw the quadrilateral (1, 2), (1, 4), (0, 3) and (4, 3).

Label this quadrilateral A.



a) Translate quadrilateral A along by vector  $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$ .

Label this quadrilateral B.

b) Write down the coordinates of the vertices of quadrilateral B.

## Task 2

**1) Describe each translation with a vector**

A to B:  $\begin{pmatrix} 5 \\ 1 \end{pmatrix}$

A to C:  $\begin{pmatrix} 3 \\ 3 \end{pmatrix}$

A to D:  $\begin{pmatrix} -1 \\ 5 \end{pmatrix}$

A to E:  $\begin{pmatrix} 6 \\ -1 \end{pmatrix}$

A to F:  $\begin{pmatrix} 1 \\ -4 \end{pmatrix}$

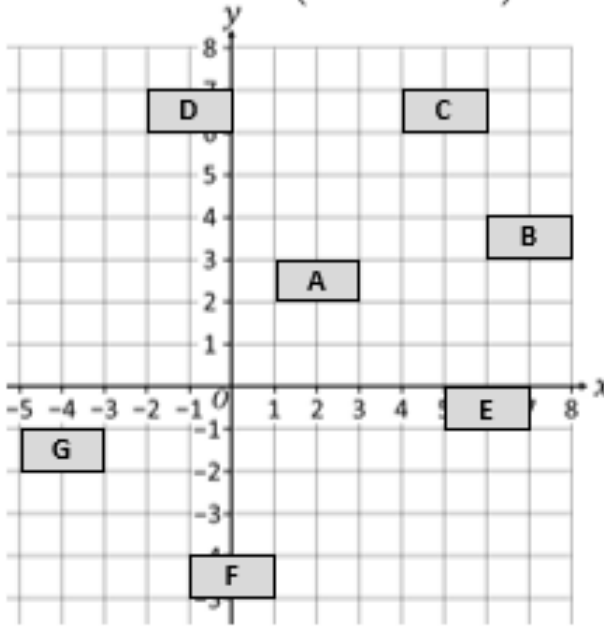
A to G:  $\begin{pmatrix} -3 \\ -1 \end{pmatrix}$

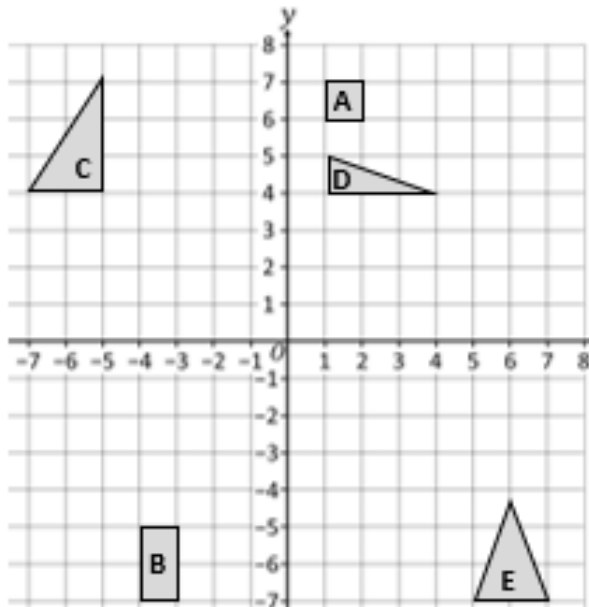
E to G:  $\begin{pmatrix} -4 \\ -2 \end{pmatrix}$

**Translation**

**(Horizontal  
Vertical)**

$\longleftrightarrow$   
 $\updownarrow$





**2) Translate each shape by the given vector. Sketch the new image. Label each image A2, B2 etc.**

A:  $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$

B:  $\begin{pmatrix} -2 \\ 4 \end{pmatrix}$

C:  $\begin{pmatrix} 6 \\ -5 \end{pmatrix}$

D:  $\begin{pmatrix} -5 \\ -3 \end{pmatrix}$

E:  $\begin{pmatrix} -8 \\ 12 \end{pmatrix}$

## Task 3

Object A is translated to give the shapes B, C, D and E.

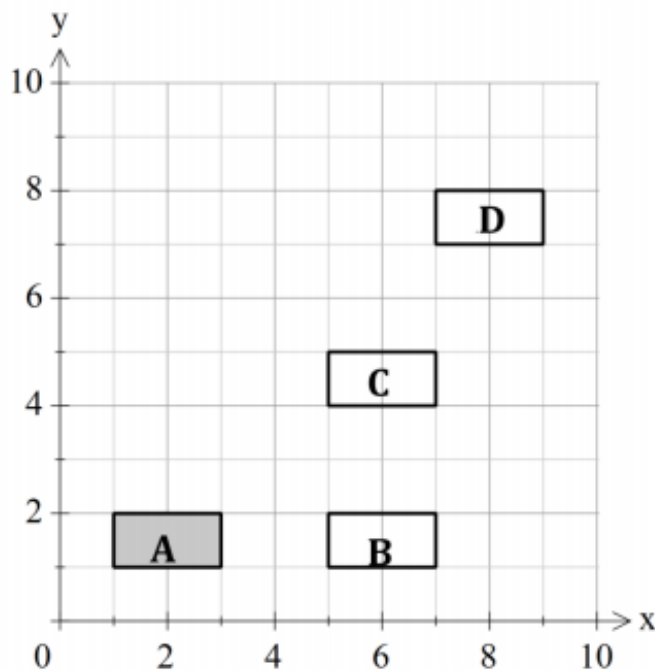
What is the column vector that describes the translations from:

a) A to B .....

b) B to C .....

c) A to C .....

d) A to D .....



## Task 4

Draw the quadrilateral (4, 2), (4, 4), (2, 3) and (5, 3).

Label this quadrilateral A.

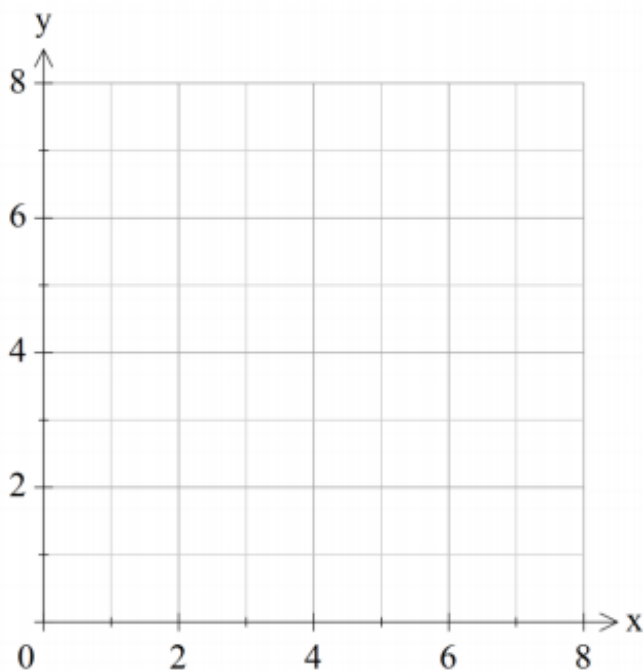
Translate the quadrilateral A  
along by vector:

a)  $\begin{pmatrix} 2 \\ 2 \end{pmatrix}$ , to obtain B,

b)  $\begin{pmatrix} 2 \\ -2 \end{pmatrix}$ , to obtain C,

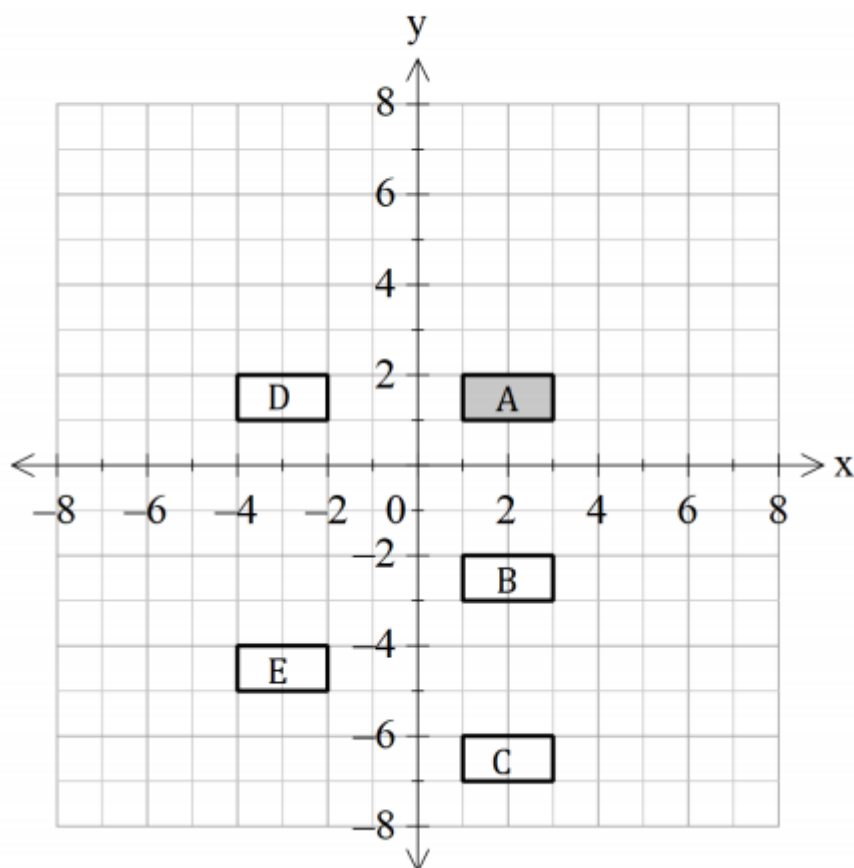
c)  $\begin{pmatrix} -2 \\ 2 \end{pmatrix}$ , to obtain D,

d)  $\begin{pmatrix} -2 \\ -2 \end{pmatrix}$ , to obtain E.



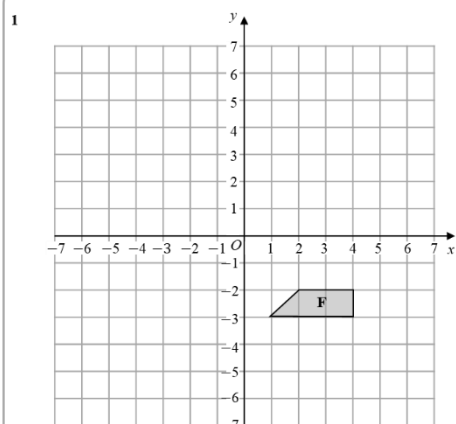
## Task 5

Write down the column vector needed to translate the shape A to each of the other shapes:



## Task 6

**GCSE** — Edexcel Foundation: November 2017 Paper 2, Q20



(a) Rotate trapezium F  $180^\circ$  about the origin.  
Label the new trapezium A.

(1)

(b) Translate trapezium F by the vector  $\begin{pmatrix} -3 \\ -2 \end{pmatrix}$ .  
Label the new trapezium B.

(1)

(Total for Question 1 is 2 marks)

**GCSE** — AQA Higher: May 2018 Paper 1, Q2

1 The vector  $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$  translates A to B.

Circle the vector that translates B to A.

[1 mark]

$\begin{pmatrix} -3 \\ 4 \end{pmatrix}$     $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$     $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$     $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$

2 The vector  $\begin{pmatrix} -5 \\ 0 \end{pmatrix}$  translates A to B.

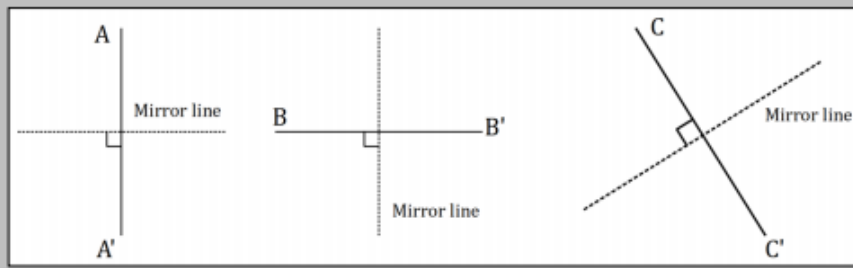
Circle the vector that translates B to A.

[1 mark]

$\begin{pmatrix} 0 \\ 5 \end{pmatrix}$     $\begin{pmatrix} 0 \\ -5 \end{pmatrix}$     $\begin{pmatrix} -5 \\ 0 \end{pmatrix}$     $\begin{pmatrix} 5 \\ 0 \end{pmatrix}$

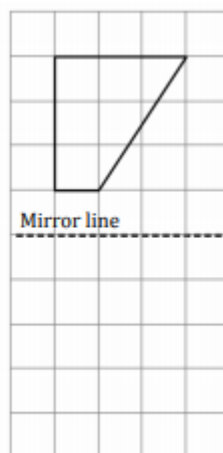
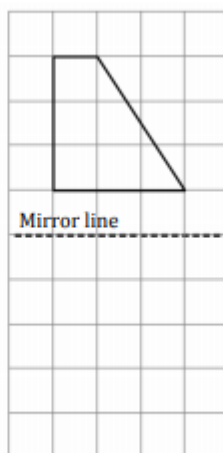
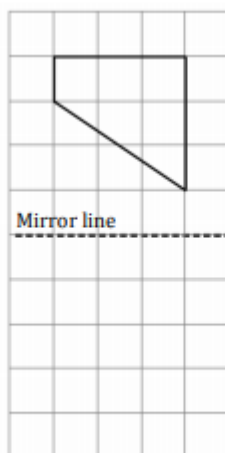
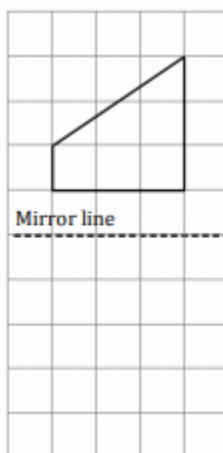
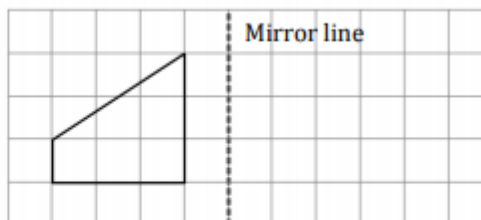
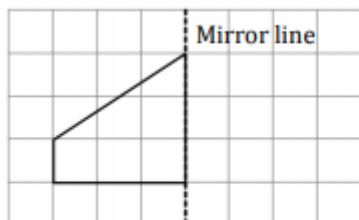
## Concept corner

When an object is transformed by a **reflection** the object and its image are always the same **perpendicular** distance from the **mirror line**.



## Task 7

Draw the reflection of each of the following shapes in the mirror line:

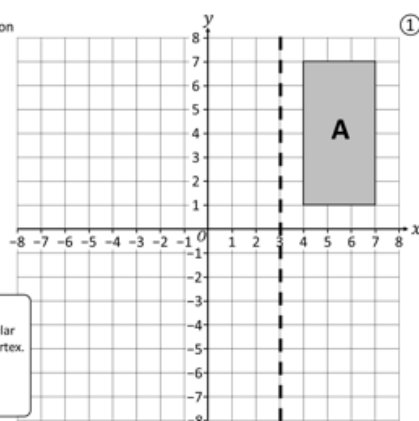


## Task 8

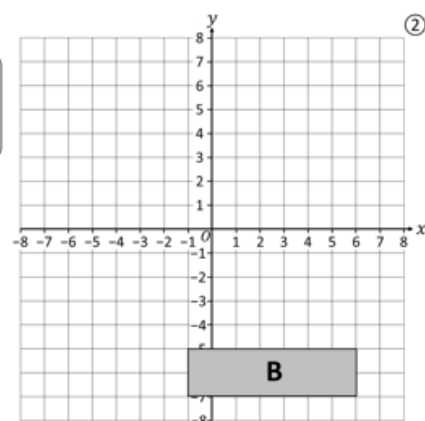
Transformations: Reflection

Reflect shape A  
in the line  
 $x = 3$   
Label the new shape A'.

- 1) Plot the line.
- 2) Count squares perpendicular from the line to each vertex.
- 3) Plot each vertex an equal distance away on the opposite side.

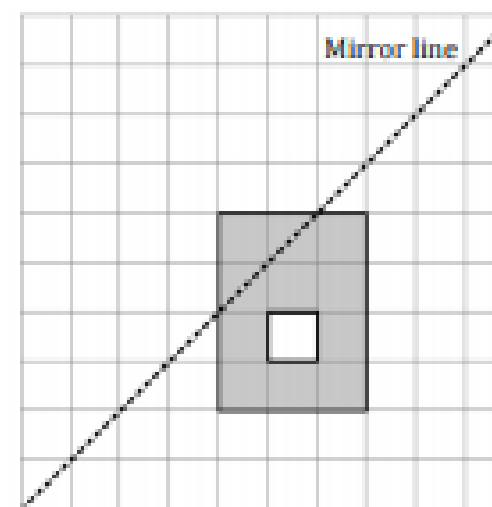
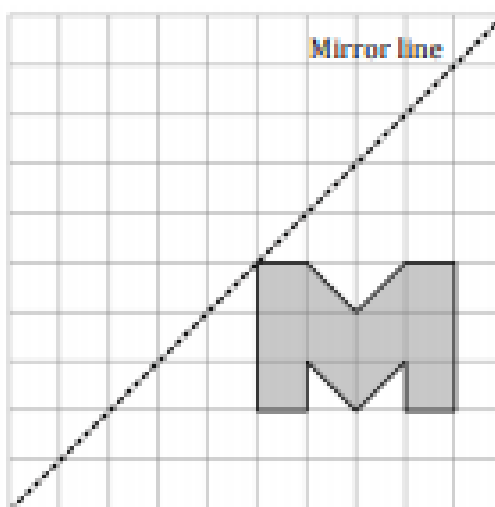
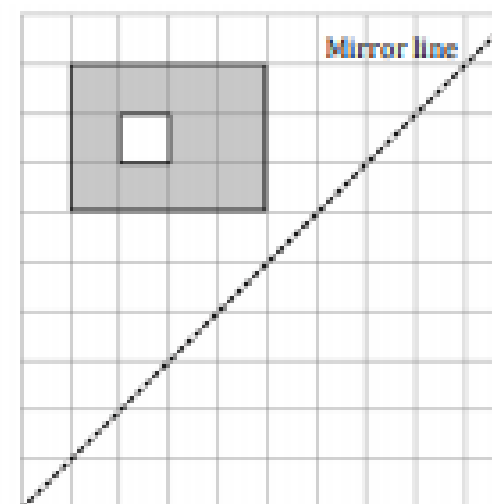
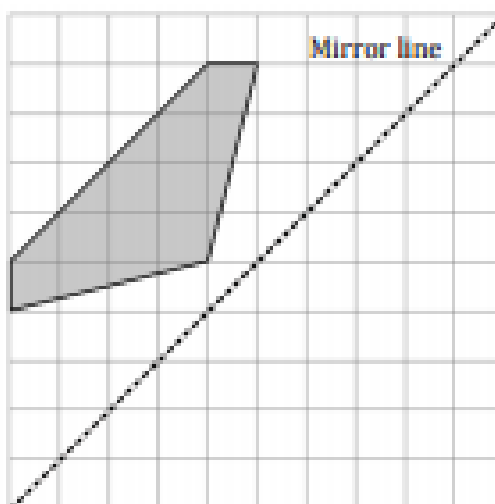
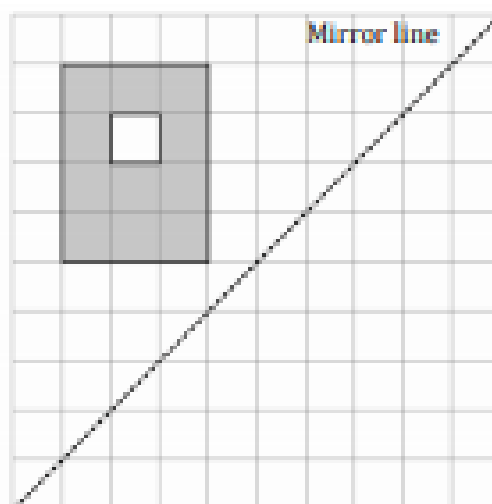
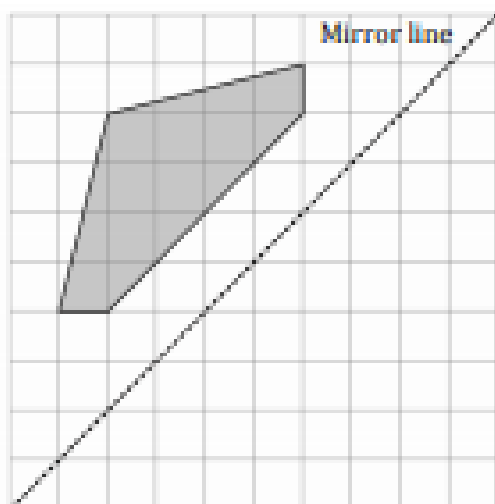


Reflect shape B  
in the line  
 $y = -2$   
Label the new shape B'.



## Task 9

2. Draw the reflection of each of the following shapes in the mirror line:





## Week 4:

- **L1:** I can rotate a shape about a centre, including on coordinate axes
- **L1:** I can identify the type of transformation carried out by comparing an object and image
- 

### Demonstration Videos:

<https://corbettmaths.com/2013/05/19/rotations/>

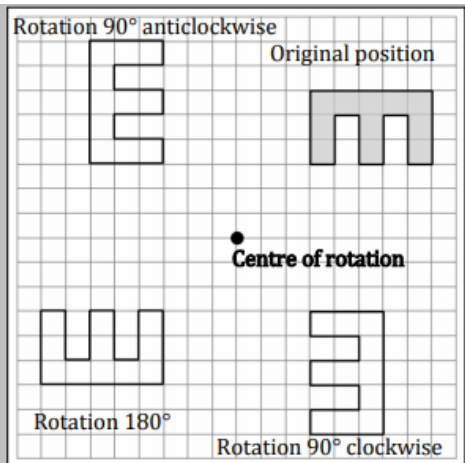
<https://www.mathsgenie.co.uk/transformations.html>

### Tasks:

#### Concept corner

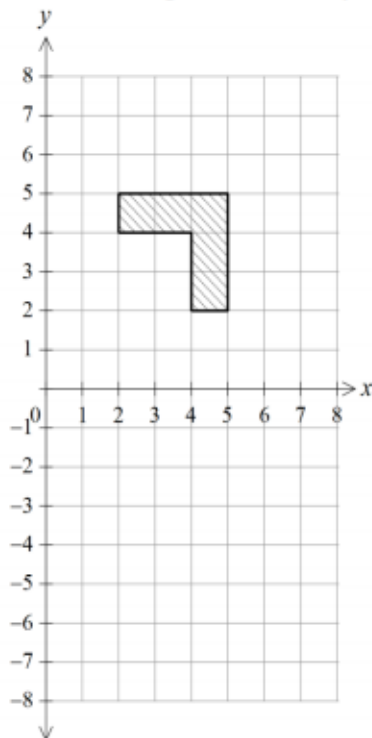
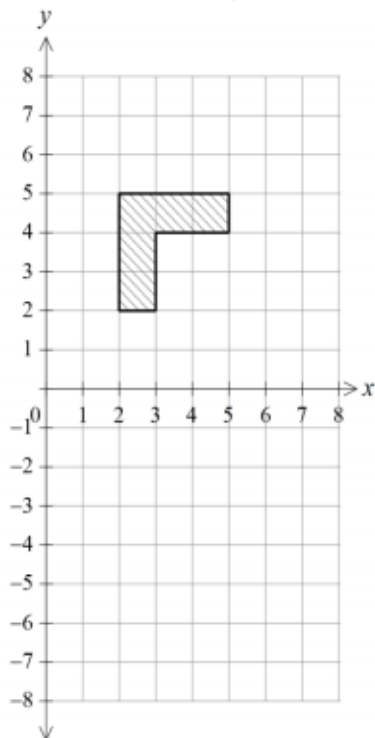
**Rotations** are obtained when you **turn** a figure about a given point, called the **centre of rotation**.

The centre of rotation can be inside the figure or anywhere outside it.



### Task 1

Rotate each of the shapes below  $90^\circ$  clockwise about the origin, coordinates (0,0).



What is the same and what is different about the two questions?

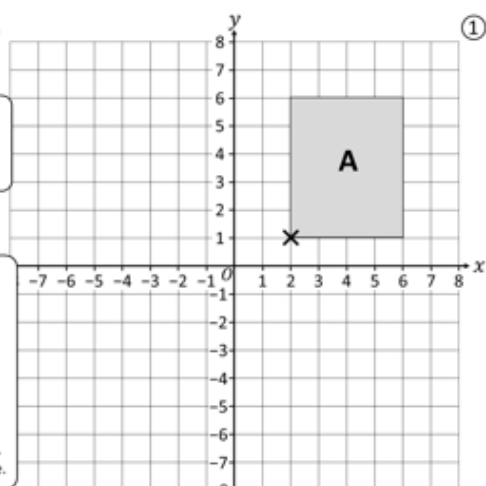


## Task 2

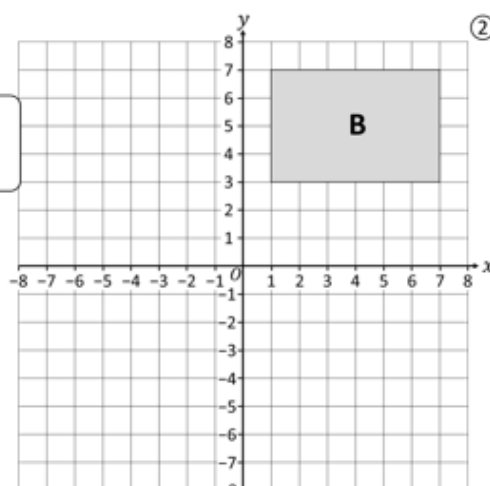
Transformations: Rotation

Rotate shape **A**  
180° about  
(2, 1).  
Label the new shape **A'**

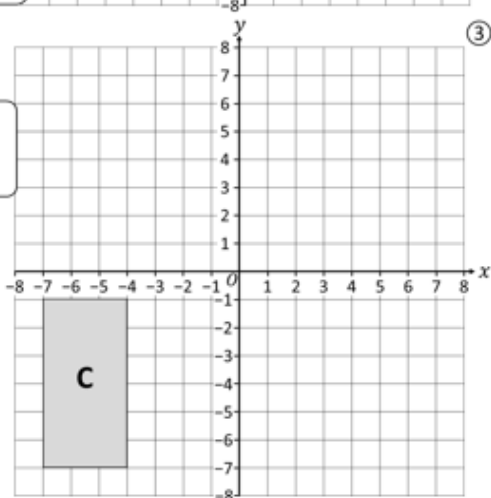
- 1) Place the tracing paper on top.
- 2) Copy the vertices & centre of rotation.
- 3) Place your pencil on the centre of rotation & rotate the paper (use straight edges to spot 90/180°).
- 4) Copy vertices onto the grid.
- 5) Complete & label the shape.



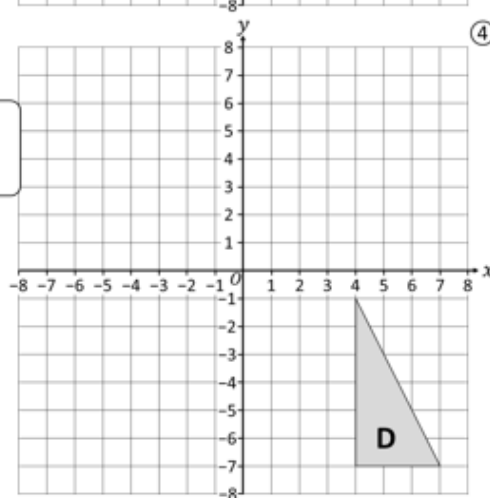
Rotate shape **B**  
90° clockwise about  
(0, 1).  
Label the new shape **B'**



Rotate shape **C**  
90° anticlockwise about  
(-5, 3).  
Label the new shape **C'**



Rotate shape **D**  
180° about  
(1, -2).  
Label the new shape **D'**

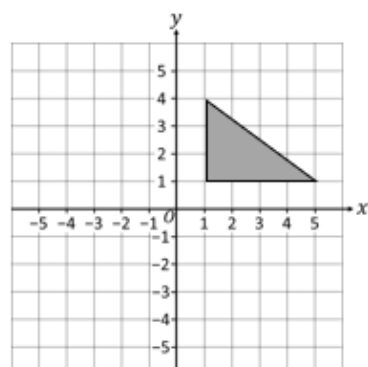


## Task 3

**GCSE** — AQA Foundation: May 2018 Paper 1, Q21

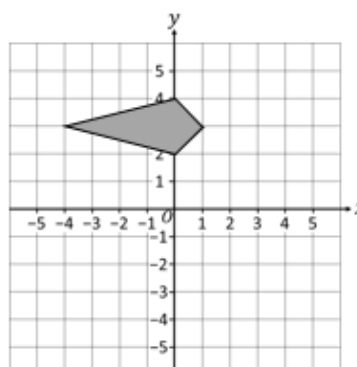
1 (a) Reflect the triangle in the line  $y = -1$

[2 marks]

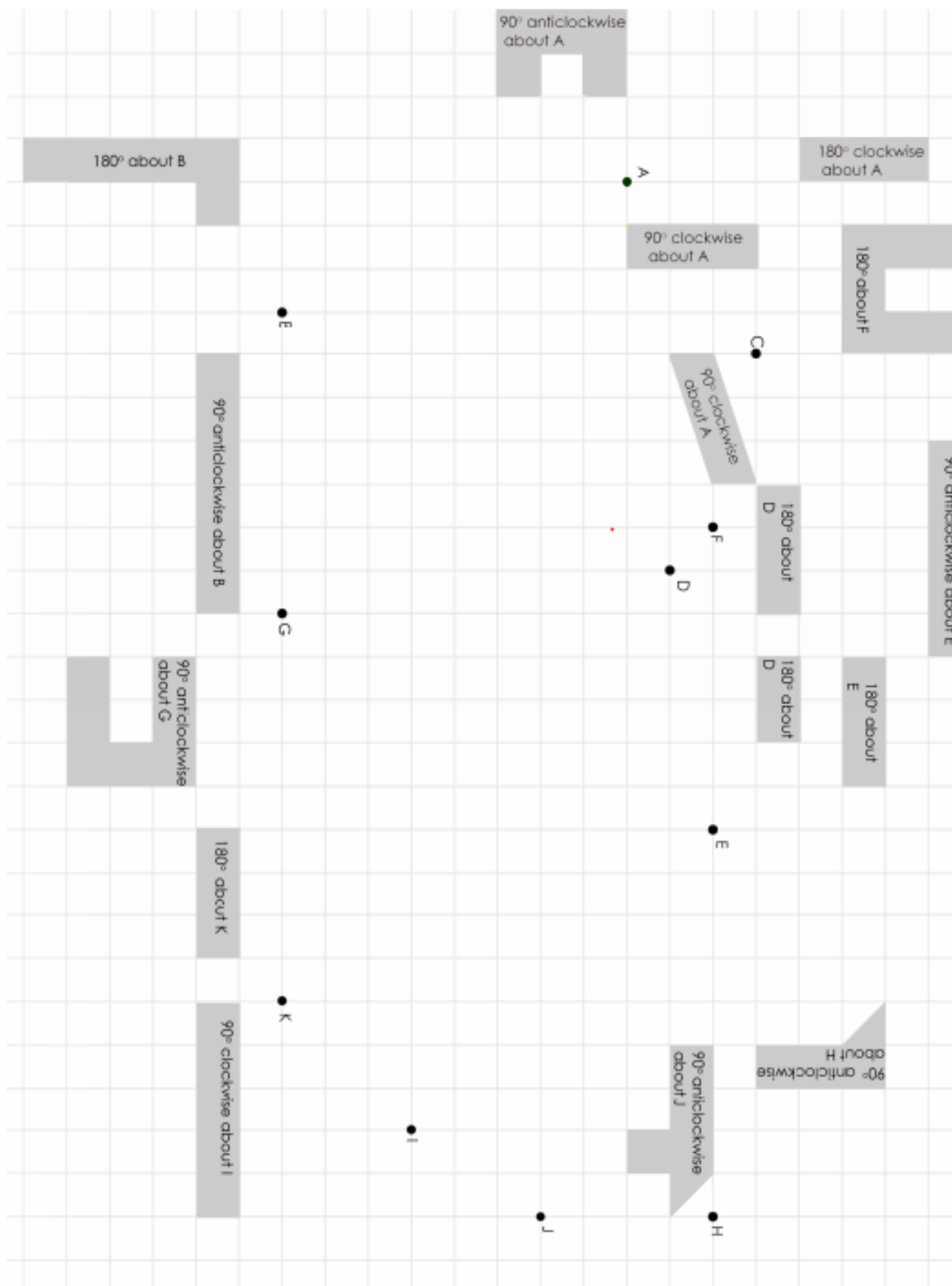


1 (b) Rotate the kite 90° clockwise about (0, 0)

[2 marks]



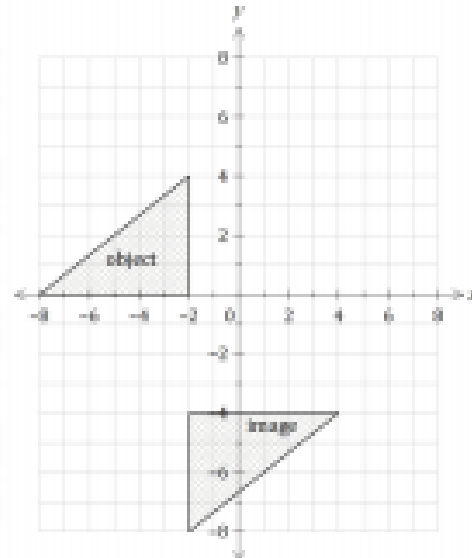
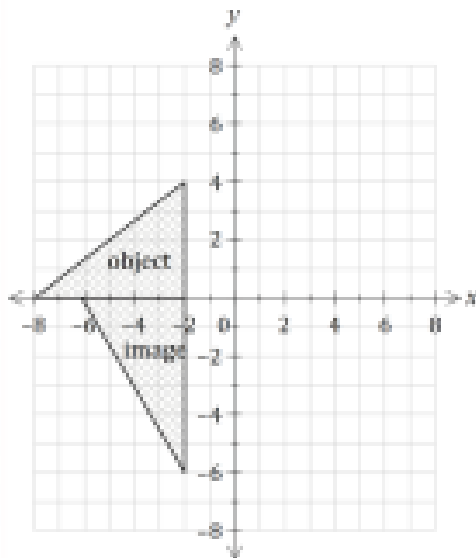
## Task 4





## Task 5

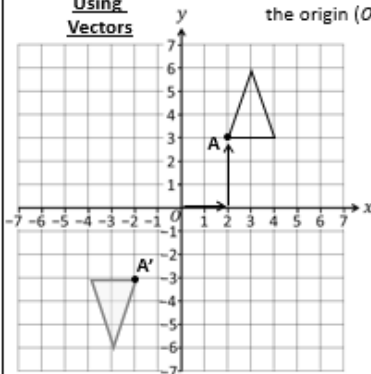
10. Find the centre of rotation in each of the following diagrams.



## Task 6

### Rotation Using Vectors

The black triangle has been rotated  $180^\circ$  about the origin ( $O$ ) to create the grey triangle.

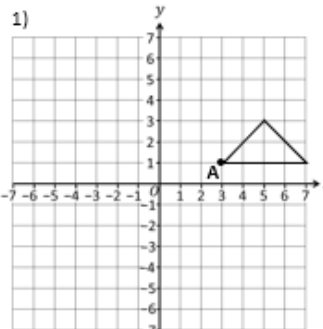


Vertex  $A$  of the black triangle corresponds with vertex  $A'$  of the grey triangle.

The vector  $O$  to  $A$  is  $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$

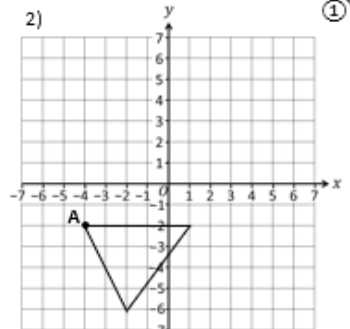
Sketch & describe the vector  $O$  to  $A'$ .

How are these vectors related?



Sketch & describe the vector  $O$  to  $A$ .

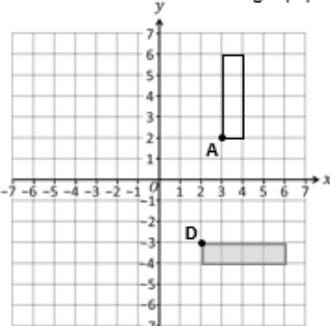
Rotate the triangle  $180^\circ$  about the origin ( $O$ ) & sketch.



Sketch & describe the vector  $O$  to  $A$ .

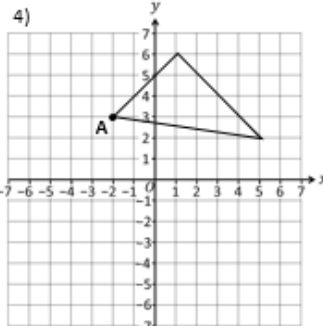
Rotate the triangle  $180^\circ$  about the origin ( $O$ ) & sketch.

3)  
The black rectangle has been rotated  $90^\circ$  clockwise about the origin ( $O$ ).



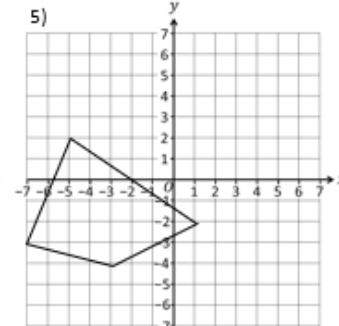
Sketch & describe the vector  $O$  to  $A$ .

Sketch & describe the vector  $O$  to  $D$ .

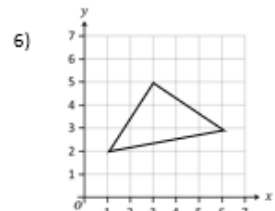


Sketch & describe the vector  $O$  to  $A$ .

Rotate the triangle  $90^\circ$  clockwise about the origin ( $O$ ) & sketch.



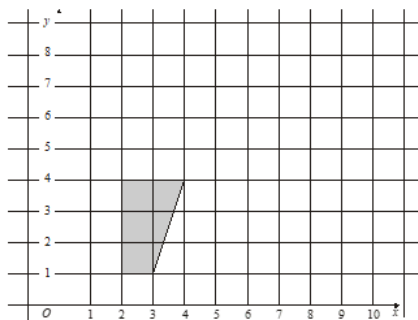
Rotate the quadrilateral  $90^\circ$  anticlockwise about the origin ( $O$ ) & sketch.



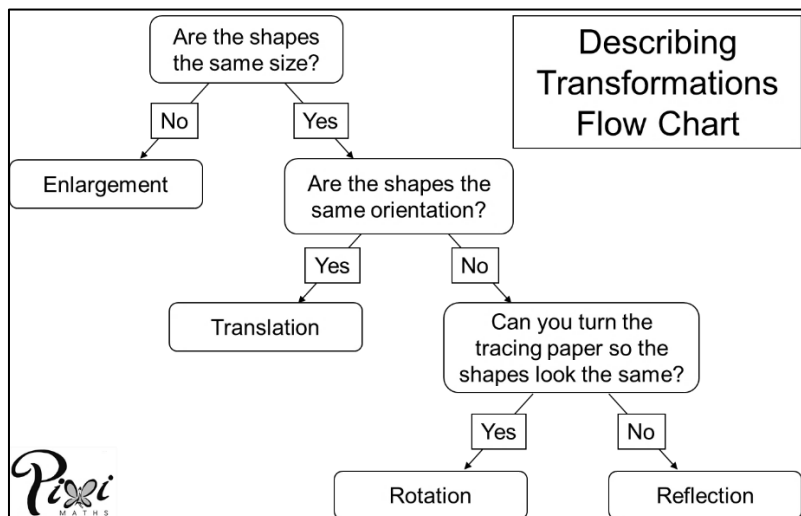
a) State the new coordinates of this triangle if it is rotated  $180^\circ$  about  $O$ .

b) State the new coordinates of this triangle if it is rotated  $90^\circ$  clockwise about  $O$ .

## Task 1



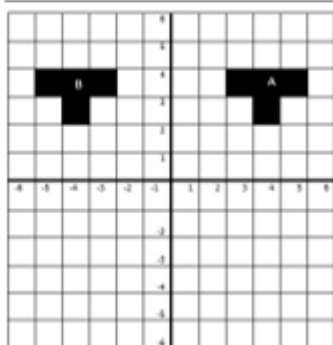
- Translate the object by the vector  $\begin{pmatrix} 7 \\ -1 \end{pmatrix}$
- Rotate the object  $180^\circ$  around the point (2, 5)
- Reflect the object in the line  $y = 4$
- Enlarge the object by scale factor 2 from centre (1, 0)



## Task 2

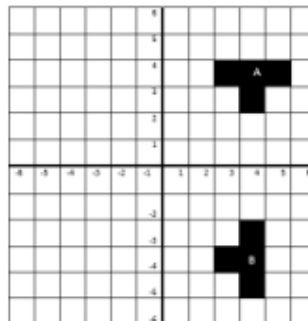
### Describing Transformations

- Describe fully the single transformation which maps Shape A onto Shape B.



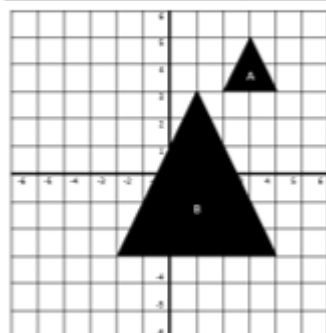
(Total 2 marks)

- Describe fully the single transformation which maps Shape A onto Shape B.



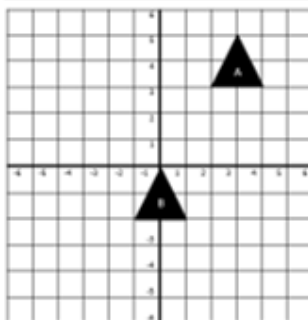
(Total 3 marks)

- Describe fully the single transformation which maps Shape A onto Shape B.



(Total 3 marks)

- Describe fully the single transformation which maps Shape A onto Shape B.



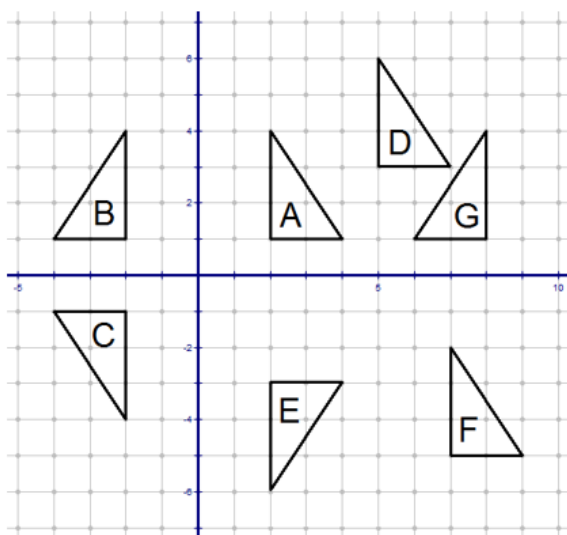
(Total 2 marks)

## Task 3

Each card has two transformations in order. Decide whether the final coordinate is <b>TRUE</b> or <b>FALSE</b> !	
<b>A</b> $(2, 1)$ $\downarrow$ $(-5, 5)$ 1) Translated $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$ 2) Reflected in the line $x = 0$	<b>B</b> $(3, 4)$ $\downarrow$ $(3, 4)$ 1) Translated $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$ 2) Translated $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$
<b>C</b> $(3, -2)$ $\downarrow$ $(0, 2)$ 1) Reflected in the line $y = 0$ 2) Reflected in the line $x = 1$	<b>D</b> $(0, 5)$ $\downarrow$ $(-7, 0)$ 1) Rotated $90^\circ$ clockwise about the origin 2) Reflected in the line $x = -1$
<b>E</b> $(6, 2)$ $\downarrow$ $(-5, -4)$ 1) Rotated $180^\circ$ about the origin 2) Reflected in the line $y = -3$	<b>F</b> $(1, 3)$ $\downarrow$ $(-1, 3)$ 1) Translated $\begin{pmatrix} -4 \\ -4 \end{pmatrix}$ 2) Rotated $90^\circ$ anticlockwise about the origin
<b>G</b> $(-3, -6)$ $\downarrow$ $(0, -1)$ 1) Rotated $90^\circ$ clockwise about the origin 2) Translated $\begin{pmatrix} 6 \\ -4 \end{pmatrix}$	<b>H</b> $(-5, -5)$ $\downarrow$ $(-4, -4)$ 1) Reflected in the line $x = -4$ 2) Reflected in the line $y = x$
<b>I</b> $(4, 0)$ $\downarrow$ $(-4, -4)$ 1) Reflected in the line $y = x$ 2) Reflected in the line $x = -1.5$	<b>J</b> $(-4, 5)$ $\downarrow$ $(-5, -6)$ 1) Rotated $90^\circ$ clockwise about $(1, 1)$ 2) Reflected in the line $y = -x$

## Task 4

### Describing Transformations



	Description of the transformation
A to B	
A to C	
A to D	
A to F	
B to C	
<b>Challenge!</b>	
A to E	
A to G	
E to G	

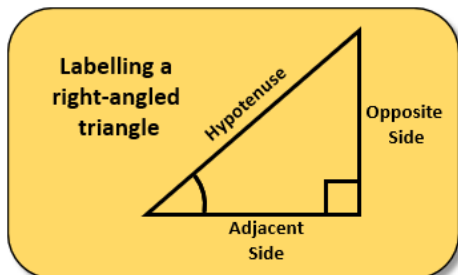
## Week 5:

- **LI:** I can investigate the trigonometric ratios using similar triangles
- **LI:** I can define and use the cosine, sine and tangent ratios

### Demonstration Videos:

<https://www.youtube.com/watch?v=9vDotQsVgDc>

### Task 1

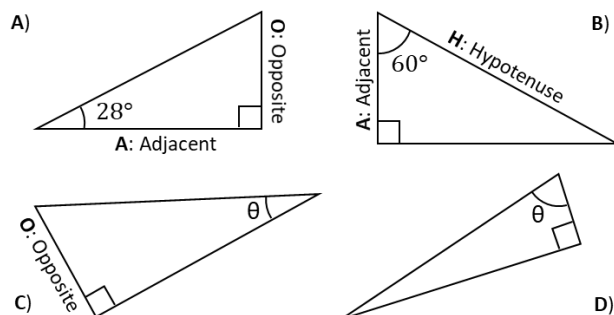


Hypotenuse – *always* across from the right-angle & *always* longest.  
Opposite – *always* opposite  $\theta$ .  
Adjacent – next to  $\theta$ .

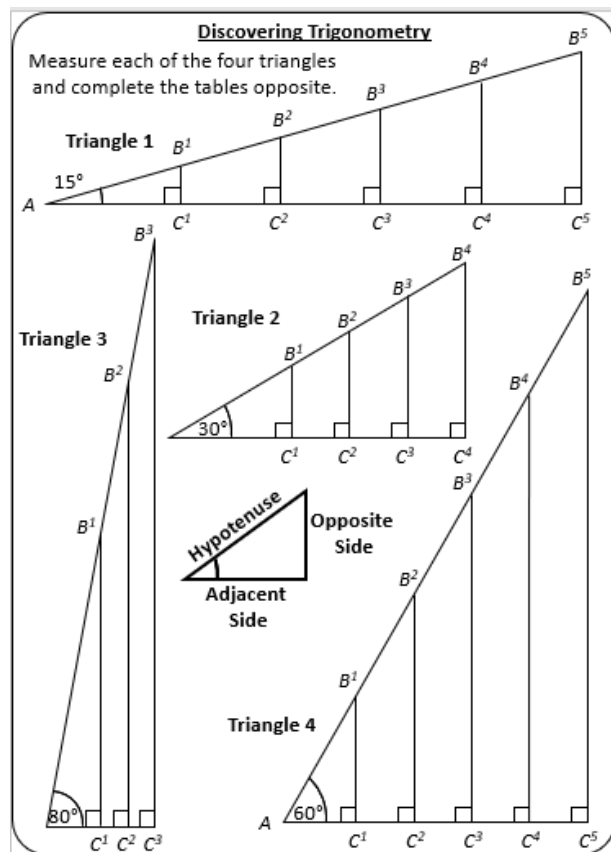
### Trigonometry: Labelling Right-Angled Triangles

For each triangle, label each side with a letter:

- H: Hypotenuse (the longest side)  
O: Opposite (opposite the labelled angle)  
A: Adjacent (next to the labelled angle)



### Task 2



Give your answers to 2 decimal places.

Triangle 1 - 15°			Triangle 2 - 30°		
$\frac{B^1C^1}{AB^1} =$	_____	=	$\frac{B^1C^1}{AB^1} =$	_____	=
$\frac{B^2C^2}{AB^2} =$	_____	=	$\frac{B^2C^2}{AB^2} =$	_____	=
$\frac{B^3C^3}{AB^3} =$	_____	=	$\frac{B^3C^3}{AB^3} =$	_____	=
$\frac{B^4C^4}{AB^4} =$	_____	=	$\frac{B^4C^4}{AB^4} =$	_____	=
$\frac{B^5C^5}{AB^5} =$	_____	=	$\frac{B^5C^5}{AB^5} =$	_____	=
Mean =	$\frac{\text{Opposite}}{\text{Hypotenuse}} =$		Mean =	$\frac{\text{Opposite}}{\text{Hypotenuse}} =$	

Triangle 3 - 80°			Triangle 4 - 60°		
$\frac{B^1C^1}{AB^1} =$	_____	=	$\frac{B^1C^1}{AB^1} =$	_____	=
$\frac{B^2C^2}{AB^2} =$	_____	=	$\frac{B^2C^2}{AB^2} =$	_____	=
$\frac{B^3C^3}{AB^3} =$	_____	=	$\frac{B^3C^3}{AB^3} =$	_____	=
$\frac{B^4C^4}{AB^4} =$	_____	=	$\frac{B^4C^4}{AB^4} =$	_____	=
$\frac{B^5C^5}{AB^5} =$	_____	=	$\frac{B^5C^5}{AB^5} =$	_____	=
Mean =	$\frac{\text{Opposite}}{\text{Hypotenuse}} =$		Mean =	$\frac{\text{Opposite}}{\text{Hypotenuse}} =$	

What comments can you make about the ratio of the opposite side to the hypotenuse of a triangle?

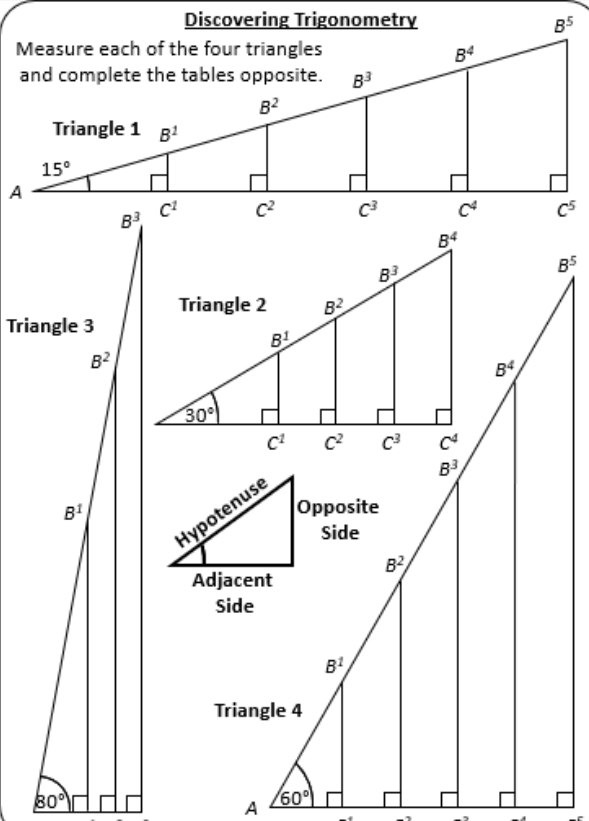
**SINE**



## Task 3

**Discovering Trigonometry**

Measure each of the four triangles and complete the tables opposite.



Give your answers to 2 decimal places.

Triangle 1 - 15°			Triangle 2 - 30°		
$\frac{AC^1}{AB^1} =$	_____ =		$\frac{AC^1}{AB^1} =$	_____ =	
$\frac{AC^2}{AB^2} =$	_____ =		$\frac{AC^2}{AB^2} =$	_____ =	
$\frac{AC^3}{AB^3} =$	_____ =		$\frac{AC^3}{AB^3} =$	_____ =	
$\frac{AC^4}{AB^4} =$	_____ =		$\frac{AC^4}{AB^4} =$	_____ =	
$\frac{AC^5}{AB^5} =$	_____ =		$\frac{AC^5}{AB^5} =$	_____ =	
Mean = $\frac{\text{Adjacent}}{\text{Hypotenuse}} =$			Mean = $\frac{\text{Adjacent}}{\text{Hypotenuse}} =$		

Triangle 3 - 80°			Triangle 4 - 60°		
$\frac{AC^1}{AB^1} =$	_____ =		$\frac{AC^1}{AB^1} =$	_____ =	
$\frac{AC^2}{AB^2} =$	_____ =		$\frac{AC^2}{AB^2} =$	_____ =	
$\frac{AC^3}{AB^3} =$	_____ =		$\frac{AC^3}{AB^3} =$	_____ =	
$\frac{AC^4}{AB^4} =$	_____ =		$\frac{AC^4}{AB^4} =$	_____ =	
$\frac{AC^5}{AB^5} =$	_____ =		$\frac{AC^5}{AB^5} =$	_____ =	
Mean = $\frac{\text{Adjacent}}{\text{Hypotenuse}} =$			Mean = $\frac{\text{Adjacent}}{\text{Hypotenuse}} =$		

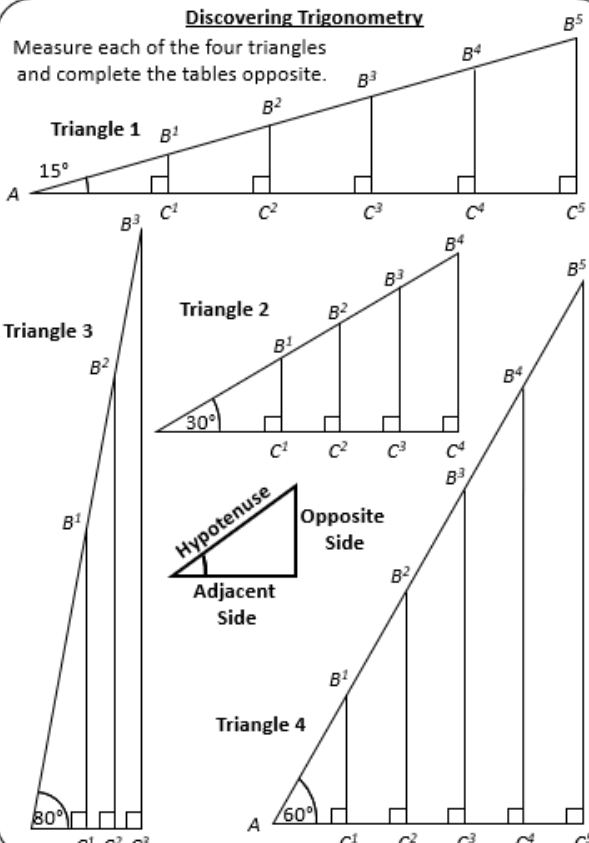
What comments can you make about the ratio of the **adjacent side** to the **hypotenuse** of a triangle?

COSINE

## Task 4

**Discovering Trigonometry**

Measure each of the four triangles and complete the tables opposite.



Give your answers to 2 decimal places.

Triangle 1 - 15°			Triangle 2 - 30°		
$\frac{B^1C^1}{AC^1} =$	_____ =		$\frac{B^1C^1}{AC^1} =$	_____ =	
$\frac{B^2C^2}{AC^2} =$	_____ =		$\frac{B^2C^2}{AC^2} =$	_____ =	
$\frac{B^3C^3}{AC^3} =$	_____ =		$\frac{B^3C^3}{AC^3} =$	_____ =	
$\frac{B^4C^4}{AC^4} =$	_____ =		$\frac{B^4C^4}{AC^4} =$	_____ =	
$\frac{B^5C^5}{AC^5} =$	_____ =		$\frac{B^5C^5}{AC^5} =$	_____ =	
Mean = $\frac{\text{Opposite}}{\text{Adjacent}} =$			Mean = $\frac{\text{Opposite}}{\text{Adjacent}} =$		

Triangle 3 - 80°			Triangle 4 - 60°		
$\frac{B^1C^1}{AC^1} =$	_____ =		$\frac{B^1C^1}{AC^1} =$	_____ =	
$\frac{B^2C^2}{AC^2} =$	_____ =		$\frac{B^2C^2}{AC^2} =$	_____ =	
$\frac{B^3C^3}{AC^3} =$	_____ =		$\frac{B^3C^3}{AC^3} =$	_____ =	
$\frac{B^4C^4}{AC^4} =$	_____ =		$\frac{B^4C^4}{AC^4} =$	_____ =	
$\frac{B^5C^5}{AC^5} =$	_____ =		$\frac{B^5C^5}{AC^5} =$	_____ =	
Mean = $\frac{\text{Opposite}}{\text{Adjacent}} =$			Mean = $\frac{\text{Opposite}}{\text{Adjacent}} =$		

What comments can you make about the ratio of the **opposite side** to the **adjacent side** of a triangle?

TANGENT

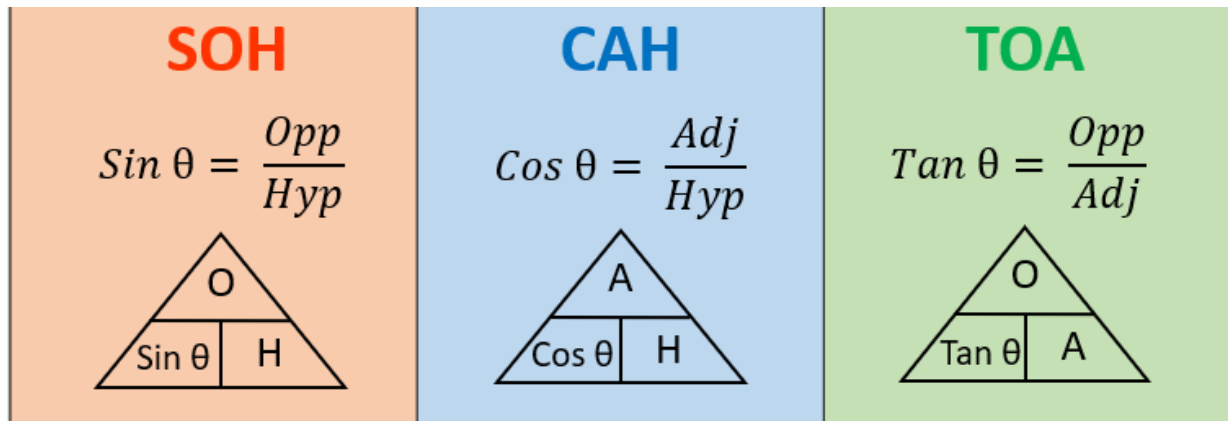
## Week 6:

- **L1:** I can develop an understanding of the trigonometric ratios
- **L1:** I can solve problems using trigonometric ratios in right-angled triangles

### Demonstration Videos:

<https://corbettmaths.com/2013/03/30/trigonometry-missing-sides/>

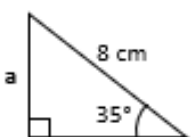
<https://corbettmaths.com/2013/03/30/trigonometry-missing-angles/>



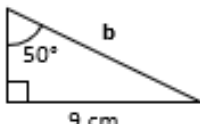
### Task 1

**Trigonometry: Finding Lengths**  
Find each missing length to 1 dp.


Not drawn accurately.



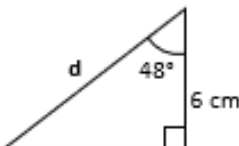
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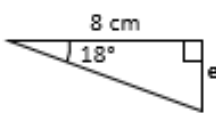
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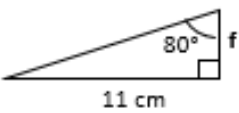
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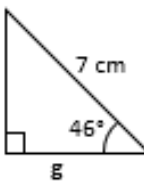
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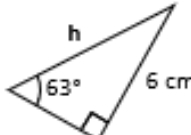
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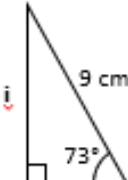
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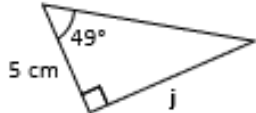
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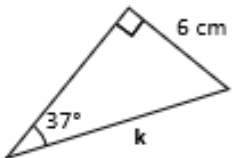
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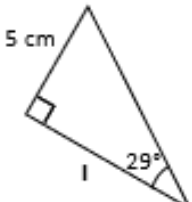
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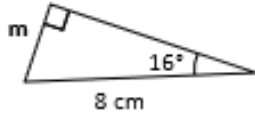
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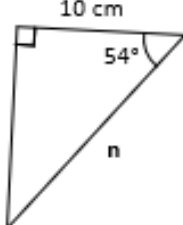
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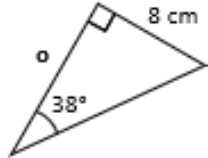
l



m



n



o

## Task 2

**Trigonometry: Finding Angles**  
Find each angle to 1 dp.

Not drawn accurately.

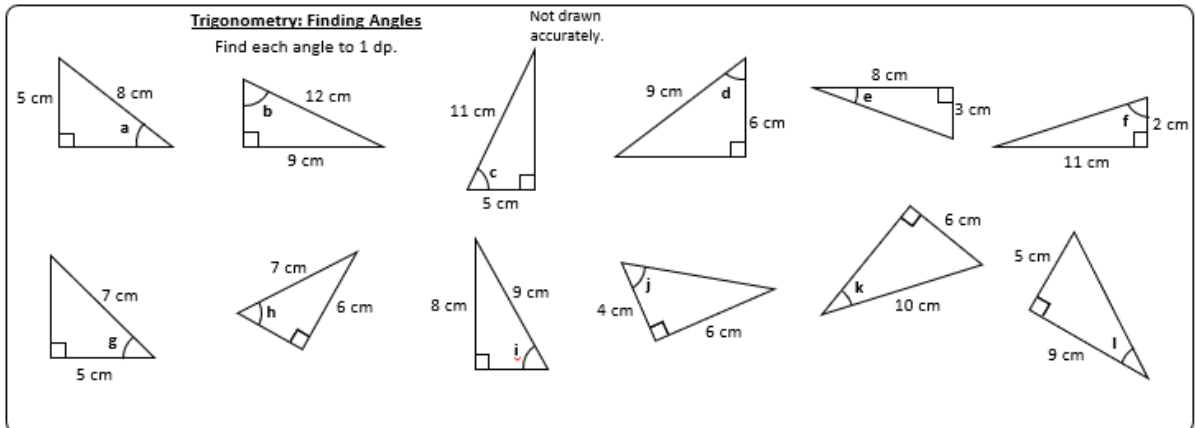


Diagram 1: Right-angled triangle with vertical side 5 cm, hypotenuse 8 cm, angle  $a$  at the bottom right.

Diagram 2: Right-angled triangle with horizontal side 9 cm, hypotenuse 12 cm, angle  $b$  at the top left.

Diagram 3: Right-angled triangle with vertical side 11 cm, horizontal side 5 cm, angle  $c$  at the bottom left.

Diagram 4: Right-angled triangle with vertical side 9 cm, horizontal side 6 cm, angle  $d$  at the top right.

Diagram 5: Right-angled triangle with horizontal side 8 cm, vertical side 3 cm, angle  $e$  at the top left.

Diagram 6: Right-angled triangle with horizontal side 11 cm, vertical side 2 cm, angle  $f$  at the top right.

Diagram 7: Right-angled triangle with vertical side 7 cm, horizontal side 5 cm, angle  $g$  at the bottom right.

Diagram 8: Right-angled triangle with vertical side 7 cm, hypotenuse 6 cm, angle  $h$  at the top left.

Diagram 9: Right-angled triangle with vertical side 8 cm, hypotenuse 9 cm, angle  $i$  at the bottom right.

Diagram 10: Right-angled triangle with vertical side 4 cm, horizontal side 6 cm, angle  $j$  at the top left.

Diagram 11: Right-angled triangle with vertical side 6 cm, hypotenuse 10 cm, angle  $k$  at the bottom left.

Diagram 12: Right-angled triangle with vertical side 5 cm, horizontal side 9 cm, angle  $l$  at the bottom right.

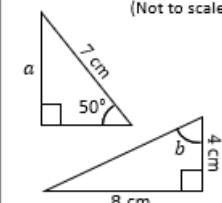
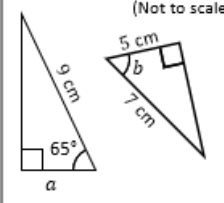
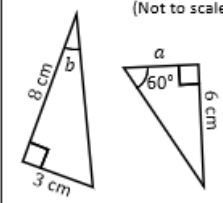
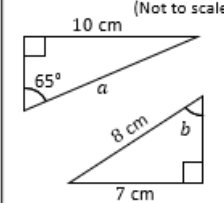
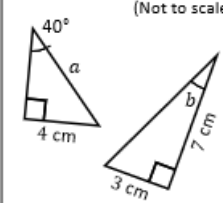
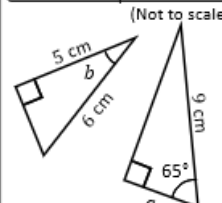
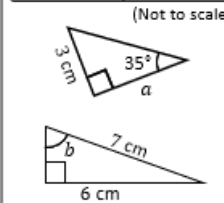
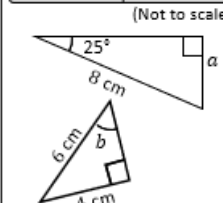
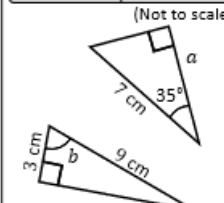
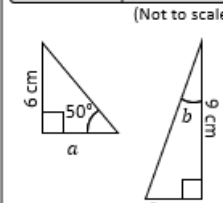
## Task 3

**VS.**

**Sample**

Hard Work	$a + 3$
Courage	$b + 10$
Teamwork	$a + 2$
Mindset	$b + 20$

Complete the cards below using the formula on the left.

<p><b>VS. ①</b></p> <p><b>Tokz</b></p> <table border="1"> <tbody> <tr><td>Hard Work</td><td></td></tr> <tr><td>Courage</td><td></td></tr> <tr><td>Teamwork</td><td></td></tr> <tr><td>Mindset</td><td></td></tr> </tbody> </table> <p>(Not to scale)</p> 	Hard Work		Courage		Teamwork		Mindset		<p><b>VS. ②</b></p> <p><b>Scorpoid</b></p> <table border="1"> <tbody> <tr><td>Hard Work</td><td></td></tr> <tr><td>Courage</td><td></td></tr> <tr><td>Teamwork</td><td></td></tr> <tr><td>Mindset</td><td></td></tr> </tbody> </table> <p>(Not to scale)</p> 	Hard Work		Courage		Teamwork		Mindset		<p><b>VS. ③</b></p> <p><b>F-Z 34</b></p> <table border="1"> <tbody> <tr><td>Hard Work</td><td></td></tr> <tr><td>Courage</td><td></td></tr> <tr><td>Teamwork</td><td></td></tr> <tr><td>Mindset</td><td></td></tr> </tbody> </table> <p>(Not to scale)</p> 	Hard Work		Courage		Teamwork		Mindset		<p><b>VS. ④</b></p> <p><b>Wingz</b></p> <table border="1"> <tbody> <tr><td>Hard Work</td><td></td></tr> <tr><td>Courage</td><td></td></tr> <tr><td>Teamwork</td><td></td></tr> <tr><td>Mindset</td><td></td></tr> </tbody> </table> <p>(Not to scale)</p> 	Hard Work		Courage		Teamwork		Mindset		<p><b>VS. ⑤</b></p> <p><b>Skex</b></p> <table border="1"> <tbody> <tr><td>Hard Work</td><td></td></tr> <tr><td>Courage</td><td></td></tr> <tr><td>Teamwork</td><td></td></tr> <tr><td>Mindset</td><td></td></tr> </tbody> </table> <p>(Not to scale)</p> 	Hard Work		Courage		Teamwork		Mindset	
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<p><b>VS. ⑥</b></p> <p><b>Type-G</b></p> <table border="1"> <tbody> <tr><td>Hard Work</td><td></td></tr> <tr><td>Courage</td><td></td></tr> <tr><td>Teamwork</td><td></td></tr> <tr><td>Mindset</td><td></td></tr> </tbody> </table> <p>(Not to scale)</p> 	Hard Work		Courage		Teamwork		Mindset		<p><b>VS. ⑦</b></p> <p><b>Sabrex</b></p> <table border="1"> <tbody> <tr><td>Hard Work</td><td></td></tr> <tr><td>Courage</td><td></td></tr> <tr><td>Teamwork</td><td></td></tr> <tr><td>Mindset</td><td></td></tr> </tbody> </table> <p>(Not to scale)</p> 	Hard Work		Courage		Teamwork		Mindset		<p><b>VS. ⑧</b></p> <p><b>Mechina</b></p> <table border="1"> <tbody> <tr><td>Hard Work</td><td></td></tr> <tr><td>Courage</td><td></td></tr> <tr><td>Teamwork</td><td></td></tr> <tr><td>Mindset</td><td></td></tr> </tbody> </table> <p>(Not to scale)</p> 	Hard Work		Courage		Teamwork		Mindset		<p><b>VS. ⑨</b></p> <p><b>J-ZON</b></p> <table border="1"> <tbody> <tr><td>Hard Work</td><td></td></tr> <tr><td>Courage</td><td></td></tr> <tr><td>Teamwork</td><td></td></tr> <tr><td>Mindset</td><td></td></tr> </tbody> </table> <p>(Not to scale)</p> 	Hard Work		Courage		Teamwork		Mindset		<p><b>VS. ⑩</b></p> <p><b>R4G</b></p> <table border="1"> <tbody> <tr><td>Hard Work</td><td></td></tr> <tr><td>Courage</td><td></td></tr> <tr><td>Teamwork</td><td></td></tr> <tr><td>Mindset</td><td></td></tr> </tbody> </table> <p>(Not to scale)</p> 	Hard Work		Courage		Teamwork		Mindset	
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## Task 6

**ROK (Retention of Knowledge) – Card Sort**  
Decide whether you need to use SOH, CAH or TOA for the stack of cards.  
Place the letter of the cards into the correct box.

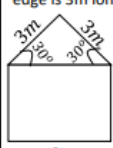
SOH	CAH	TOA

**Literacy**  
Work in pairs and create your own mnemonic to help you remember SOHCAHTOA.  
E.g. Sense Of Humour Can Always Help To Overcome Awkwardness.

S    O    H    C  
A    H    T  
O    A

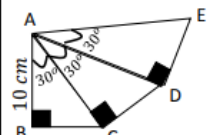
**Stretch 1** **Grade A**

A shed roof has sloping sides at an angle of  $30^\circ$ . Each edge is 3m long, calculate, f, the width of the shed.

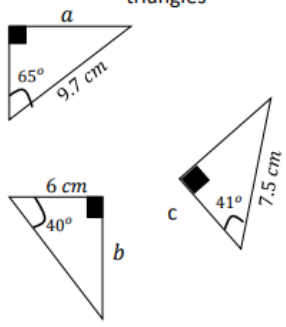


f




ABCDE is a pentagon made up of three similar right-angled triangles. AB = 10 cm. Calculate AE.



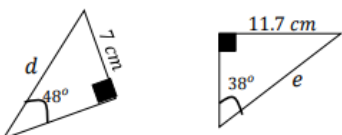
**Skill 1**  
Find the missing lengths of these triangles



**Memory**  
Use the trigonometry triangles to help establish which formula you need to use.

SOH	CAH	TOA
		

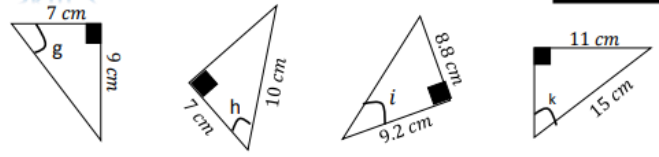
**Grade B**



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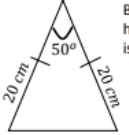
## Task 7

**Skill 2** Find the size of the missing angles. **Grade B**

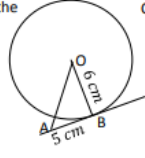


**Stretch 3** Subject Knowledge Cross Over **Grade A**


By first finding its perpendicular height, calculate the area of the isosceles triangle.



Calculate the size of the angle AOB.



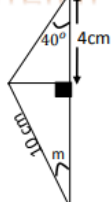
A ship sails 40Km on a bearing of  $055^\circ$ . how far north has it travelled?



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**Stretch 2** Application of knowledge **Grade A**

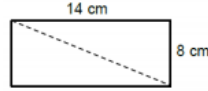
Find the missing angle marked m.



A ladder 5m long rests against a wall. The foot of the ladder is 2.2m from the base of the wall. Draw a diagram of this.

What angle does the ladder make with the wall? (Give your answer to 1 decimal place)

A rectangle has a length of 14cm and width of 8cm. What angle does the diagonal make with the longest side?





## Task 7

<b>START!</b>  7 cm, 10 cm, $x^\circ$	 8 cm, 10 cm, $x^\circ$	 7 cm, 7 cm, $50^\circ$	 14 cm, 10 cm, $x^\circ$	 9 cm, 9 cm, $48^\circ$	 11 cm, 11 cm, $48^\circ$	 10 cm, 10 cm, $x^\circ$	 12 cm, 12 cm, $55^\circ$	 9 cm, 9 cm, $58^\circ$	 12 cm, 12 cm, $48^\circ$	 7 cm, 7 cm, $52^\circ$	 7 cm, 7 cm, $44^\circ$	 11 cm, 14 cm, $74^\circ$	<b>FINISH!</b>
34	42	6.5	46.3	2.8	23.8	18.8	5.3	13.2	9.0	74	60.5	55.2	
Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	Area = $x \text{ cm}^2$	



Attainment Band :	Unit 6 – Statistics	
	Knowledge and Understanding	Skills
Yellow Plus	Knows the trigonometric ratios	Uses trigonometry to answer two-step problems 9b Uses trigonometry to solve worded problems 10 Uses trigonometry to find missing sides in complex shapes 11
Yellow	Splits a shape into two similar shapes 3	Finds the perimeter of compound similar shapes 3b Enlarges a shape using a fractional scale factor 5 Uses trigonometry to find a missing angle and side 8, 9a
Blue	Understands column vectors, including negatives 6 Finds the equations of lines without a gradient 12 Can determine between the different types of transformation 12	Proves triangles are similar 3a Enlarges a shape from a point 5 Translates a shape given a vector 6 Describes rotations 7b Describe different transformations 12
Green	Knows angle facts for similar shapes 1b Identify co-ordinates on a grid 5, 7a	Finds missing side lengths using a scale factor 1a, c Rotates a shape around a point 7a
White	Understands how to find linear scale factors 1 Understands properties of similar triangles 2	Identifies if triangles are similar 2 Enlarges a shape by an integer scale factor 4