Mathematics

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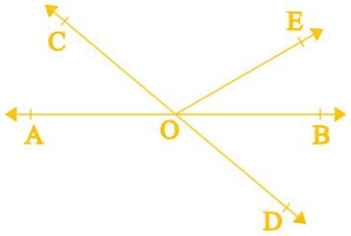
(Chapter – 6)(Lines and Angles)

(Class – 9)

Exercise 6.1

Question 1:

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



Answer 1:

Given: Lines AB and CD intersects at O such that ∠BOD = 40° and

∠AOC + ∠BOE = 70° ... (1)

∠AOC = ∠BOD [∵ Vertically Opposite Angles]

Hence, ∠AOC = 40° [∵ ∠BOD = 40°]

Therefore, from the equation (1), we have,

40°+ ∠BOE = 70°

⇒ ∠BOE = 70° − 40° = 30°

Here, ∠AOC + ∠BOE + ∠COE = 180° [∵ AOB is a straight line]

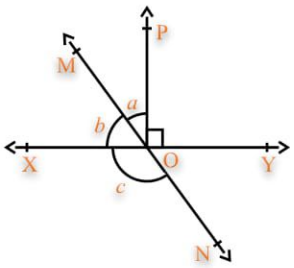
⇒ 70° + ∠COE = 180° [From the equation (1)]

⇒ ∠COE = 180° − 70° = 110° and

Reflex ∠COE = 360° − ∠COE = 360° − 110° = 250°

Question 2:

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



Answer 2:

Given: Lines XY and MN intersects at O, ∠POY = 90° and $a: b = 2: 3$

Let, $a = 2x$, therefore $b = 3x$

Here, ∠XOM + ∠POM + ∠POY = 180° [∵ XOY is a straight line]

⇒ $3x + 2x + 90° = 180°$ [∵∠POY = 90°]

⇒ $5x + 90° = 180°$

⇒ $5x = 180° - 90° = 90°$

⇒ $x = \frac{180°}{5} = 18°$

Hence, $\angle XOM = 3x = 3 \times 18° = 54°$ and

$\angle POM = 2x = 2 \times 18° = 36°$

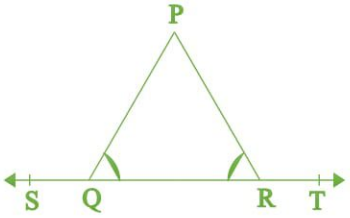
Here, ∠XON = ∠MOY [∵ Vertically Opposite Angles]

⇒ c = ∠POM + ∠POY [∵∠XON = c and ∠MOY = ∠POM + ∠POY]

⇒ $c = 36° + 90° = 126°$

Question 3:

In Figure, ∠PQR = ∠PRQ, then prove that ∠PQS = ∠PRT.



Answer 3:

∠PQS + ∠PQR = 180° [∵ Linear Pair] ... (1)

∠PRQ + ∠PRT = 180° [∵Linear Pair] ... (2)

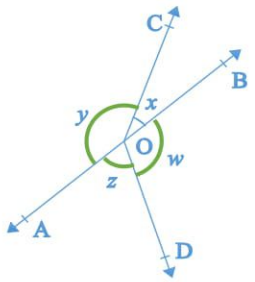
But, ∠PQR = ∠PRQ [∵ Given]

∴ From the equations (1) and (2), we have

∠PQS = ∠PRT

Question 4:

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



Answer 4:

We know that the sum of angles around a point is 360°. Therefore

$x + y + w + z = 360°$

$\Rightarrow (x + y) + (w + z) = 360°$

$\Rightarrow (x + y) + (x + y) = 360°$ [∵ Given $x + y = w + z$]

$\Rightarrow 2(x + y) = 360°$

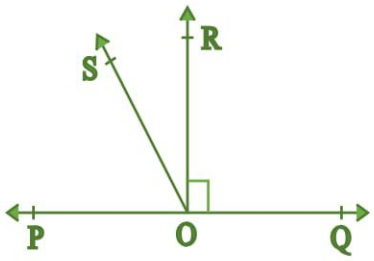
$\Rightarrow (x + y) = \frac{360°}{2}$

$\Rightarrow x + y = 180°$

∠AOC and ∠COB are forming linear pair. Hence, AOB is a straight line.

Question 5:

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: $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$



Answer 5:

$RHS = \frac{1}{2}(\angle QOS - \angle POS)$

$= \frac{1}{2}[(\angle QOR + \angle ROS) - (\angle POR - \angle ROS)]$

[∵ $\angle QOS = \angle QOR + \angle ROS$ and $\angle POS = \angle POR - \angle ROS$]

$= \frac{1}{2}[\angle QOR + \angle ROS - \angle POR + \angle ROS]$

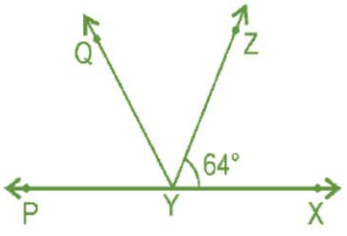
$= \frac{1}{2}[90° + \angle ROS - 90° + \angle ROS]$ [∵ $\angle QOR = 90°$ और $\angle POR = 90°$]

$= \frac{1}{2}[2\angle ROS]$

$= \angle ROS = LHS$

Question 6:

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



Answer 6:

∠PYZ + ∠XYZ = 180° [∵ Linear Pair]

⇒∠PYZ + 64° = 180° [∵ ∠XYZ = 64°]

⇒∠PYZ = 180°− 64° = 116°

But,

$\angle PYQ = \angle ZYQ = \frac{1}{2}\angle PYZ$ [∵ ∠ZYP is bisected by ray YQ]

$\therefore \angle PYQ = \angle ZYQ = \frac{1}{2} \times 116° = 58°$

∴ ∠XYQ = ∠XYZ + ∠ZYQ = 64° + 58° = 122° and

Reflex ∠QYP = 360° − ∠QYP = 360° − 58° = 302°