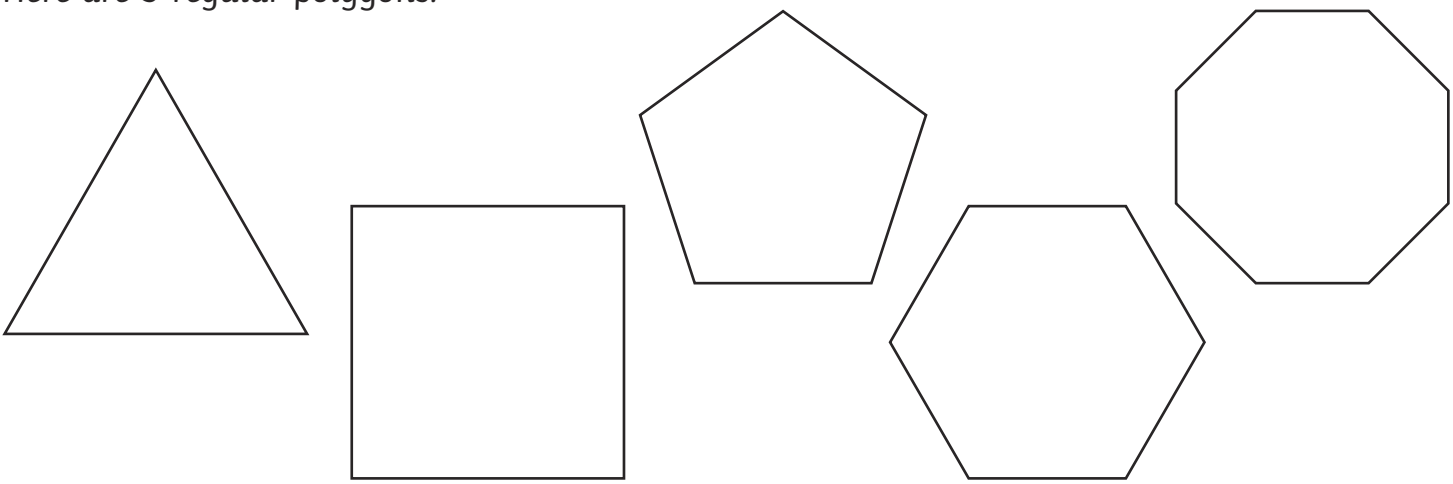
The Interior Angles of Regular Polygons

Here are 5 regular polygons.



Measure each angle and complete the table below.

Shape	Number of Angles	Interior Angle	Total of All Interior Angles
equilateral triangle			
square			
regular pentagon			
regular hexagon			
regular octagon			

In the space below, draw an equilateral triangle and a square.

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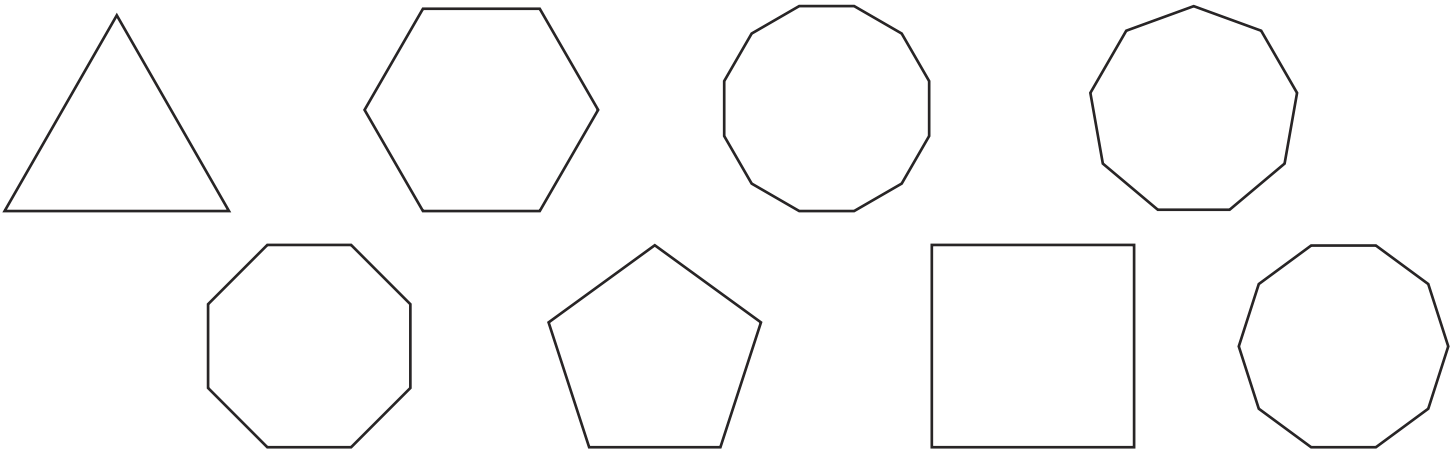
Here are 8 regular polygons.



Record the name of each shape, the number of angles, the size of the interior angle and the total of the interior angles of each shape on the grid below.

Shape	Number of Angles	Interior Angle	Total of All Interior Angles
e.g. equilateral triangle	3	60°	180°

Describe any patterns you can see.

Accurately draw these shapes on plain paper.

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A square could be drawn by drawing a line, turning 90°, drawing a second line of the same length, turning 90°, repeating this until you have drawn a square. You will make a final 90° turn to face the direction in which you started.

How many turns of 90° would you make? _____

What is the total turn?_____

What angle would you turn to draw an equilateral triangle?_____

What would be the total turn for an equilateral triangle?_____

How could you use the turn each time to find the interior angle of each regular polygon?

_____

How would you calculate the interior angle from the angle of turn?

_____

Use your answers to the above questions to find the turn for each regular polygon, and therefore the interior angle. Record your results in the table below.

Shape	Number of Angles	Angle of Turn	Interior Angle	Total of All Interior Angles
e.g. equilateral triangle	3	120°	60°	180°

Write a formula for the turn needed for any polygon with n number of sides.

_____

What is the interior angle for regular polygons with 15, 20, 30, 60 and 100 sides?

_____

The Interior Angles of Regular Polygons
Answers

Shape	Number of Angles	Interior Angle	Total of All Interior Angles
equilateral triangle	**3**	**60°**	**180°**
square	**4**	**90°**	**360°**
regular pentagon	**5**	**108°**	**540°**
regular hexagon	**6**	**120°**	**720°**
regular octagon	**8**	**135°**	**1080°**

The Interior Angles of Regular Polygons
Answers

Shape	Number of Angles	Interior Angle	Total of All Interior Angles
e.g. equilateral triangle	3	600	1800
square	**4**	**90°**	**360°**
regular pentagon	**5**	**108°**	**540°**
regular hexagon	**6**	**120°**	**720°**
regular octagon	**8**	**135°**	**1080°**
regular nonagon	**9**	**140°**	**1260°**
regular decagon	**10**	**144°**	**1440°**
regular dodecagon	**12**	**150°**	**1800°**

Describe any patterns you can see.

The total of all interior angles increases by 180° each time.

The Interior Angles of Regular Polygons
Answers

How many turns of 90° would you make? **4**

What is the total turn? **360°**

What angle would you turn to draw an equilateral triangle? **120°**

What would be the total turn for an equilateral triangle? **360°**

How could you use the turn each time to find the interior angle of each regular polygon?

Angle of turn × number of angles = 360°

How would you calculate the interior angle from the angle of turn?

Interior angle + angle of turn = 180°, so interior angle = 180° – angle of turn

Use your answers to the above questions to find the turn for each regular polygon, and therefore the interior angle. Record your results in the table below.

Shape	Number of Angles	Angle of Turn	Interior Angle	Total of All Interior Angles
e.g. equilateral triangle	3	120°	60°	180°
square	**4**	**90°**	**90°**	**360°**
regular pentagon	**5**	**72°**	**108°**	**540°**
regular hexagon	**6**	**60°**	**120°**	**720°**
regular octagon	**8**	**45°**	**135°**	**1080°**
regular nonagon	**9**	**40°**	**140°**	**1260°**
regular decagon	**10**	**36°**	**144°**	**1440°**
regular dodecagon	**12**	**30°**	**150°**	**1800°**

Write a formula for the turn needed for any polygon with n number of sides.
Angle of turn = 360° ÷ number of sides.

What is the interior angle for regular polygons with 15, 20, 30, 60 and 100 sides?
156°, 162°, 168°, 174°, 176.4°