

# Regular Polygons: Interior Angles — Answers



A regular polygon has all equal interior angles. Formula: interior angle =  $\frac{(n-2) \times 180^\circ}{n}$ .

1. Each interior angle of a regular pentagon?



**Solution**

$$(5-2) \times 180^\circ = 540^\circ$$

$$540^\circ \div 5 = 108^\circ$$

2. Each interior angle of a regular hexagon?



**Solution**

$$(6-2) \times 180^\circ = 720^\circ$$

$$720^\circ \div 6 = 120^\circ$$

3. Each interior angle of a regular octagon?



**Solution**

$$(8-2) \times 180^\circ = 1080^\circ$$

$$1080^\circ \div 8 = 135^\circ$$

4. Each interior angle of a regular polygon is  $144^\circ$ . How many sides?

**Solution**

$$(n-2) \times 180^\circ = 144n$$

$$36n = 360^\circ; n = 10 \text{ sides}$$

5. Each interior angle of a regular polygon is  $120^\circ$ . How many sides?

**Solution**

$$(n-2) \times 180^\circ = 120n$$

$$60n = 360^\circ; n = 6 \text{ sides}$$

6. Each interior angle of a regular polygon is  $156^\circ$ . How many sides?

**Solution**

$$180n - 360^\circ = 156n$$

$$24n = 360^\circ; n = 15 \text{ sides}$$

7. Each interior angle of a regular polygon is  $150^\circ$ . How many sides?

**Solution**

$$180n - 360^\circ = 150n$$

$$30n = 360^\circ; n = 12 \text{ sides}$$

8. A regular 12-gon has interior angles of what measure?

**Solution**

$$(12-2) \times 180^\circ = 1800^\circ$$

$$1800^\circ \div 12 = 150^\circ$$

9. A regular 9-gon has interior angles of what measure?

**Solution**

$$(9-2) \times 180^\circ = 1260^\circ$$

$$1260^\circ \div 9 = 140^\circ$$

# Irregular Polygons & Exterior Angles — Answers



*The sum of exterior angles of any polygon is always  $360^\circ$ . Exterior angle + interior angle =  $180^\circ$ .*

**10.** Sum =  $360^\circ$ . Find  $x$ .



**Solution**

$$95^\circ + 105^\circ + 85^\circ + x = 360^\circ$$

$$x = 360^\circ - 285^\circ = 75^\circ$$

**11.** Sum =  $540^\circ$ . Find  $y$ .



**Solution**

$$100^\circ + 110^\circ + 120^\circ + 95^\circ + y = 540^\circ$$

$$y = 540^\circ - 425^\circ = 115^\circ$$

**12.** Sum =  $720^\circ$ . Find  $z$ .



**Solution**

$$130^\circ + 115^\circ + 125^\circ + 110^\circ + 120^\circ + z = 720^\circ$$

$$z = 720^\circ - 600^\circ = 120^\circ$$

**13.** Interior angle =  $115^\circ$ . What is the exterior angle?

**Solution**

$$\text{Exterior} = 180^\circ - 115^\circ$$

$$= 65^\circ$$

**14.** Exterior angle =  $52^\circ$ . What is the interior angle?

**Solution**

$$\text{Interior} = 180^\circ - 52^\circ$$

$$= 128^\circ$$

**15.** Exterior angle =  $30^\circ$ . Is this a regular 12-gon?

**Solution**

$$360^\circ \div 12 = 30^\circ$$

Yes — it is a regular 12-gon.

**16.** Interior angle of regular heptagon?



**Solution**

$$(7-2) \times 180^\circ = 900^\circ$$

$$900^\circ \div 7 \approx 128.6^\circ$$

**17.** Interior =  $162^\circ$ . Exterior = ?  
Name the polygon type.

**Solution**

$$\text{Exterior} = 180^\circ - 162^\circ = 18^\circ$$

$$\text{Sides} = 360^\circ \div 18^\circ = 20$$

It is a 20-gon.

**18.** Sum of all exterior angles of a 15-gon?

**Solution**

The sum of exterior angles of

ANY polygon =  $360^\circ$ .