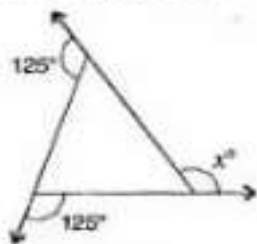


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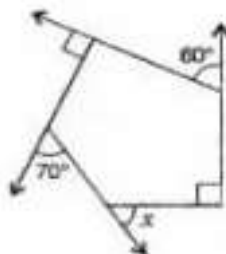
Exercise 3.2



Question 1:

Find x in the following figures:

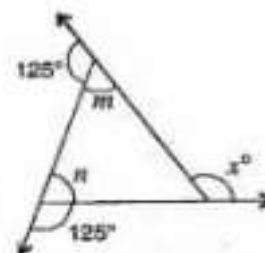
(a)



(b)

Answer 1:

- (a) Here, $125^\circ + m = 180^\circ$ [Linear pair]
 $\Rightarrow m = 180^\circ - 125^\circ = 55^\circ$
 and $125^\circ + n = 180^\circ$ [Linear pair]
 $\Rightarrow n = 180^\circ - 125^\circ = 55^\circ$
 \therefore Exterior angle $x^\circ =$ Sum of opposite interior angles
 $\therefore x^\circ = 55^\circ + 55^\circ = 110^\circ$



- (b) Sum of angles of a pentagon $= (n-2) \times 180^\circ$
 $= (5-2) \times 180^\circ$
 $= 3 \times 180^\circ = 540^\circ$

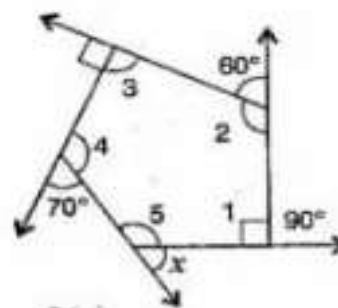
By linear pairs of angles,

- $\angle 1 + 90^\circ = 180^\circ$ (i)
 $\angle 2 + 60^\circ = 180^\circ$ (ii)
 $\angle 3 + 90^\circ = 180^\circ$ (iii)
 $\angle 4 + 70^\circ = 180^\circ$ (iv)
 $\angle 5 + x = 180^\circ$ (v)

Adding eq. (i), (ii), (iii), (iv) and (v),

$$x + (\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5) + 310^\circ = 900$$

$$\Rightarrow x + 540^\circ + 310^\circ = 900^\circ \Rightarrow x + 850^\circ = 900^\circ \Rightarrow x = 900^\circ - 850^\circ = 50^\circ$$



Question 2:

Find the measure of each exterior angle of a regular polygon of:

(a) 9 sides

(b) 15 sides

Answer 2:

- (i) Sum of angles of a regular polygon $= (n-2) \times 180^\circ$
 $= (9-2) \times 180^\circ = 7 \times 180^\circ = 1260^\circ$
 Each interior angle $= \frac{\text{Sum of interior angles}}{\text{Number of sides}} = \frac{1260^\circ}{9} = 140^\circ$
 Each exterior angle $= 180^\circ - 140^\circ = 40^\circ$
- (ii) Sum of exterior angles of a regular polygon $= 360^\circ$
 Each interior angle $= \frac{\text{Sum of interior angles}}{\text{Number of sides}} = \frac{360^\circ}{15} = 24^\circ$

Question 3:

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

**Answer 3:**

Let number of sides be n .

$$\text{Sum of exterior angles of a regular polygon} = 360^\circ$$

$$\text{Number of sides} = \frac{\text{Sum of exterior angles}}{\text{Each interior angle}} = \frac{360^\circ}{24^\circ} = 15$$

Hence, the regular polygon has 15 sides.

Question 4:

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

Answer 4:

Let number of sides be n .

$$\text{Exterior angle} = 180^\circ - 165^\circ = 15^\circ$$

$$\text{Sum of exterior angles of a regular polygon} = 360^\circ$$

$$\text{Number of sides} = \frac{\text{Sum of exterior angles}}{\text{Each interior angle}} = \frac{360^\circ}{15^\circ} = 24$$

Hence, the regular polygon has 24 sides.

Question 5:

(a) Is it possible to have a regular polygon with each exterior angle as 22° ?

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

Answer 5:

(a) No. (Since 22 is not a divisor of 360°)

(b) No, (Because each exterior angle is $180^\circ - 22^\circ = 158^\circ$, which is not a divisor of 360°)

Question 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?

Answer 6:

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

$$\therefore \text{Sum of all the angles of a triangle} = 180^\circ$$

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

$$\Rightarrow 3x = 180^\circ$$

$$\Rightarrow x = 60^\circ$$

(b) By (a), we can observe that the greatest exterior angle is $180^\circ - 60^\circ = 120^\circ$.