GEOMETRY: ANGLES IN POLYGONS

Best Guess Mastery Worksheet (Target Grade 5/6)

I Do

ABCDEFGHIJK is a regular 11-sided polygon.

The vertices *B* and *E* are joined with a straight line.

Work out the size of angle *BEF*.

Give your answer correct to 1 decimal place.

You must show how you get your answer.

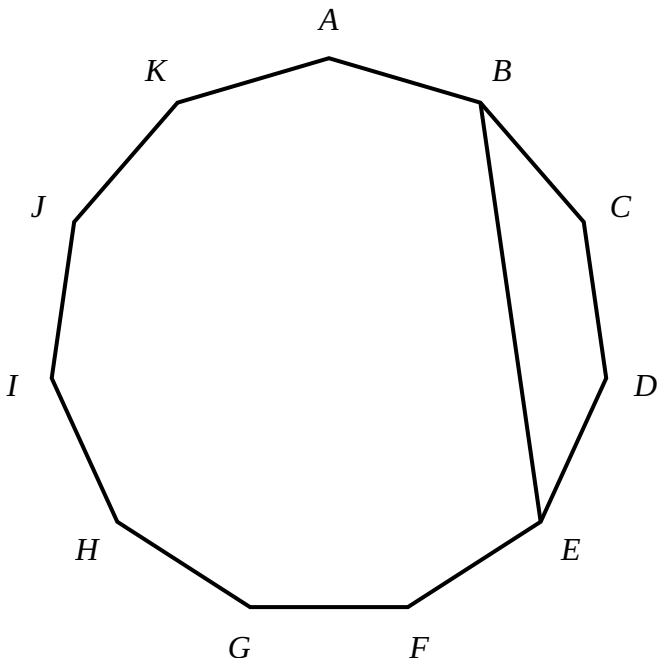


Diagram NOT accurately drawn

Angle *BEF* = ... °

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We Do

The interior angle of a regular polygon is 156°.

Work out the number of sides the polygon has.

You must show how you get your answer.

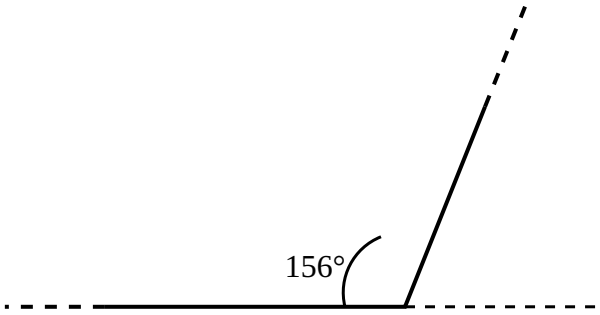


Diagram NOT accurately drawn

Number of sides = ...

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You Do 1

A regular polygon has 24 sides.

Work out the size of each interior angle.

You must show how you get your answer.

Interior angle = ... °

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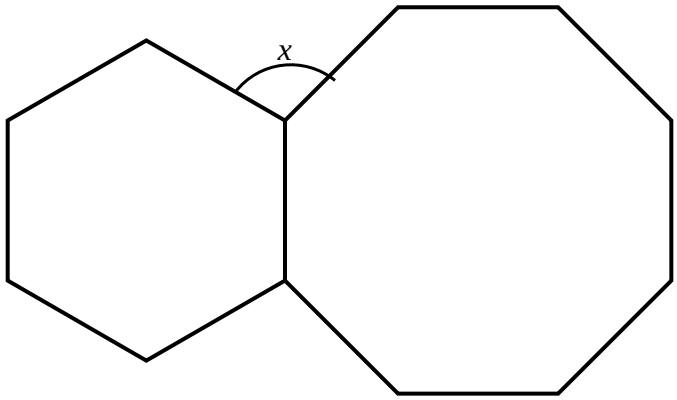
You Do 2

A regular hexagon and a regular octagon are placed edge to edge as shown in the diagram.

Work out the size of the angle marked *x*.

You must show how you get your answer.

Diagram NOT accurately drawn



Angle *x* = ... °

GEOMETRY: ANGLES IN POLYGONS (ALGEBRAIC)

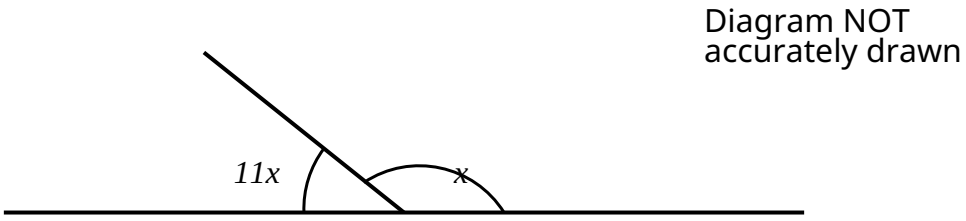
Best Guess Mastery Worksheet (Target Grade 5/6)

Challenge 1

For a regular polygon, the ratio of the size of the interior angle to the size of the exterior angle is 11 : 1.

Form and solve a linear equation to find the number of sides the polygon has.

Show your algebraic working clearly.



Number of sides = ...

GEOMETRY: ANGLES IN POLYGONS (ALGEBRAIC)

Best Guess Mastery Worksheet (Target Grade 5/6)

Challenge 2

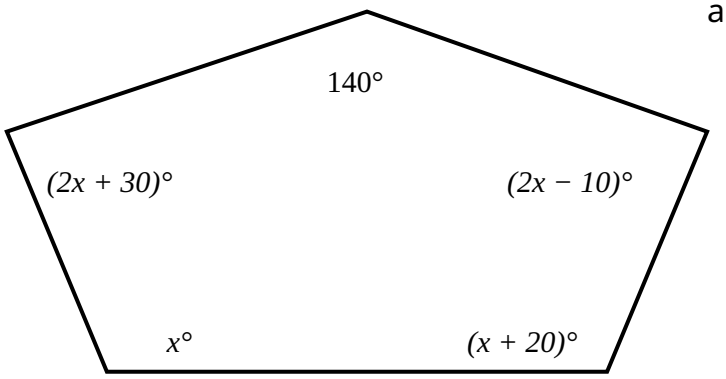
An irregular pentagon has interior angles of $x°$, $(x + 20)°$, $(2x - 10)°$, $(2x + 30)°$, and $140°$.

Form and solve a linear equation to find the value of x.

Hence, find the size of the largest angle in the pentagon.

Show your algebraic working clearly.

Diagram NOT accurately drawn



x = _____

Largest angle = _____ degrees

ANSWERS & WORKED SOLUTIONS

I Do

The sum of the interior angles of an 11-sided polygon is (11 - 2) x 180 = 1620 degrees.

Each interior angle is 1620/11 degrees.

In quadrilateral BCDE, the angles at C and D are both 1620/11 degrees. The remaining two angles are equal, so each is 360/11 degrees.

Angle BEF = 1620/11 - 360/11 = 1260/11 = 114.545... degrees.

Therefore angle BEF = 114.5 degrees (1 decimal place).

We Do

Exterior angle = 180 - 156 = 24 degrees.

Number of sides = 360/24 = 15.

You Do 1

Exterior angle = 360/24 = 15 degrees.

Interior angle = 180 - 15 = 165 degrees.

ANSWERS & WORKED SOLUTIONS

You Do 2

Interior angle of the regular hexagon = (4 x 180)/6 = 120 degrees.

Interior angle of the regular octagon = (6 x 180)/8 = 135 degrees.

Angles around a point total 360 degrees, so x = 360 - 120 - 135 = 105 degrees.

Challenge 1

Interior and exterior angles on a straight line total 180 degrees.

11x + x = 180, so 12x = 180 and x = 15.

The exterior angle is 15 degrees, so the polygon has 360/15 = 24 sides.

Challenge 2

The interior angles of a pentagon total (5 - 2) x 180 = 540 degrees.

x + (x + 20) + (2x - 10) + (2x + 30) + 140 = 540.

6x + 180 = 540, so x = 60.

The five angles are 60, 80, 110, 150 and 140 degrees.

Therefore the largest angle is 150 degrees.