



# Shape Formulae

I can use simple formulae for calculating the area and perimeter of shapes.



Use the formulas to calculate the unknown dimensions of these 2D shapes.

## Rectangles

$$\text{length} \times \text{width} = \text{area}$$

$$\frac{\text{area}}{\text{length}} = \text{width}$$

$$\frac{\text{area}}{\text{width}} = \text{length}$$

$$2(\text{length} + \text{width}) = \text{perimeter}$$

$$\frac{\text{perimeter}}{2} - \text{length} = \text{width}$$

$$\frac{\text{perimeter}}{2} - \text{width} = \text{length}$$

## Triangles

$$\frac{\text{base} \times \text{height}}{2} = \text{area}$$

$$\frac{\text{area} \times 2}{\text{base}} = \text{height}$$

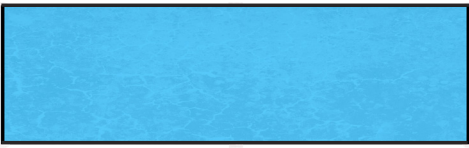
$$\frac{\text{area} \times 2}{\text{height}} = \text{base}$$

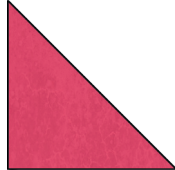
## Regular Polygons

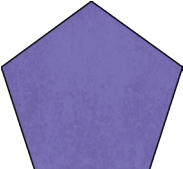
$$\text{length} \times \text{number of sides} = \text{perimeter}$$


$$\frac{\text{perimeter}}{\text{length}} = \text{number of sides}$$

$$\frac{\text{perimeter}}{\text{number of sides}} = \text{length}$$

		
Length	Width	Area
25cm	14cm	
	16cm	384cm <sup>2</sup>
26cm		442cm <sup>2</sup>

		
Base	Height	Area
18cm	25cm	
	23cm	184cm <sup>2</sup>
15cm		180cm <sup>2</sup>

		
Length	Number of Sides	Perimeter
34.2cm	5	
	5	182cm

		
Length	Width	Perimeter
35.6cm	17.2cm	
	16.3cm	100.8cm
26.4cm		90cm



# Shape Formulae

I can use simple formulae for calculating the area and perimeter of shapes.



Use the shape formulas to prove if the dimensions of the shapes have been calculated correctly.

## Rectangles

$$\text{length} \times \text{width} = \text{area}$$

$$\frac{\text{area}}{\text{length}} = \text{width}$$

$$\frac{\text{area}}{\text{width}} = \text{length}$$

$$2(\text{length} + \text{width}) = \text{perimeter}$$

$$\frac{\text{perimeter}}{2} - \text{length} = \text{width}$$

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## Triangles

$$\frac{\text{base} \times \text{height}}{2} = \text{area}$$

$$\frac{\text{area} \times 2}{\text{base}} = \text{height}$$

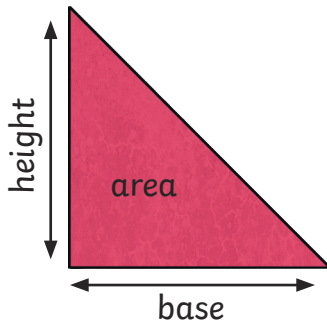
$$\frac{\text{area} \times 2}{\text{height}} = \text{base}$$

## Regular Polygons

$$\text{length} \times \text{number of sides} = \text{perimeter}$$

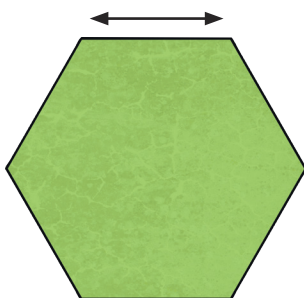
$$\frac{\text{perimeter}}{\text{length}} = \text{number of sides}$$

$$\frac{\text{perimeter}}{\text{number of sides}} = \text{length}$$



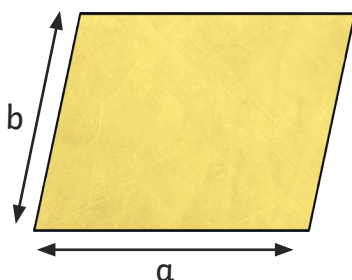
If the base of this triangle measures 12cm and the area is  $96\text{cm}^2$ , then the height of the triangle must be greater than 15cm.

Correct? Prove it!



If the perimeter of this regular hexagon measures 88.8cm, then the length of each side must be an even number of mm.

Correct? Prove it!



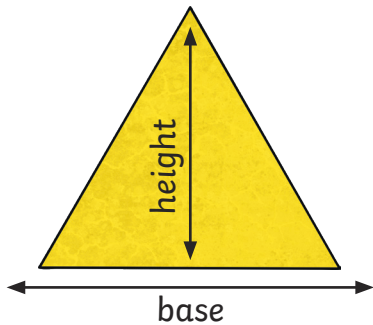
If the perimeter of this parallelogram measures 90.5cm and the length measures 21cm, then the width must measure more than 25cm.

Correct? Prove it!

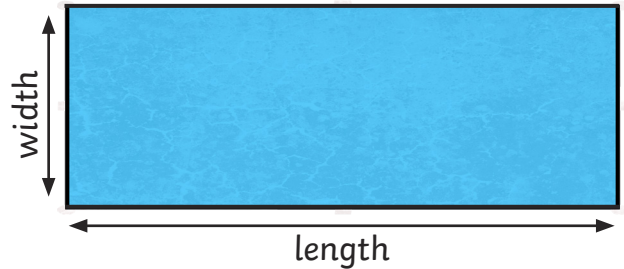


# Shape Formulae

I can use simple formulae for calculating the area and perimeter of shapes.

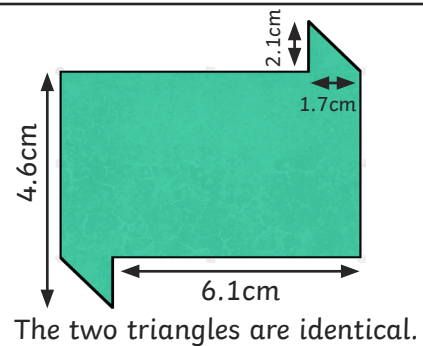
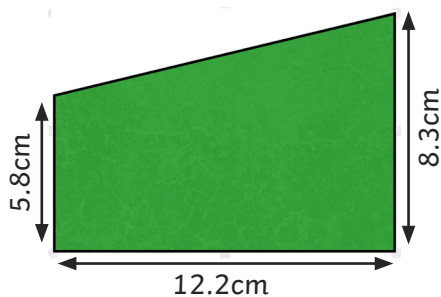
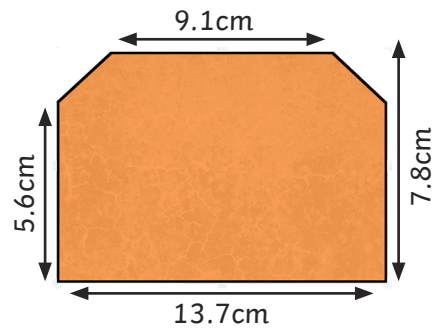
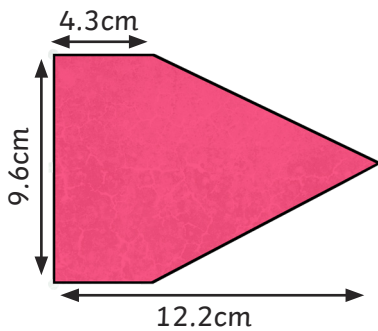


$(\text{base} \times \text{height}) \div 2 = \text{area of triangle}$



$\text{length} \times \text{width} = \text{area of square or rectangle}$

Use the shape formulae to calculate the area of these compound shapes:

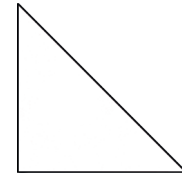




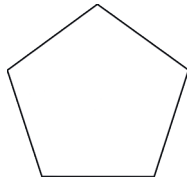
# Shape Formulae Answers



Length	Width	Area
25cm	14cm	$350\text{cm}^2$
24cm	16cm	$384\text{cm}^2$
26cm	17cm	$442\text{cm}^2$



Base	Height	Area
18cm	25cm	$225\text{cm}^2$
16cm	23cm	$184\text{cm}^2$
15cm	24cm	$180\text{cm}^2$



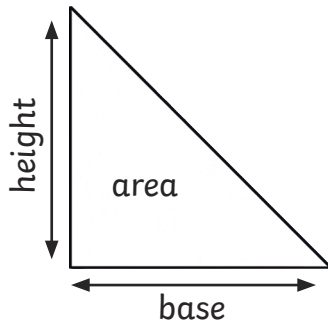
Length	Number of Sides	Perimeter
34.2cm	5	171cm
36.4cm	5	182cm



Length	Width	Perimeter
35.6cm	17.2cm	105.6cm
34.1cm	16.3cm	100.8cm
26.4cm	18.6cm	90cm



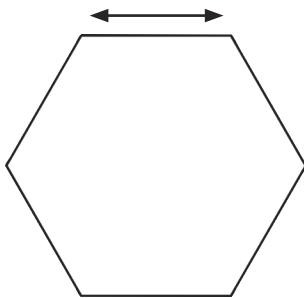
# Shape Formulae Answers



If the base of this triangle measures 12cm and the area is  $96\text{cm}^2$ , then the height of the triangle must be greater than 15cm.

Correct? Prove it!

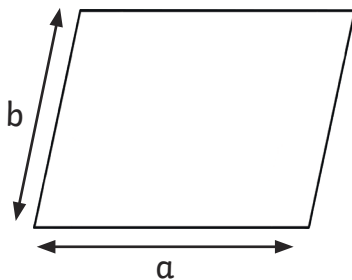
Correct because  $(96 \times 2) \div 12 = 16$ , which is greater than 15cm.



If the perimeter of this regular hexagon measures 88.8cm, then the length of each side must be an even number of mm.

Correct? Prove it!

Correct because  $88.8\text{cm} \div 6 = 14.8\text{cm}$ .



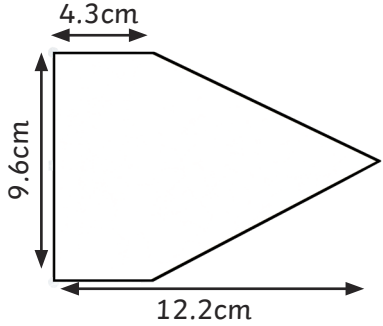
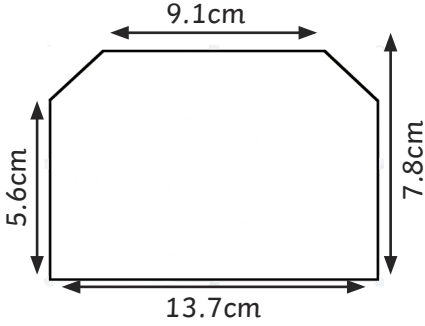
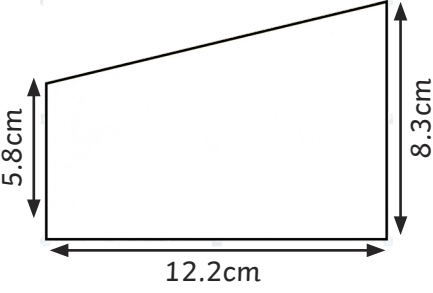
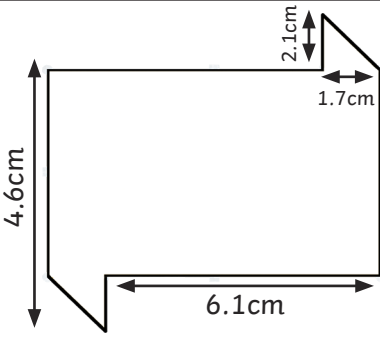
If the perimeter of this parallelogram measures 90.5cm and the length measures 21cm, then the width must measure more than 25cm.

Correct? Prove it!

Incorrect because  $90.5\text{cm} \div 2 - 21 = 24.25\text{cm}$ .



# Shape Formulae Answers

	
$9.6\text{cm} \times 4.3\text{cm} = 41.3\text{cm}^2$ $9.6\text{cm} \times (12.2\text{cm} - 4.3\text{cm}) \div 2 = 37.9\text{cm}^2$ $41.3\text{cm}^2 + 37.9\text{cm}^2 = 79.2\text{cm}^2$	$13.7\text{cm} \times 7.8\text{cm} = 106.9\text{cm}^2$ $(13.7\text{cm} - 9.1\text{cm}) \times (7.8\text{cm} - 5.6\text{cm}) = 10.1\text{cm}^2$ $106.9\text{cm}^2 - 10.1\text{cm}^2 = 96.8\text{cm}^2$
	
$12.2\text{cm} \times 5.8\text{cm} = 70.8\text{cm}^2$ $(12.2\text{cm} \times (8.3\text{cm} - 5.8\text{cm})) \div 2 = 15.3\text{cm}^2$ $70.8\text{cm}^2 + 15.3\text{cm}^2 = 86.1\text{cm}^2$	$2.1\text{cm} \times 1.7\text{cm} = 3.6\text{cm}^2$ $(6.1\text{cm} + 1.7\text{cm}) \times (4.6\text{cm} - 2.1\text{cm}) = 19.5\text{cm}^2$ $19.5\text{cm}^2 + 3.6\text{cm}^2 = 23.1\text{cm}^2$

All answers have been rounded to one decimal place.