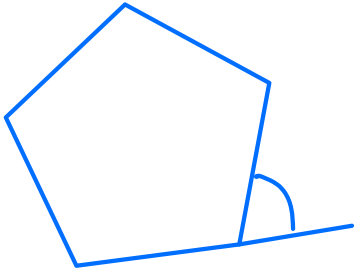


Angles in Polygons



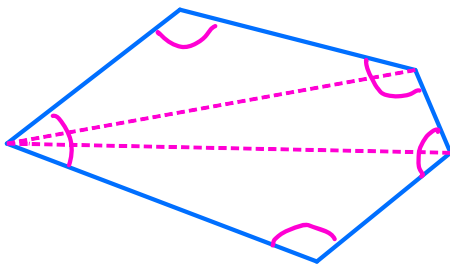
Exterior angle of a
regular n -sided polygon
 $= \frac{360^\circ}{n}$

$$\text{Pentagon ext angle} = \frac{360}{5} = 72^\circ$$

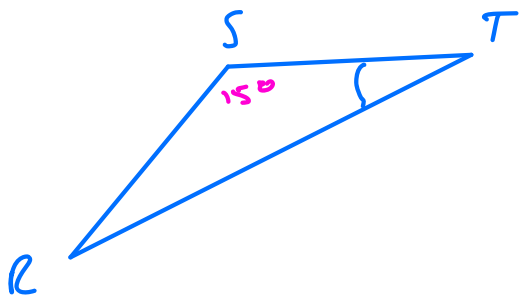
$$\text{Interior angle} = 180 - \frac{360}{n}$$

$$\text{Pentagon} \quad 180 - 72 = 108^\circ$$

Sum of interior angles of any
 n -sided polygon = $(n-2) \times 180^\circ$



Example Questions



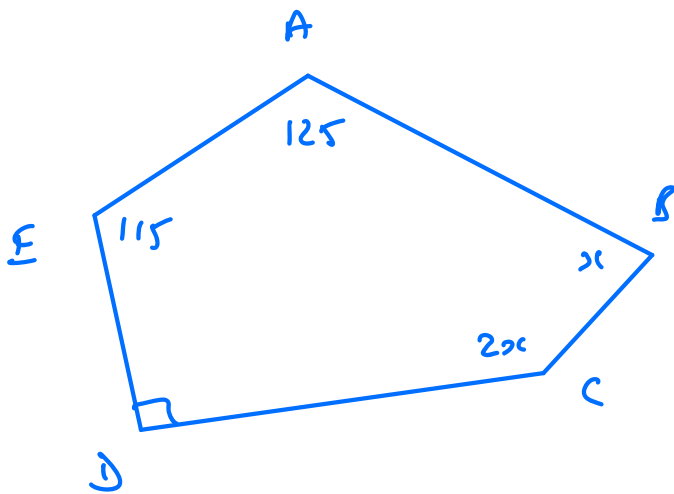
RS and ST are
sides of regular 12 sided
Polygon. Find angle STR

$$\text{Ext angle} = \frac{360}{12} = 30^\circ$$

$$\text{Int angle} = 180 - 30 = 150^\circ$$

$$\angle STR = \frac{180 - 150}{2} = 15^\circ$$

(angle sum of $150^\circ \Delta$)



$$\angle BCD = 2 \times \angle ABC$$

$$\begin{aligned} \angle \text{sum of pentagon} &= (5-2) \times 180^\circ \\ &= 540 \end{aligned}$$

$$115 + 125 + 90 + x + 2x = 540$$

$$330 + 3x = 540$$

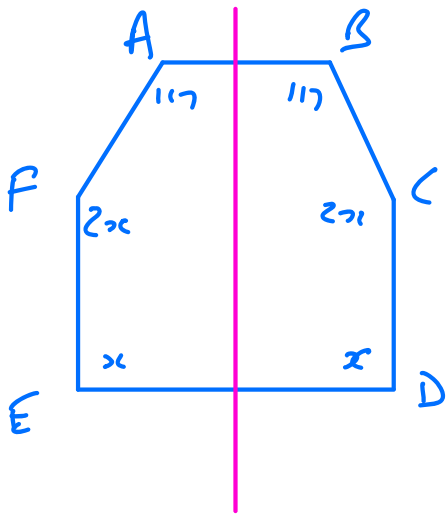
$$3x = 540 - 330$$

$$3x = 210$$

$$x = \frac{210}{3}$$

$$x = 70^\circ$$

$$\underline{\angle BCD = 2x = 140^\circ}$$



∠ sum of hexagon

$$= 4 \times 180 = 720^\circ$$

$$117 + 117 + 2x + 2x + x + x = 720^\circ$$

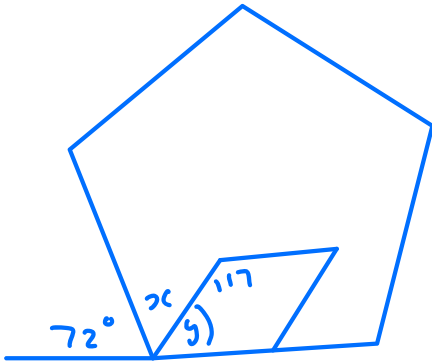
$$234 + 6x = 720$$

$$6x = 720 - 234$$

$$6x = 486$$

$$x = \frac{486}{6} = 81^\circ$$

$$\angle AFE = 2x = 162^\circ$$



$$y = 180 - 117 = 63^\circ$$

(allied angles)

$$\text{Ext } \angle \text{ of pentagon} = \frac{360}{5} = 72^\circ$$

$$72 + x + y = 180^\circ \text{ (str line)}$$

$$72 + 63 + x = 180^\circ$$

$$135 + x = 180^\circ$$

$$x = 180 - 135$$

$$x = 45^\circ$$

Expanding Brackets

$$\begin{aligned} & (x+1)(x+2)(x+3) \\ &= [x^2 + x + 2x + 2](x+3) \\ &= [x^2 + 3x + 2](x+3) \\ &= \begin{array}{r} x^3 + 3x^2 + 2x \\ + 3x^2 + 9x + 6 \\ \hline x^3 + 6x^2 + 11x + 6 \end{array} \end{aligned}$$

$$\begin{aligned} & 5(p+3) - 2(1-2p) \\ &= 5p + 15 - 2 + 4p \\ &= 9p + 13 \end{aligned}$$

$$\begin{aligned} & (x+5)(x-9) \\ &= x^2 + 5x - 9x - 45 \\ &= \underline{x^2 - 4x - 45} \end{aligned}$$

$$9x^2 + 6x = 3x(3x + 2)$$

Factorising

Examples

$$1) \quad 8xy - 4xp = 4x(2y - p)$$

$$2) \quad 6x^3y^4 - 9x^2y^5 = 3x^2y^4(2x - 3y)$$

$$3) \quad 4p^4q^4r^4 + 6p^2q^3r^4 - 8p^3q^3r^4 \\ = 2p^2q^3r^4(2p^2 + 3 - 4p)$$

Exercise Factorise

$$1) \quad 10p^4q^3 - 15p^2q^4 = 5p^2q^3(2p^2 - 3q)$$

$$2) \quad 14h^3k^2 - 7h^2k^2 = 7h^2k^2(2h - 1)$$