

**General instructions for Students: Whatever be the notes provided, everything must be copied in the Mathematics copy and then do the HOMEWORK in the same copy.**

**CLASS – VIII**

**MATHEMATICS**

---

**13. UNDERSTANDING QUADRILATERALS**

---

- \* **The sum of interior angles of a triangle is  $180^\circ$**
- \* **The sum of interior angles of a quadrilateral is  $360^\circ$**
- \* **The sum of all interior angles of  $n$  – sided polygon =  $(n - 2) \times 180^\circ$**
- \* **Each interior angle of a  $n$  – sided regular polygon =  $\frac{(n-2) \times 180^\circ}{n}$**
- \* **The number of diagonals of the polygon =  $\frac{n(n-3)}{2}$ , ( $n > 3$ )**
- \* **The sum of exterior angles of a polygon =  $360^\circ$**
- \* **Each exterior angle of a regular polygon of  $n$  – sides =  $\frac{360^\circ}{n}$**
- \* **If each exterior angle of a regular polygon is  $x^\circ$  then the no. of sides =  $\frac{360^\circ}{x^\circ}$**

\*\*\*\*\* **EXERCISE – 13.1** \*\*\*\*\*

**3. Find the sum of measures of all interior angles of a polygon with number of sides 8.**

**Soln :** Here, no. of sides = 8

$$\begin{aligned} \text{The sum of all interior angles of } n\text{ – sided polygon} &= (n - 2) \times 180^\circ \\ &= (8 - 2) \times 180^\circ \quad \{ \because n = 8 \} \\ &= 6 \times 180^\circ = 1080^\circ \quad \text{Ans.} \end{aligned}$$

**4. Find the number of sides of a regular polygon whose each exterior angle has a measure of  $24^\circ$**

**Soln :** Here, each exterior angle ( $x^\circ$ ) =  $24^\circ$

$$\text{no. of sides} = \frac{360^\circ}{x^\circ} = \frac{360^\circ}{24^\circ} = 15 \quad \text{Ans.}$$

5. Find the number of sides of a regular polygon if each of its interior angle is  $90^\circ$

Soln : Here, Each interior angle of a  $n$  – sided regular polygon =  $90^\circ$

$$\begin{aligned} &\Rightarrow \frac{(n-2) \times 180^\circ}{n} = 90^\circ \\ \Rightarrow 180^\circ n - 360^\circ &= 90^\circ n \Rightarrow 180^\circ n - 90^\circ n = 360^\circ \\ &\Rightarrow 90^\circ n = 360^\circ \\ &\Rightarrow n = \frac{360^\circ}{90^\circ} \Rightarrow n = 4 \quad \text{Ans.} \end{aligned}$$

8. The angles of a pentagon are  $x^\circ$ ,  $(x - 10)^\circ$ ,  $(x + 20)^\circ$ ,  $(2x - 44)^\circ$  and  $(2x - 70)^\circ$ . Calculate  $x$

Soln : In pentagon, no. of sides = 5

$$\begin{aligned} \text{The sum of all interior angles of } n\text{-sided polygon} &= (n - 2) \times 180^\circ \\ &= (5 - 2) \times 180^\circ \quad \{\because n = 5\} \\ &= 3 \times 180^\circ = 540^\circ \end{aligned}$$

$$\text{Now, } x^\circ + (x - 10)^\circ + (x + 20)^\circ + (2x - 44)^\circ + (2x - 70)^\circ = 540^\circ$$

$$\begin{aligned} &\Rightarrow 7x - 104^\circ = 540^\circ \\ &\Rightarrow 7x = 540^\circ + 104^\circ \\ &\Rightarrow x = \frac{644^\circ}{7} \Rightarrow x = 92^\circ \quad \text{Ans.} \end{aligned}$$

13. (i) In the adjoining figure, find  $x + y + z$

Soln :  $\because$  BAD is a straight line

$$\therefore x + 90^\circ = 180^\circ \Rightarrow x = 90^\circ$$

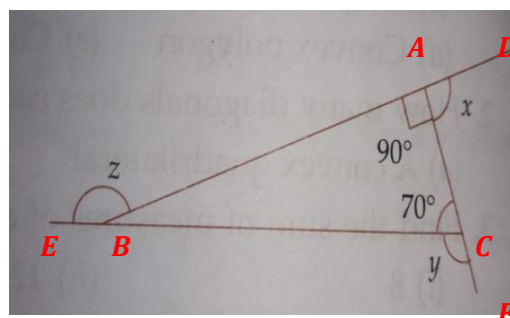
$\because$  ACF is a straight line

$$\therefore y + 70^\circ = 180^\circ \Rightarrow y = 110^\circ$$

In  $\triangle ABC$ ,  $\angle A + \angle B + \angle C = 180^\circ$

$$\Rightarrow 90^\circ + \angle B + 70^\circ = 180^\circ$$

$$\Rightarrow \angle B = 180^\circ - 160^\circ = 20^\circ$$



[ Angle sum prop. of a triangle ]

$\therefore EBC$  is a straight line

$$\therefore z + 20^\circ = 180^\circ \Rightarrow z = 160^\circ$$

Now,  $x + y + z = 90^\circ + 110^\circ + 160^\circ$

$$\Rightarrow x + y + z = 360^\circ \quad \text{Ans.}$$

16. Each interior angle of a regular polygon is double of its exterior angle.

Find the number of sides in the polygon.

Soln : Let each exterior angle and interior angle be  $x^\circ$  and  $2x^\circ$  respectively.

According to question,  $x^\circ + 2x^\circ = 180^\circ$

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

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

Now, no. of sides( $n$ ) =  $\frac{360^\circ}{x^\circ}$

$$\Rightarrow \text{no. of sides}(n) = \frac{360^\circ}{60^\circ} = 6 \quad \text{Ans.}$$

\*\*\*\*\*

## **HOMEWORK**

### **EXERCISE – 13.1**

**QUESTION NUMBERS : 1, 2, 5, 7, 11, 12(i)(iv), 13 and 14**