



The Mathematics Department

10

Measuring

Shapes 3

Foundation Tier

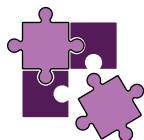
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Name:

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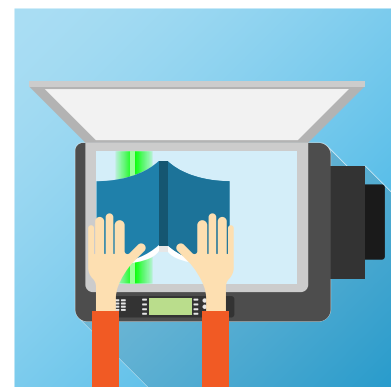
Enlargement



Enlargement is one of the four transformations.

Year 7	Year 8	Year 9	Year 10
Translation	Rotation	Reflection	Enlargement

When a shape is enlarged, the **size** of the shape changes. The **scale factor** decides how the shape changes. For example, if the scale factor is 2, then the size of the shape doubles. If the scale factor is $\frac{1}{2}$, then the size of the shape halves.

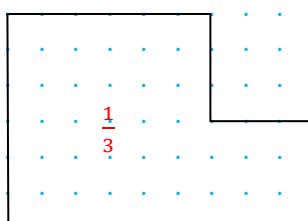
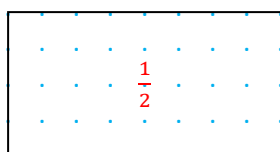
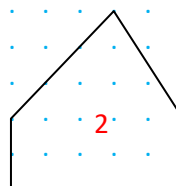
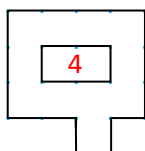
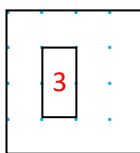
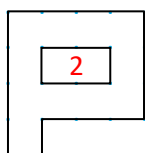


Skill

Exercise 1

Enlarge the following shapes using the scale factor that is given in the centre of each shape.

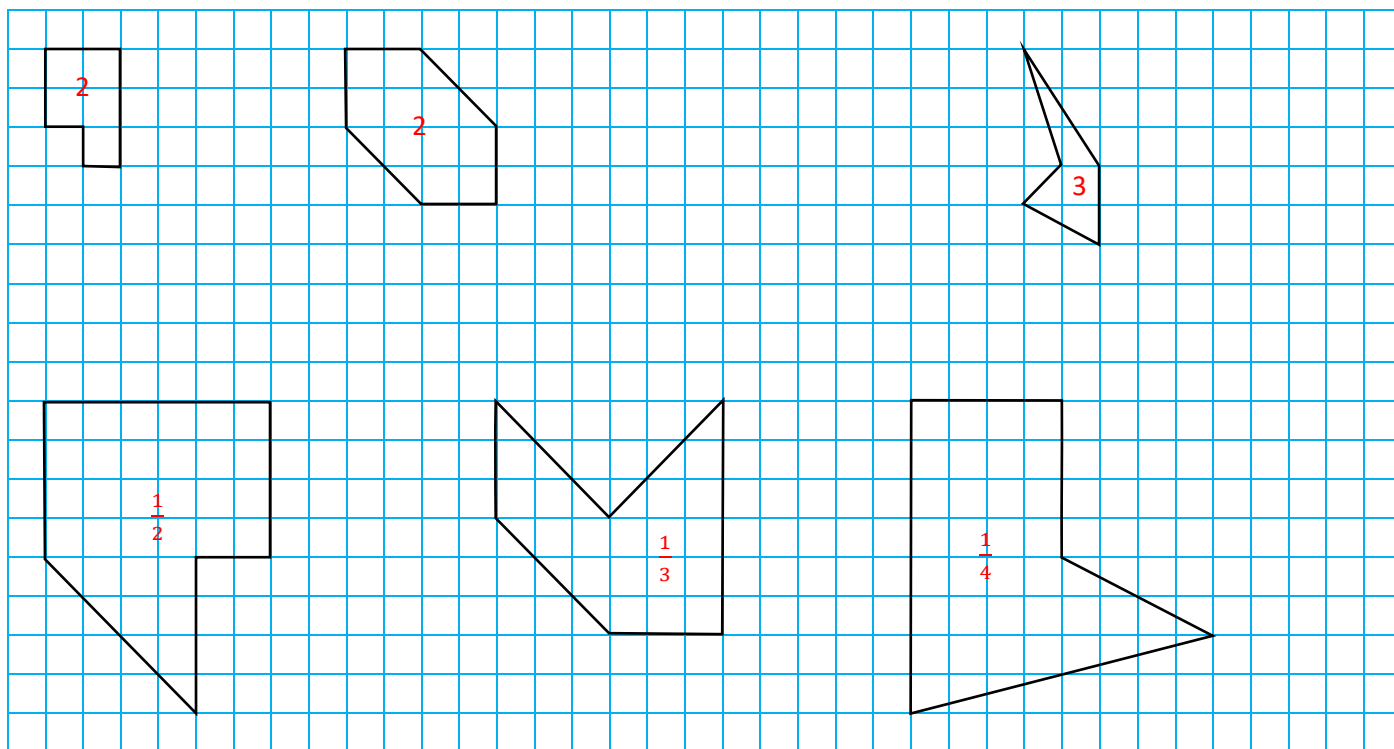
2



Exercise 2



Enlarge the following shapes using the scale factor that is given in the centre of each shape.



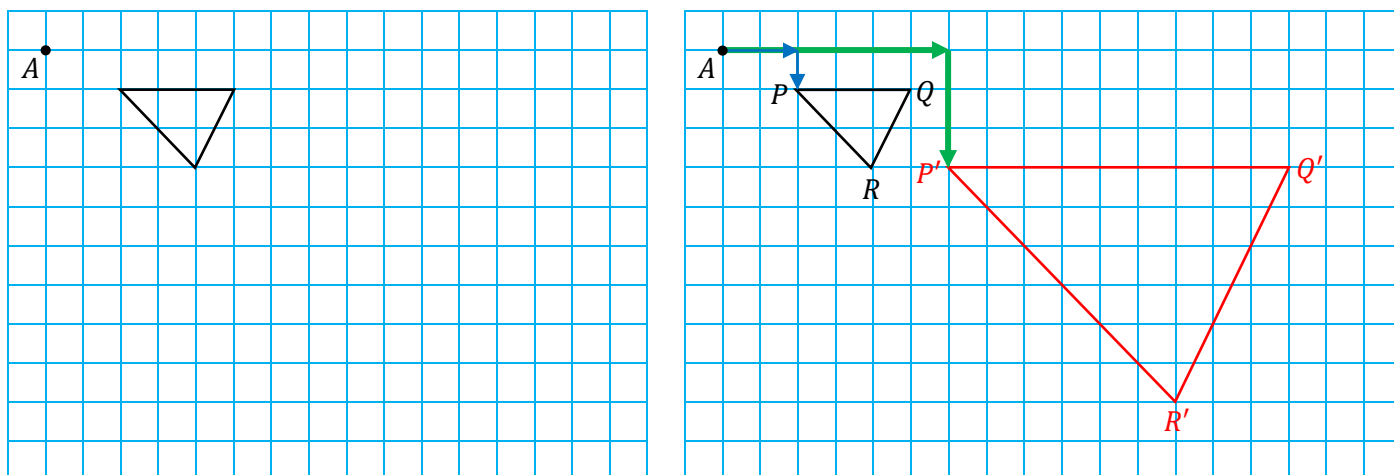
Centre of Enlargement

If a question states a point as the **centre of enlargement**, then the enlargement must appear in a certain location (it cannot appear *anywhere* like in Exercises 11 and 12).

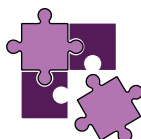


Example

Enlarge the following triangle using a scale factor of 3 and the point A as the centre of enlargement.

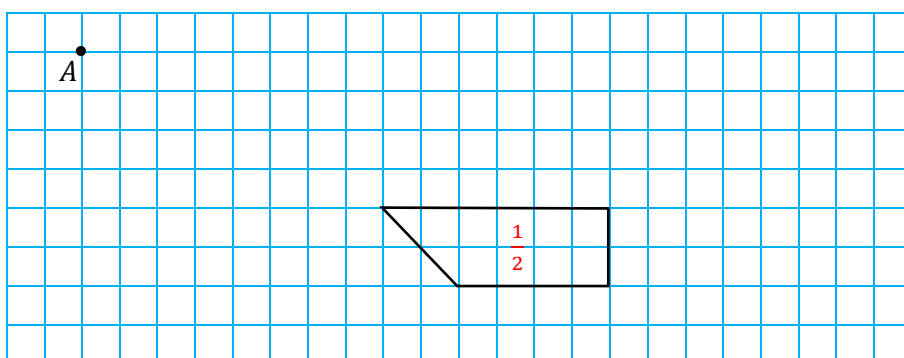
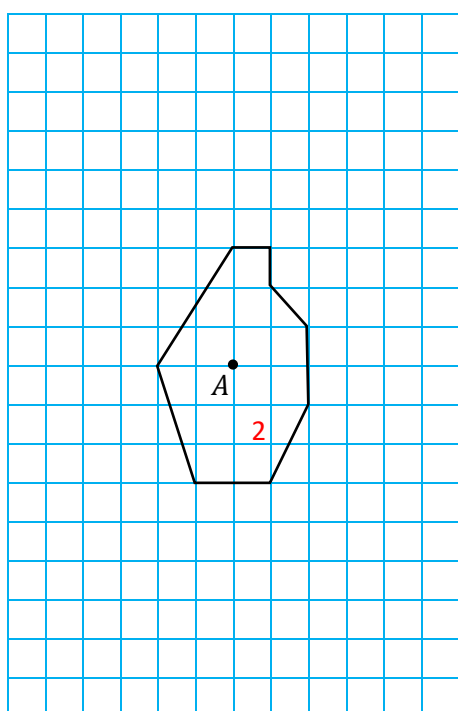
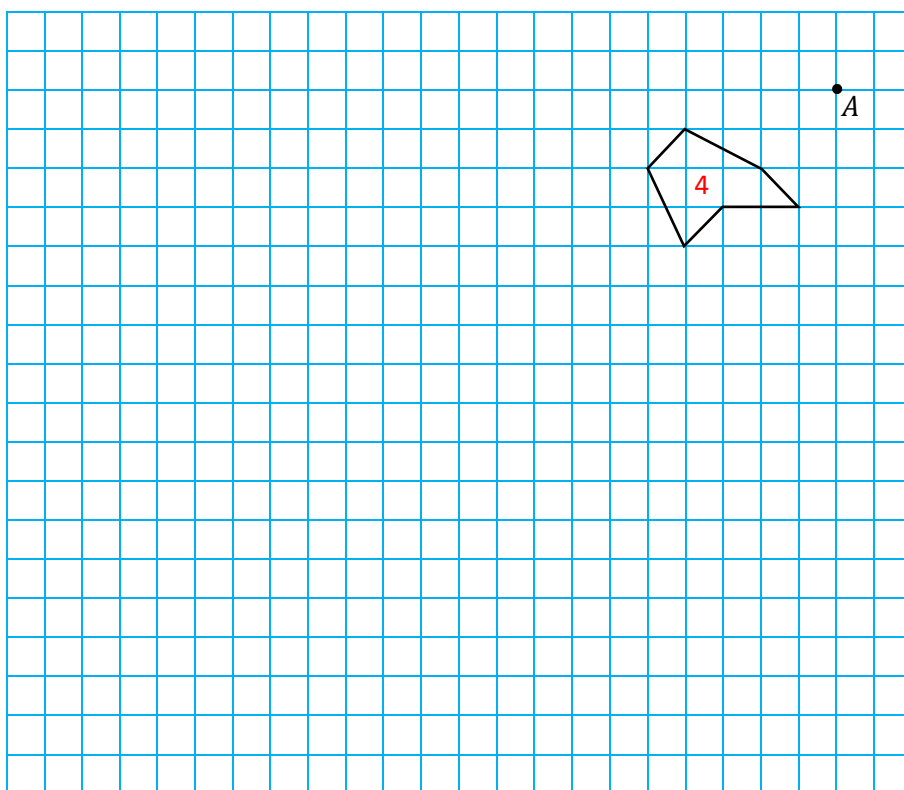
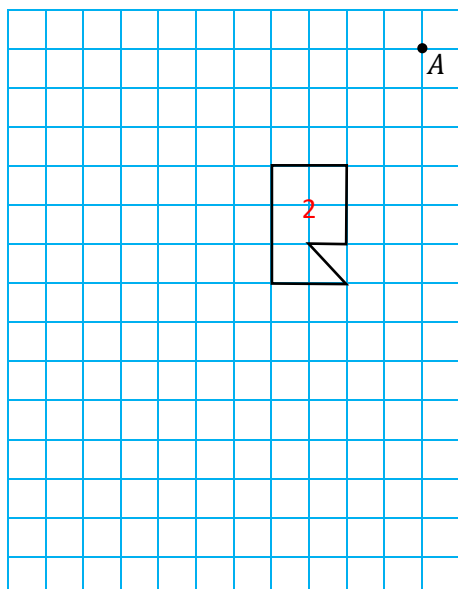
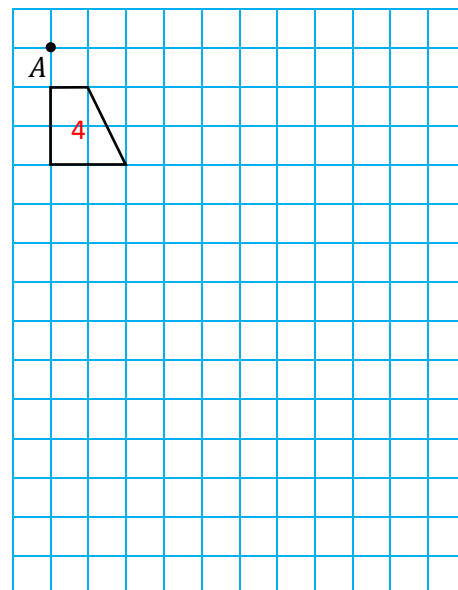
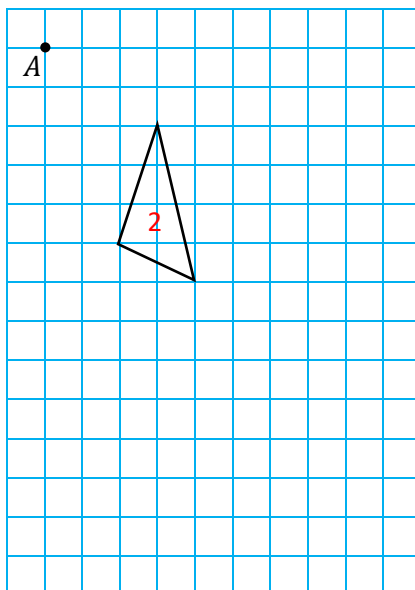
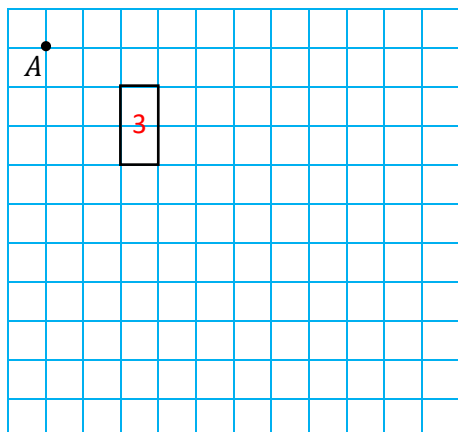


To go from the point A to the vertex P in the original triangle, we must go **2 units to the right and 1 unit down**. Since the scale factor is 3, to go from the point A to the vertex P' in the new triangle, we must go **$2 \times 3 = 6$ units to the right, and $1 \times 3 = 3$ units down**. We can repeat this with the other vertices (Q and R), or you can start at the vertex P' and draw a triangle that is three times larger.

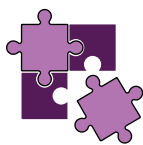


Exercise 3

Enlarge the following shapes using the point A as the centre of enlargement and the number in the centre of each shape as the scale factor.

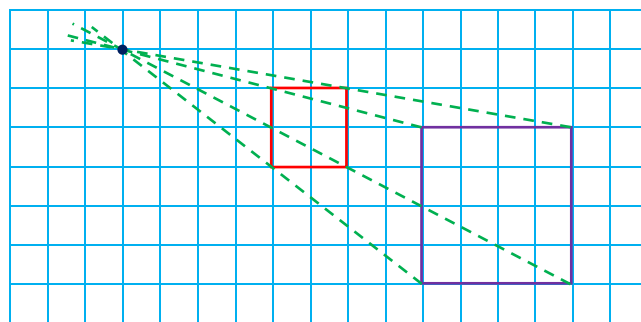


Finding the centre of enlargement



Given a **shape** and its **enlargement**, **connect the corresponding vertices** and **extend the lines** to find the location of the **centre of enlargement**.

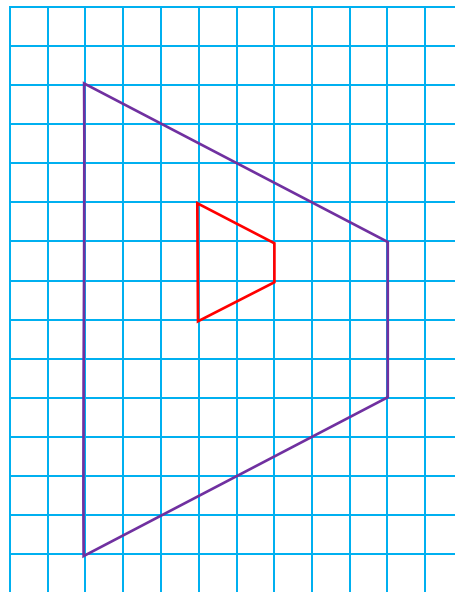
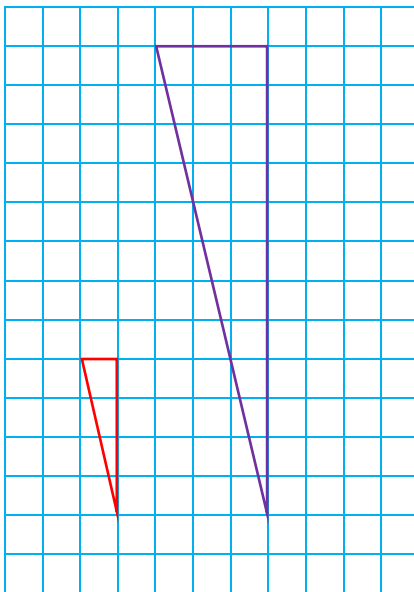
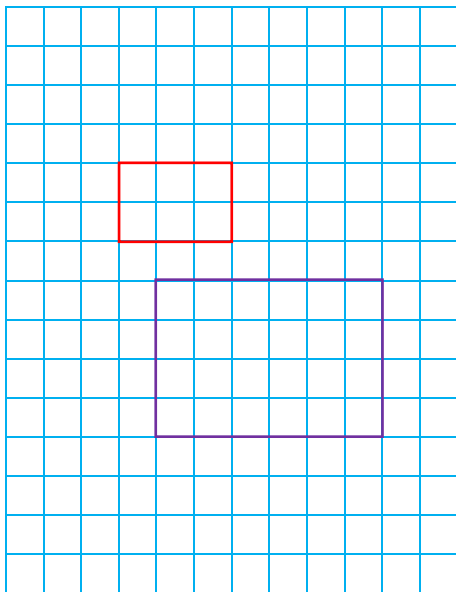
You can find the scale factor by comparing the sizes of the shapes.



Exercise 4

Find the scale factor and the centre of enlargement for the following enlargements.

2

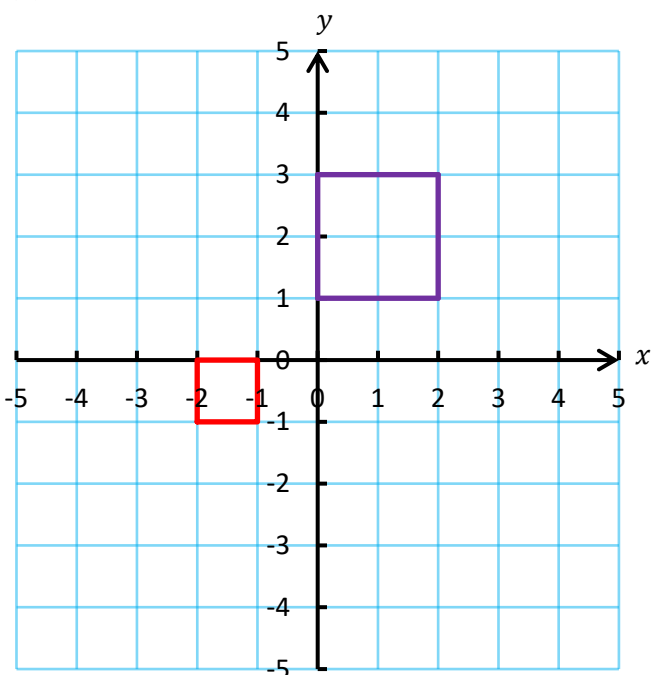


Exercise 5

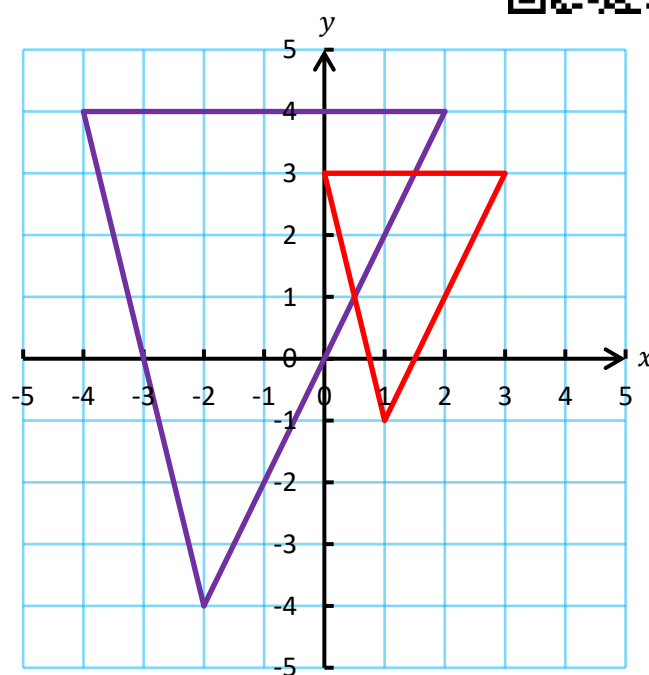
Find the scale factor and the centre of enlargement for the following enlargements.



(a)



(b)



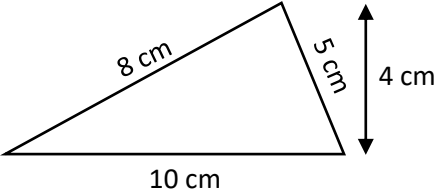
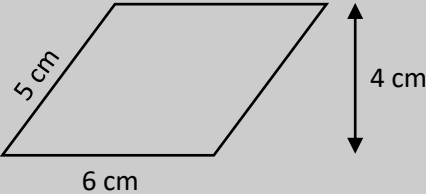
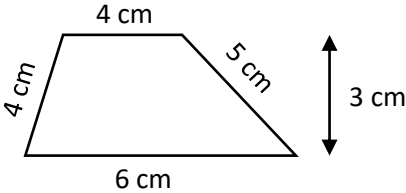
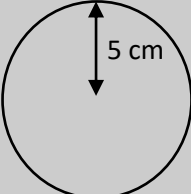
Composite Shapes

Revision

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Exercise 6

Complete the following table.

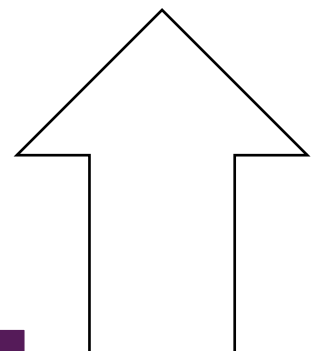
Shape	Name of the shape	Formula to find the area of the shape	Calculate the area of the shape
			
			
			
			
			

Exercise 7

Calculate the perimeter of each shape in the above table.

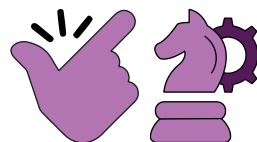
Composite Shapes

Composite shapes are shapes that you can split into simpler shapes, like the shapes in the above table. For example, the shape on the right is a composite shape – it is possible to split the shape into a rectangle (at the bottom) and a triangle (at the top). We can calculate the area of the composite shape by adding the area of the rectangle to the area of the triangle.

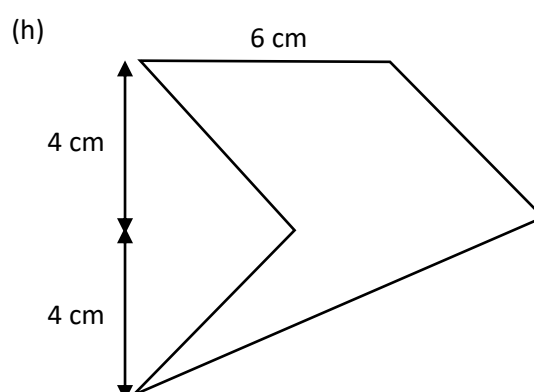
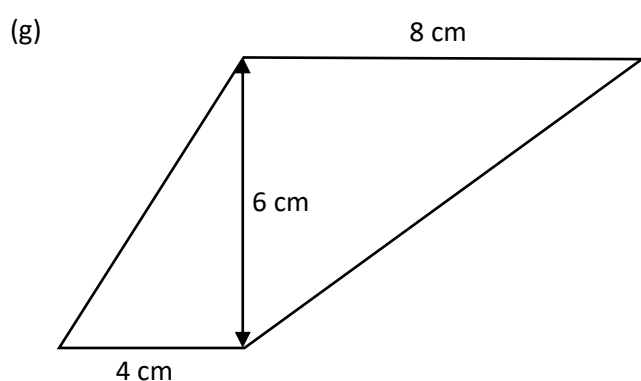
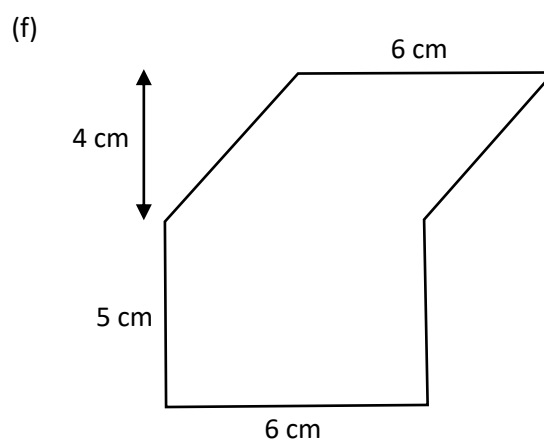
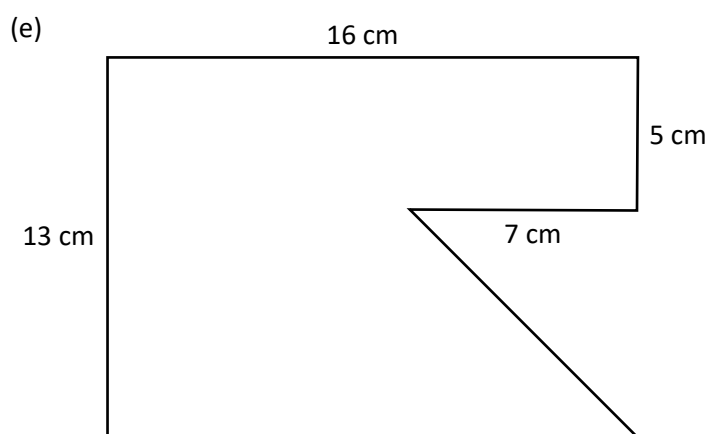
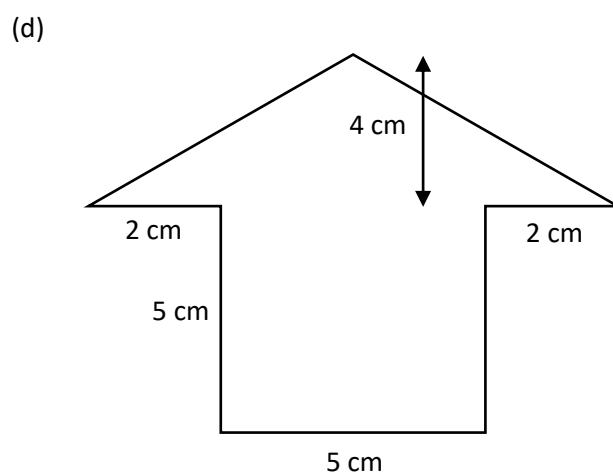
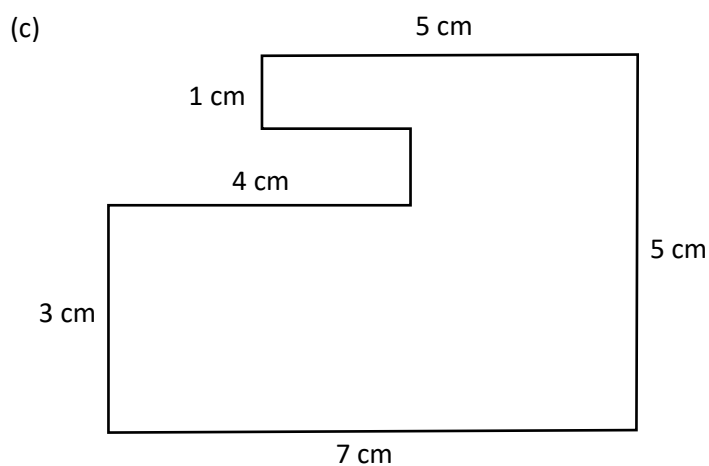
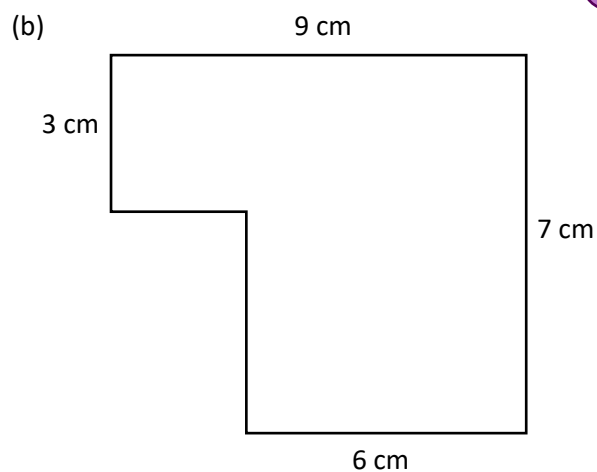
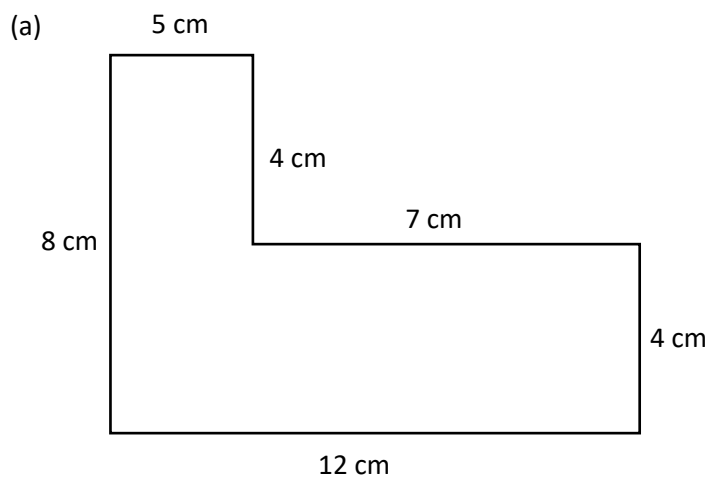


Exercise 8

Calculate the area of each of the following composite shapes.

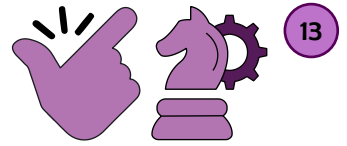


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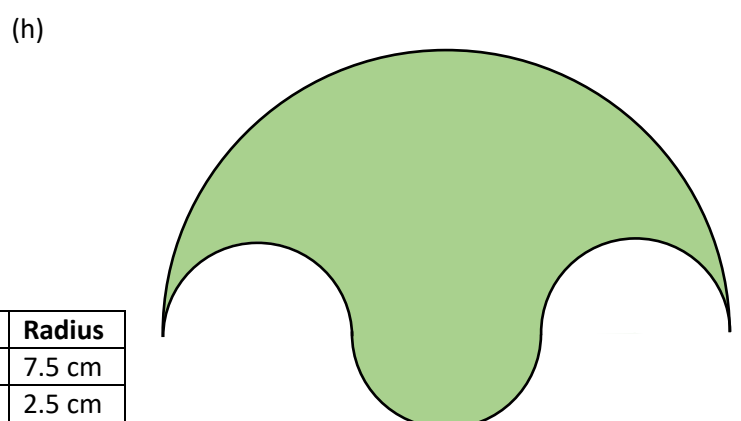
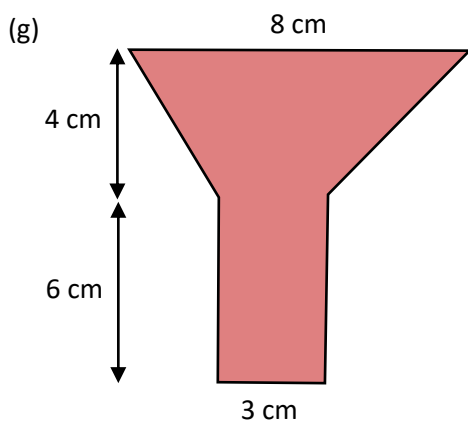
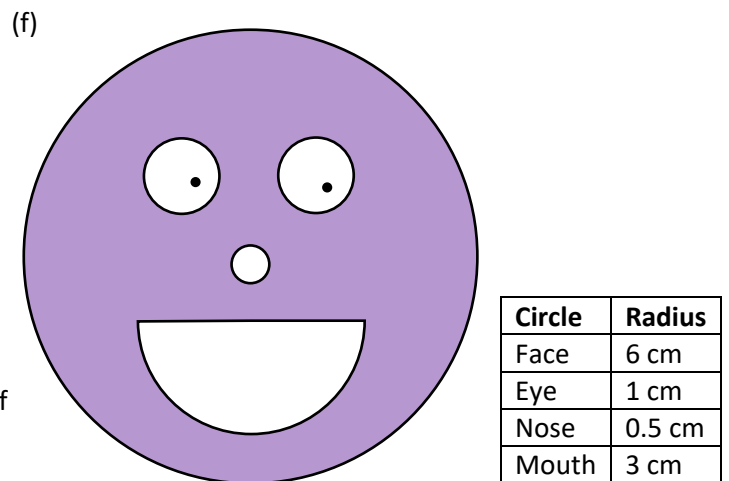
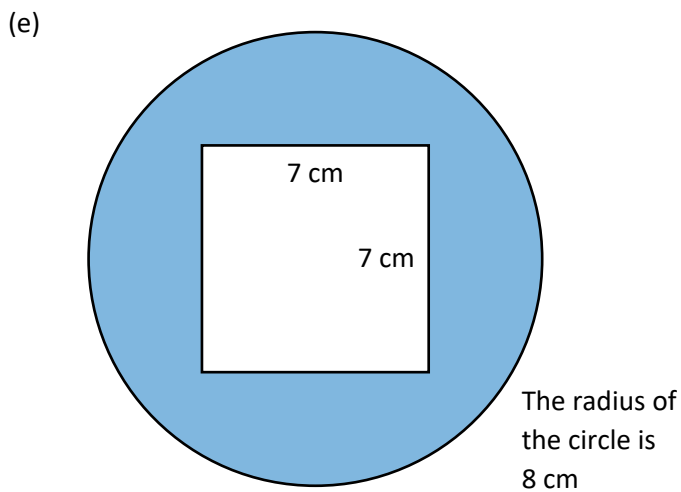
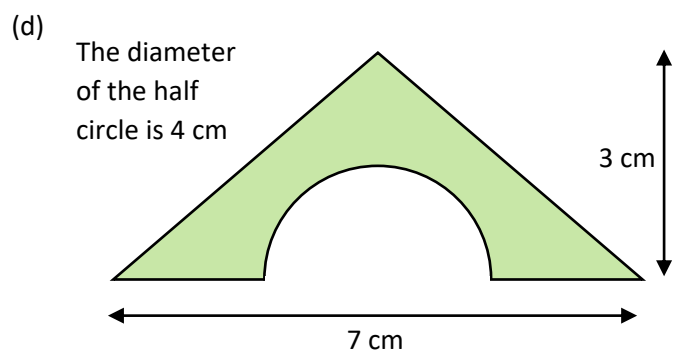
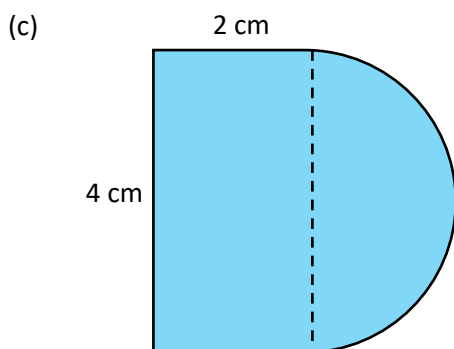
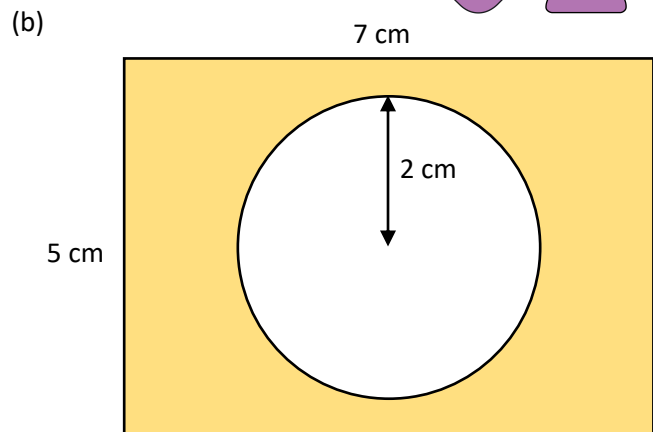
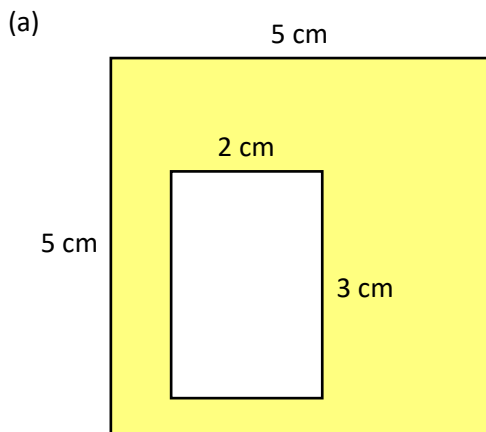


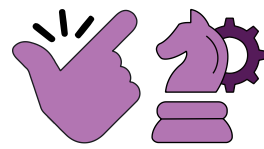
Exercise 9

Calculate the area of the coloured region.

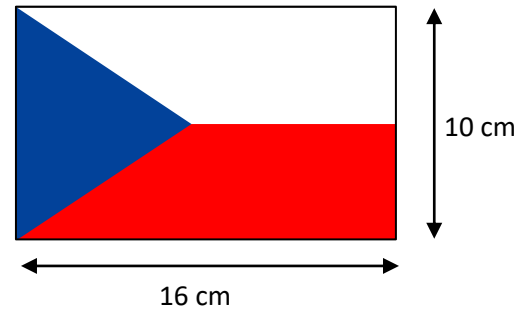


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**Exercise 10**

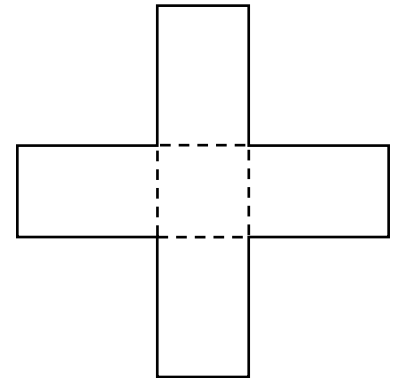
(a) The flag of the Czech Republic is shown on the right. Given that the vertex of the blue triangle appears in the middle of the flag, calculate the area of the red region.



(b) A pattern in the form of a cross is formed by arranging four identical rectangles around the sides of a square, as shown in the diagram on the right. (The diagram is not drawn to scale.)

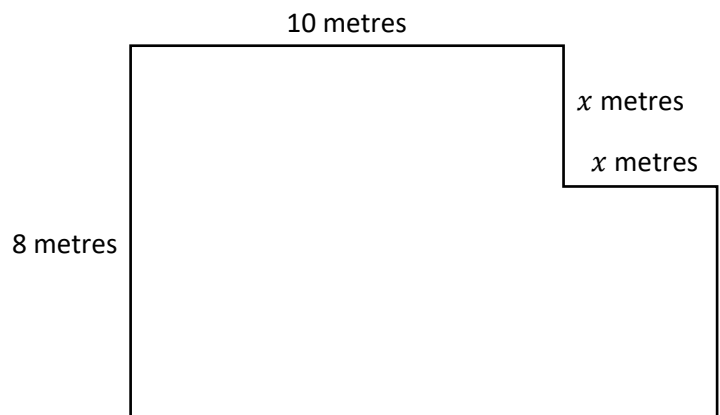
The area of the square is 36 cm^2 . The area of each rectangle is one and a half times the area of the square.

- (i) Find the area of the pattern in the form of a cross.
 (ii) Find the perimeter of the pattern in the form of a cross.



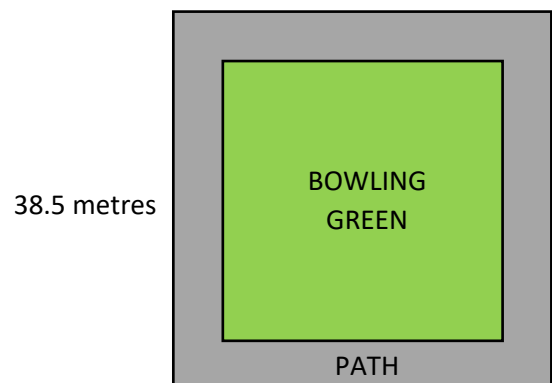
(c) Gerry has drawn a sketch of a room's floor plan. Each one of the corners of the room is either 90° or 270° . Gerry has forgotten some of the measurements but knows that two of the measurements are the same, and so labels them with x metres.

Show that the area of the floor, in square metres, is $80 + 8x - x^2$.

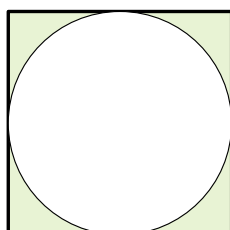


(d) The local council decides to place a concrete path of width $1\frac{1}{2}$ metres around a square bowling green, as shown in the diagram.

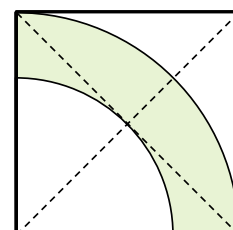
Calculate the area of the concrete path, in square metres.

**Challenge!**

Which fraction of the square is shaded?

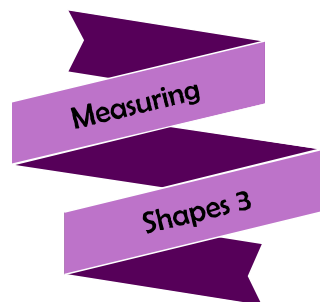
**Challenge 2!**

Which fraction of the square is shaded?



Puzzle: Find the seven differences between the pictures below.





Reflection Sheet

Name:

Percentage in the test:

I know this. 	I need to revise this. 	Question in the test	Correct in the test?
I can enlarge shapes using a scale factor that is a positive whole number .		1	
I can enlarge shapes using a scale factor that is fractional .		3	
I know how to use the centre of enlargement whilst enlarging shapes.		2	
Given a shape and its enlargement, I can find the scale factor and the centre of enlargement .		4	
I can calculate the perimeter of a composite shape .		5, 6	
I can calculate the area of a composite shape .		7, 8	