POLYGONS

INTERIOR AND EXTERIOR ANGLES

Ref: G424.5R1

A1 Write down a formula that allows you to calculate the size of an exterior angle (E) of a regular polygon with n sides.	**A2** Write down a formula that relates the size of an exterior angle (E) and the size of an interior angle (I) of a polygon.	**A3** Write down a formula that allows you to calculate the sum (S) of the interior angles in a regular polygon with n sides.	**A4** Work out the size of an exterior angle of a regular polygon with 5 sides
B1 Work out the size of an interior angle of a regular polygon with 9 sides	**B2** Each exterior angle of a regular polygon is 15º. Work out the number of sides the polygon has.	**B3** Each interior angle of a regular polygon is 156º. Work out the number of sides the polygon has.	**B4** Find the **sum** of the interior angles of a polygon with 7 sides
C1 The size of each exterior angle of a regular polygon is 18°. Work out the **sum** of the interior angles of the polygon.	**C2** The sum of the interior angles of a polygon is 2700º. Work out the number of sides the polygon has.	**C3** The size of each interior angle of a regular polygon is 140º bigger than the size of each exterior angle. Work out the number of sides the polygon has.	**C4** The size of each interior angle of a regular polygon is 11 times the size of each exterior angle. Work out the number of sides the polygon has.
D1 The size of each interior angle of a regular polygon with n sides is 144°. Work out the size of each interior angle of a regular polygon with $2n$ sides.	**D2** An exterior angle of regular polygon **A** is 30º bigger than an exterior angle of regular polygon **B**. Polygon **A** has 9 sides. Find the number of sides of polygon **B**.	**D3** An interior angle of regular polygon **C** is 10º smaller than an interior angle of regular polygon **D**. Polygon **C** has 12 sides. Find the number of sides of polygon **D**.	**D4** The sum of the interior angles in polygon **E** is 900º more than the sum of the interior angles in polygon **F**. The total number of sides of the two polygons is 25. How many sides in each polygon?

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A1

Write down a formula that allows you to calculate the size of an exterior angle (E) of a regular polygon with n sides.

$E = \frac{360}{n}$

A2

Write down a formula that relates the size of an exterior angle (E) and the size of an interior angle (I) of a polygon.

$I + E = 180$

A3

Write down a formula that allows you to calculate the sum (S) of the interior angles in a regular polygon with n sides.

$Sum = (n-2) \times 180$

A4

Work out the size of an exterior angle of a regular polygon with 5 sides

$\frac{360}{5} = 72°$

B1

Work out the size of an interior angle of a regular polygon with 9 sides

$Ext. = \frac{360}{9}$

$= 40$

$Int. = 180 - 40$

$= 140°$

B2

Each exterior angle of a regular polygon is 15°.

Work out the number of sides the polygon has.

$n = \frac{360}{15} = 24$

B3

Each interior angle of a regular polygon is 156°.

$Ext. = 180 - 156$

$= 24$

$n = \frac{360}{24}$

$= 15$

B4

Find the **sum** of the interior angles of a polygon with 7 sides

$Sum = (n-2) \times 180$

$= 5 \times 180$

$= 900°$

C1

The size of each exterior angle of a regular polygon is 18°.

$n = \frac{360}{18}$

$= 20$

$Sum = (20-2) \times 180$

$= 3240°$

C2

The sum of the interior angles of a polygon is 2700°.

$(n-2) \times 180 = 2700$

$n - 2 = 15$

$n = 17$

C3

$x + (x + 140) = 180$

$2x + 140 = 180$

$x = 20°$

$n = \frac{360}{20}$

$= 18$

C4

$x + 11x = 180$

$12x = 180$

$x = 15$

$n = \frac{360}{15}$

$= 24$

D1

$n = \frac{360}{36}$

$= 10$

$2n = 20$

$Ext. = \frac{360}{20}$

$= 18$

$Int. = 162°$

D2

$E_A = \frac{360}{9}$

$= 40°$

$\Rightarrow E_B = 10°$

$n_B = \frac{360}{10}$

$= 36$

D3

$E_C = \frac{360}{12}$

$= 30$

$I_C = 150°$

$I_D = 160°$

$E_D = 20$

$n_D = \frac{360}{20}$

$= 18$

D4

$(n_E - 2) \times 180 = (n_F - 2) \times 180 + 900$

$n_E - n_F = 5$

$n_E + n_F = 25$

$n_E = 15$ $n_F = 10$