Exercise: 6.1 **(Page No: 96)**

1. In Fig. 6.13, lines AB and CD intersect at O. If $\angle AOC + \angle BOE = 70°$ and $\angle BOD = 40°$, find $\angle BOE$ and reflex $\angle COE$.

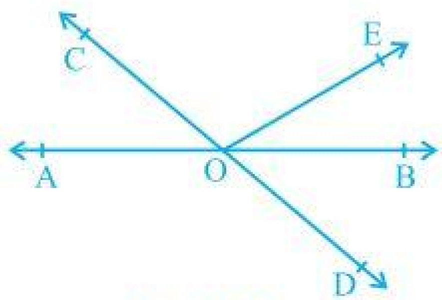


Fig. 6.13

Solution:

From the diagram,

$\angle AOC + \angle BOE + \angle COE$ and $\angle COE + \angle BOD + \angle BOE$ forms a straight line.

So, $\angle AOC + \angle BOE + \angle COE = \angle COE + \angle BOD + \angle BOE = 180°$

Now, by putting the values of $\angle AOC + \angle BOE = 70°$ and $\angle BOD = 40°$ we get

$\angle COE = 110°$ and

$\angle BOE = 30°$

2. In Fig. 6.14, lines XY and MN intersect at O. If $\angle POY = 90°$ and a : b = 2 : 3, find c.

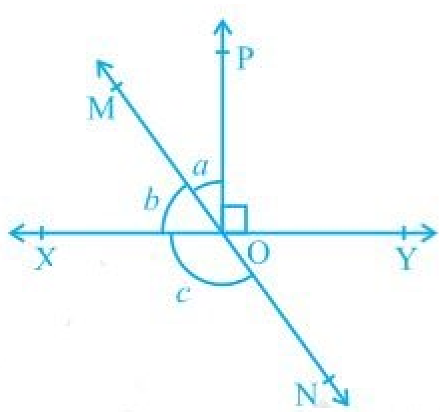


Fig. 6.14

Solution:

We know that the sum of linear pair are always equal to 180°

So,

$\angle POY + a + b = 180^\circ$

Putting the value of $\angle POY = 90^\circ$ (as given in the question) we get,

$a + b = 90^\circ$

Now, it is given that $a : b = 2 : 3$ so,

Let a be 2x and b be 3x

$\therefore 2x + 3x = 90^\circ$

Solving this we get

$5x = 90^\circ$

So, $x = 18^\circ$

$\therefore a = 2 \times 18^\circ = 36^\circ$

Similarly b can be calculated and the value will be

$b = 3 \times 18^\circ = 54^\circ$

From the diagram, b + c also forms a straight angle so,

$b + c = 180^\circ$

=> $c + 54^\circ = 180^\circ$

$\therefore c = 126^\circ$

3. In Fig. 6.15, $\angle PQR = \angle PRQ$, then prove that $\angle PQS = \angle PRT$.

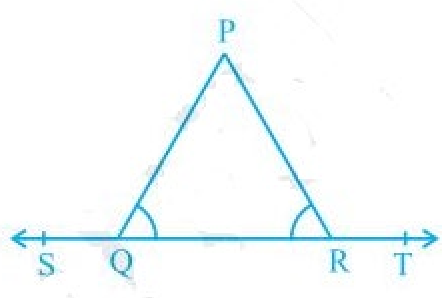


Fig. 6.15

Solution:

Since ST is a straight line so,

$\angle PQS + \angle PAR = 180^\circ$ (linear pair) and

$\angle PRT + \angle PRQ = 180^\circ$ (linear pair)

Now, $\angle PQS + \angle PAR = \angle PRT + \angle PRQ = 180^\circ$

Since $\angle PQR = \angle PRQ$ (as given in the question)

$\angle PQS = \angle PRT$. (Hence proved).

4. In Fig. 6.16, if x + y = w + z, then prove that AOB is a line.

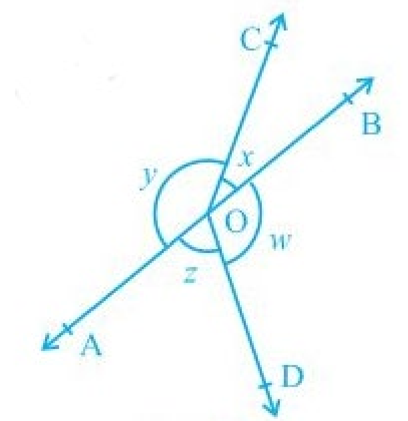


Fig. 6.16

Solution:

For proving AOB is a straight line, we will have to prove x + y is a linear pair

i.e. x + y = 180°

We know that the angles around a point are 360° so,

x + y + w + z = 360°

In the question, it is given that,

x + y = w + z

So, (x + y) + (x + y) = 360°

=> 2(x + y) = 360°

∴ (x + y) = 180° (Hence proved).

5. In Fig. 6.17, POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that $\angle ROS = 1/2(\angle QOS - \angle POS)$.

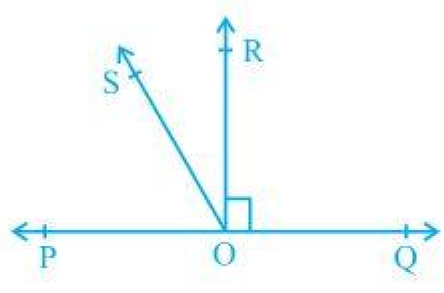


Fig. 6.17

Solution:

In the question, it is given that (OR $\perp$ PQ) and $\angle POQ = 180°$

So, $\angle POS + \angle ROS + \angle ROQ = 180°$

Now, $\angle POS + \angle ROS =$

$180° - 90°$ (Since $\angle POR = \angle ROQ = 90°$)

$\therefore \angle POS + \angle ROS = 90°$

Now, $\angle QOS = \angle ROQ + \angle ROS$

It is given that $\angle ROQ = 90°$,

$\therefore \angle QOS = 90° + \angle ROS$

Or, $\angle QOS + \angle ROS = 90°$

As $\angle POS + \angle ROS = 90°$ and $\angle QOS + \angle ROS = 90°$, we get

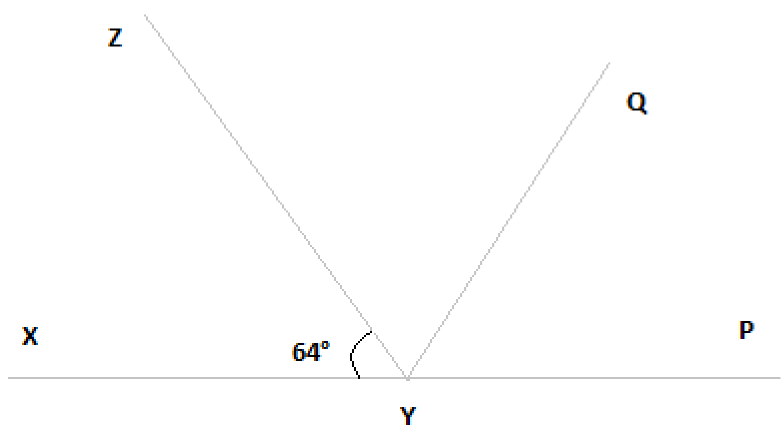
$\angle POS + \angle ROS = \angle QOS + \angle ROS$

$\Rightarrow 2\angle ROS + \angle POS = \angle QOS$

Or, $\angle ROS = ½\ (\angle QOS\ \angle POS)$ (Hence proved).

6. It is given that $\angle XYZ = 64°$ and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects $\angle ZYP$, find $\angle XYQ$ and reflex $\angle QYP$.

Solution:



Here, XP is a straight line

So, $\angle XYZ + \angle ZYP = 180°$

Putting the valye of $\angle XYZ = 64°$ we get,

$64° + \angle ZYP = 180°$

$\therefore \angle ZYP = 116°$

From the diagram, we also know that $\angle ZYP = \angle ZYQ + \angle QYP$

Now, as YQ bisects $\angle ZYP$,

$\angle ZYQ = \angle QYP$

Or, $\angle ZYP = 2\angle ZYQ$

$\therefore \angle ZYQ = \angle QYP = 58°$

Again, $\angle XYQ = \angle XYZ + \angle ZYQ$

By putting the value of $\angle XYZ = 64^\circ$ and $\angle ZYQ = 58^\circ$ we get.

$\angle XYQ = 64^\circ + 58^\circ$

Or, $\angle XYQ = 122^\circ$

Now, reflex $\angle QYP = 180^\circ + \angle XYQ$

We computed that the value of $\angle XYQ = 122^\circ$. So,

$\angle QYP = 180^\circ + 122^\circ$

$\therefore \angle QYP = 302^\circ$