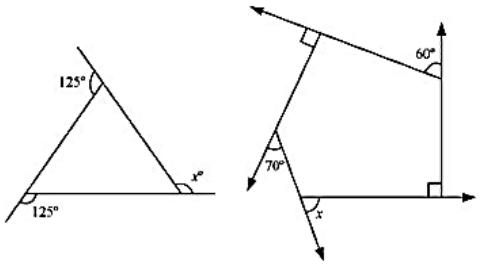
Board – CBSE	Class – 8th	Topic – Understanding Quadrilateral 3.2

Q.1 Find x in the following figures.



(a) (b)

Sol: (a) $125° + m = 180°$ (Linear pair of angles)

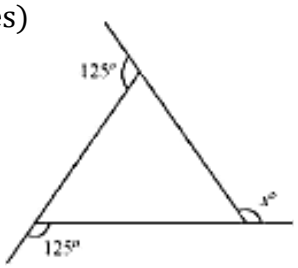
$m = 180° - 125° = 55°$ (Linear pair of angles)

and $125° + n = 180°$

$n = 180° - 125° = 55°$

Exterior angle $x°$ = sum of opposite interior angles

or $x° = 55° + 55° = 110°$



or

Since, sum of exterior angles of a triangle = 360°

$125° + 125° + x° = 360°$

$\Rightarrow 250° + x° = 360°$

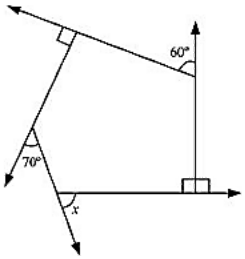
$x° = 360° - 250° = 110°$

(b) Sum of angles of a pentagon

$= (n - 2) \times 180°$

$= (5 - 2) \times 180°$

$= 3 \times 180° = 540°$



By linear pairs of angles

$\angle 1 + 90° = 180°$ ...(i)

$\angle 2 + 60° = 180°$ ...(ii)

$\angle 3 + 90° = 180°$ ...(iii)

$\angle 4 + 70° = 180°$ ...(iv)

$\angle 5 + x = 180°$ ...(v)

Adding equations (i), (ii), (iii), (iv), and (v)

$\Rightarrow x + (\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5) + 310° = 900°$

$\Rightarrow x + 540° + 310° = 900°$

$\Rightarrow x + 850° = 900°$

$\Rightarrow x = 900° - 850° = 50°$

Q.2 Find the measure of each exterior angle of a regular polygon of (i) 9 sides (ii) 15 sides.

Sol: (i) Sum of angles of a regular polygon $= (n - 2) \times 180° = (9 - 2) \times 180° = 7 \times 180° = 1260°$

Each interior angle $= \frac{Sum\ of\ interior\ angles}{Number\ of\ sides} = \frac{1260}{9} = 140°$

Each exterior angle $= 180° - 140° = 40°$

Or

Exterior angle $= \frac{Sum\ of\ exterior\ angles}{Number\ of\ sides} = \frac{360°}{9} = 40°$

(ii) Sum of exterior angles of a regular polygon $= 360°$

Exterior angle having 15 sides $= \frac{Sum\ of\ exterior\ angles}{Number\ of\ sides} = \frac{360°}{15} = 24°$

Q.3 How many sides does a regular polygon have, if the measure of an exterior angle is 24°?

Sol: Let number of sides be n

The measures of all exterior angles $= 360°$

Number of sides $= \frac{Sum\ of\ exterior\ angles}{Each\ exterior\ angle}\ n = \frac{360°}{24°} = 15$

Hence, the regular polygon has 15 sides.

Q.4 How many sides does a regular polygon have if each of its interior angles is 165°?

Sol: Let the number of sides be n.

Exterior angle $= 180° - 165° = 15°$

Sum of exterior angles of a regular polygon $= 360°$

Number of sides $= \frac{Sum\ of\ exterior\ angles}{Each\ exterior\ angle} \Rightarrow n = \frac{360°}{15°} = 24$

Hence, the regular polygon has 24 sides.

Q.5 (a) Is it possible to have a regular polygon with each of its exterior angles as 22°?

(b) Can it be an interior angle of a regular polygon? Why?

Sol: (a) Exterior angle = 22°

Number of sides = sum of exterior angles/ exterior angle

⇒ Number of sides = 360/22 = 16.36

No, we can't have a regular polygon with each exterior angle as 22° as it is not a divisor of 360.

(b) No; (because each exterior angle is 180° – 22° = 158°, which is not a divisor of 360°).

Q.6 (a) What is the minimum interior angle possible for a regular polygon? Why?

(b) What is the maximum exterior angle possible for a regular polygon?

Sol: (a) The equilateral triangle being a regular polygon of 3 sides has the least measure of an interior angle = 60°.

Since, the angle sum property of a triangle = 180°

x + x + x = 180°

3x = 180°

$x = \frac{180°}{3} = 60°$

(b) By (a), we can see that the greatest exterior angle is 180° – 60° = 120°.