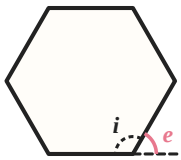
Angles in Polygons

ANSWERS

1
A regular hexagon has 6 sides. Find (a) the exterior angle e and (b) the interior angle i.

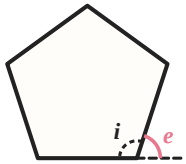


$e = 360° \div 6$ = 60°

$i = 180° -$ 60° = 120°

Answer (a) 60° (b) 120°

2
A regular pentagon has 5 sides.
Find (a) the exterior angle e and (b) the interior angle i.

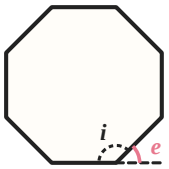


$e = 360° \div 5$ = 72°

$i = 180° -$ 72° = 108°

Answer (a) 72° (b) 108°

3
A regular octagon has 8 sides. Find (a) the exterior angle e and (b) the interior angle i.

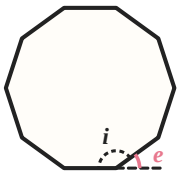


e = 360° ÷ 8 = 45°

i = 180° − 45° = 135°

Answer (a) 45° (b) 135°

4
A regular decagon has 10 sides.
Find (a) the exterior angle e and (b) the interior angle i.

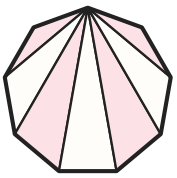


e = 360° ÷ 10 = 36°

i = 180° − 36° = 144°

Answer (a) 36° (b) 144°

5
A regular nonagon has 9 sides. Find (a) the sum of the interior angles and (b) each interior angle.

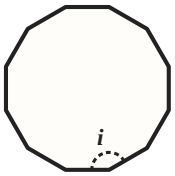


Sum = (9 − 2) × 180° = 1260°

1260° ÷ 9 = 140°

Answer (a) 1260° (b) 140°

6
A regular dodecagon has 12 sides.
Find (a) the sum of the interior angles and (b) the interior angle i.

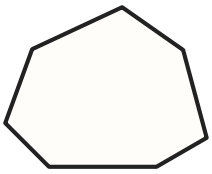


Sum = (12 − 2) × 180° = 1800°

i = 1800° ÷ 12 = 150°

Answer (a) 1800° (b) 150°

7
This heptagon has 7 sides. It is not regular.
Find the sum of its interior angles.



(7 − 2) × 180°

5 × 180° = 900°

Answer 900°

8
The interior angles of a polygon add up to 2160°. How many sides does the polygon have?

2160° ÷ 180° = 12 triangles

12 + 2 = 14

Answer 14 sides

Angles in Polygons *further practice*

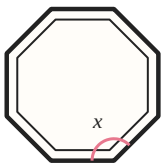
ANSWERS

9
Each exterior angle of a regular polygon is 20°. How many sides does the polygon have?

360 ÷ 20

Answer 18 sides

10
A road sign is a regular octagon.
Find the size of angle x, one of its interior angles.



exterior 360 ÷ 8 = 45, then 180 − 45

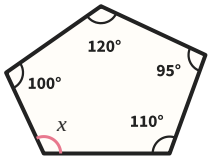
Answer x = 135°

11
Each interior angle of a regular polygon is 156°. How many sides does the polygon have?

exterior 24°, then 360 ÷ 24

Answer 15 sides

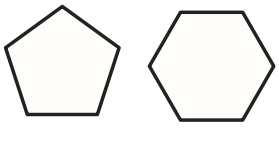
12
A pentagon is not regular. Four of its angles are 110°, 95°, 120° and 100°.
Find the size of angle x.



540 − 110 − 95 − 120 − 100

Answer x = 115°

13
Which has the bigger interior angle, a regular pentagon or a regular hexagon? By how much?

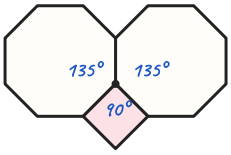


pentagon hexagon

108° and 120°

Answer the hexagon, by 12°

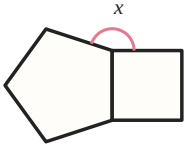
14
Floor tiles are regular octagons and squares. Two octagons and a square meet at a point. Show that they fit with no gap.



135 + 135 + 90 = 360

Answer they make 360°

15
A regular pentagon and a square share a side. Find the size of angle x.



360 − 108 − 90

Answer x = 162°

16
Sam says the interior angles of an octagon add up to 8 × 180° = 1440°.
Explain Sam's mistake.

an octagon splits into 6 triangles, not 8

Answer (8 − 2) × 180° = 1080°