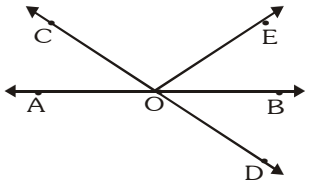
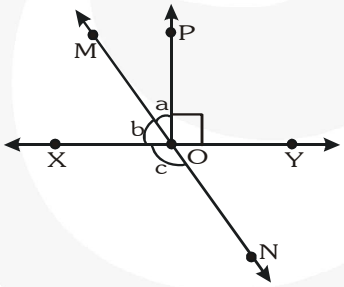
Ex - 6.1

Q1. In figure, lines AB and CD intersect at O. If ∠AOC + ∠BOE = 70° and ∠BOD = 40°, find ∠BOE and reflex ∠COE.



Sol. ∠AOC = ∠BOD [Vertically opposite angles]
⇒ ∠AOC = 40° [∵ ∠BOD = 40° is given]
Now, ∠AOC + ∠BOE = 70° [Given]
⇒ 40° + ∠BOE = 70°
⇒ ∠BOE = 30°
∠AOE + ∠BOE = 180° [Linear pair of angles]
⇒ ∠AOE + 30° = 180°
⇒ ∠AOE = 150°
⇒ ∠AOC + ∠COE = 150°
⇒ 40° + ∠COE = 150°
⇒ ∠COE = 110°
Reflex ∠COE = 360°–110° = 250°

Q2. In figure, lines XY and MN intersect at O. If ∠POY = 90° and a : b = 2 : 3, find c.



Sol. Ray OP stands on line XY
∠POX + ∠ POY = 180°
∠POX + 90° = 180°
∠POX = 90°
∠POM + ∠XOM = 90°
a + b = 90° .... (1)
a : b = 2 : 3

$\frac{a}{2} = \frac{b}{3} = k$ (let)

a = 2k, b = 3k

$3k + 2k = 90°$ from (1)

$k = 18°$

$\Rightarrow a = 36°$, $b = 54°$

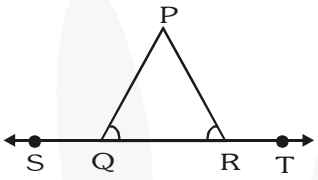
$\therefore$ Ray OX stands on line MN

$\angle XOM + \angle XON = 180°$

$b + c = 180°$

$54° + c = 180° \Rightarrow c = 126°$

Q3. In figure, $\angle PQR = \angle PRQ$, then prove that $\angle PQS = \angle PRT$.



Sol. $\angle PQR = \angle PRQ = x$ (say) ...(1)

Now, $\angle PQS + \angle PQR = 180°$ [Linear pair of angles]

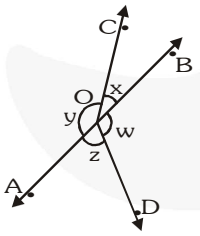
and $\angle PRT + \angle PRQ = 180°$ [Linear pair of angles]

$\Rightarrow \angle PQS + \angle PQR = \angle PRT + \angle PRQ$ [$\because$ each $= 180°$]

$\Rightarrow \angle PQS + x = \angle PRT + x$ [By (1)]

$\Rightarrow \angle PQS = \angle PRT$

Q4. In figure, if $x + y = w + z$, then prove that AOB is a line.



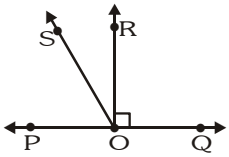
Sol. $x + y = w + z$ ...(1)

$x + y + w + z = 360°$ [Complete angle]

$\Rightarrow 2(x + y) = 360°$, $x + y = 180°$ [From (1)]

$\Rightarrow$ AOB is a line.

Q5. In figure, POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$.



Sol. $\angle POR = \angle QOR = 90°$ ...(1)

[$\because$ OR $\perp$ PQ at O]

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

$\Rightarrow \angle QOS = 90° + \angle ROS$ ...(2) {by (1)}

$\angle POS + \angle ROS = \angle POR$

$\Rightarrow \angle POS = \angle POR - \angle ROS$

$\Rightarrow \angle POS = 90° - \angle ROS$ ...(3) {by (1)}

Subtracting (3) from (2),

$\angle QOS - \angle POS = \{90° + \angle ROS\} - \{90° - \angle ROS\}$

$= 2 \times \angle ROS$

$\Rightarrow 2 \times \angle ROS = \{\angle QOS - \angle POS\}$

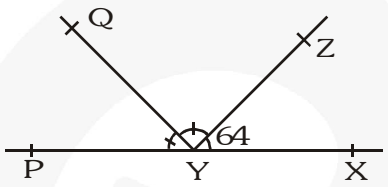
i.e., $\angle ROS = \frac{1}{2}\{\angle QOS - \angle POS\}$

Q6. 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 $\angle QYP$.

Sol. $\angle XYZ + \angle ZYP = 180°$ [Linear pair]

$\Rightarrow 64 + \angle ZYP = 180°$

$\Rightarrow \angle ZYP = 116°$



Ray YQ bisects angle $\angle ZYP$

$\Rightarrow \angle PYQ = \angle ZYP = \frac{116}{2} = 58°$

Reflex $\angle QYP = 360° - 58° = 302°$

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

$= 64° + 58° = 122°$