

**EXERCISE 6.1**

Write the correct answer in each of the following:

1. In Fig. 6.1, if  $AB \parallel CD \parallel EF$ ,  $PQ \parallel RS$ ,  $\angle RQD = 25^\circ$  and  $\angle CQP = 60^\circ$ , then  $\angle QRS$  is equal to

- (A)  $85^\circ$   
 (B)  $135^\circ$   
 (C)  $145^\circ$   
 (D)  $110^\circ$



**Solution:**

(C)  $145^\circ$

Explanation:

According to the given figure, we have

$AB \parallel CD \parallel EF$

$PQ \parallel RS$

$\angle RQD = 25^\circ$

$\angle CQP = 60^\circ$

$PQ \parallel RS$ .

We know that,

If a transversal intersects two parallel lines, then each pair of alternate exterior angles is equal.

Now, since  $PQ \parallel RS$

$\Rightarrow \angle PQC = \angle BRS$

We have  $\angle PQC = 60^\circ$

$\Rightarrow \angle BRS = 60^\circ \dots \text{eq.(i)}$

We also know that,

If a transversal intersects two parallel lines, then each pair of alternate interior angles is equal.

Now again, since  $AB \parallel CD$

$$\Rightarrow \angle DQR = \angle QRA$$

We have  $\angle DQR = 25^\circ$

$$\Rightarrow \angle QRA = 25^\circ \dots \text{eq.(ii)}$$

Using linear pair axiom,

We get,

$$\angle ARS + \angle BRS = 180^\circ$$

$$\Rightarrow \angle ARS = 180^\circ - \angle BRS$$

$$\Rightarrow \angle ARS = 180^\circ - 60^\circ \text{ (From (i), } \angle BRS = 60^\circ \text{)}$$

$$\Rightarrow \angle ARS = 120^\circ \dots \text{eq.(iii)}$$

$$\text{Now, } \angle QRS = \angle QRA + \angle ARS$$

From equations (ii) and (iii), we have,

$$\angle QRA = 25^\circ \text{ and } \angle ARS = 120^\circ$$

Hence, the above equation can be written as:

$$\angle QRS = 25^\circ + 120^\circ$$

$$\Rightarrow \angle QRS = 145^\circ$$

Therefore, option (C) is the correct answer.

**2. If one angle of a triangle is equal to the sum of the other two angles, then the triangle is**

- (A) An isosceles triangle
- (B) An obtuse triangle
- (C) An equilateral triangle
- (D) A right triangle

**Solution:**

**(D) A right triangle**

Explanation:

Let the angles of  $\triangle ABC$  be  $\angle A$ ,  $\angle B$  and  $\angle C$

$$\text{Given that } \angle A = \angle B + \angle C \dots \text{(eq1)}$$

But, in any  $\triangle ABC$ ,

Using the angle sum property, we have,

$$\angle A + \angle B + \angle C = 180^\circ \dots \text{(eq2)}$$

From equations (eq1) and (eq2), we get

$$\angle A + \angle A = 180^\circ$$

$$\Rightarrow 2\angle A = 180^\circ$$

$$\Rightarrow \angle A = 180^\circ / 2 = 90^\circ$$

$$\Rightarrow \angle A = 90^\circ$$

Hence, we get that the triangle is a right triangle

Therefore, option (D) is the correct answer.

**3. An exterior angle of a triangle is  $105^\circ$ , and its two interior opposite angles are equal. Each of these equal angles is**

(A)  $37\frac{1}{2}^\circ$

(B)  $52\frac{1}{2}^\circ$

(C)  $72\frac{1}{2}^\circ$

(D)  $75^\circ$

**Solution:**

(B)  $52\frac{1}{2}^\circ$

Explanation:

According to the question,

The exterior angle of triangle =  $105^\circ$

Let the two interior opposite angles of the triangle =  $x$

We know that,

The exterior angle of a triangle = sum of interior opposite angles

Then, we have the equation,

$$105^\circ = x + x$$

$$2x = 105^\circ$$

$$x = 52.5^\circ$$

$$x = 52\frac{1}{2}$$

Therefore, option (B) is the correct answer.

**4. The angles of a triangle are in the ratio 5 : 3 : 7. The triangle is**

(A) An acute angled triangle

(B) An obtuse-angled triangle

(C) A right triangle

(D) An isosceles triangle

**Solution:**

(A) An acute angled triangle

Explanation:

According to the question,

The angles of a triangle are of the ratio 5 : 3 : 7

Let 5:3:7 be  $5x$ ,  $3x$  and  $7x$

Using the angle sum property of a triangle,

$$5x + 3x + 7x = 180$$

$$15x = 180$$

$$x = 12$$

Substituting the value of  $x$ ,  $x = 12$ , in  $5x$ ,  $3x$  and  $7x$  we get,

$$5x = 5 \times 12 = 60^\circ$$

$$3x = 3 \times 12 = 36^\circ$$

$$7x = 7 \times 12 = 84^\circ$$

Since all the angles are less than  $90^\circ$ , the triangle is an acute-angled triangle.

Therefore, option (A) is the correct answer.



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