NCERT Solutions for Class 9 Maths Chapter 6 Lines and Angles Ex 6.1

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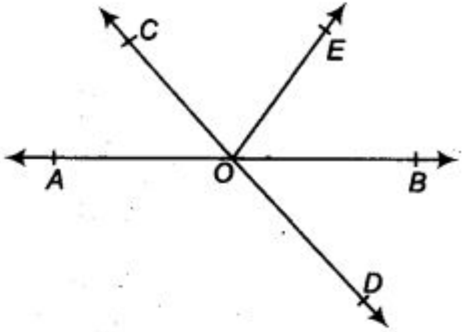
Question 1
In figure, lines AB and CD intersect at 0. If ∠AOC + ∠BOE = 70° and ∠BOD = 40°, find ∠BOE and reflex ∠COE.

Solution:



Since AB is a straight line,

∴ ∠AOC + ∠COE + ∠EOB = 180°

or (∠AOC + ∠BOE) + ∠COE = 180° or 70° + ∠COE = 180° [

∵ ∠AOC + ∠BOE = 70° (Given)]

∠COE = 180° – 70° = 110°

∴ Reflex ∠COE = 360° – 110° = 250°

Also, AB and CD intersect at O.

∴ ∠COA = ∠BOD [Vertically opposite angles]

∠BOD = 40° [Given]

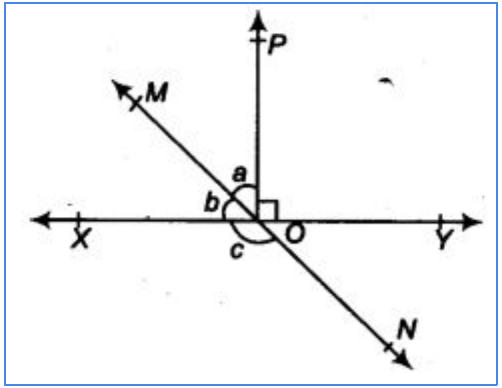
∴ ∠COA = 40°

Also, ∠AOC + ∠BOE = 70°

∴ 40° + ∠BOE = 70° or ∠BOE = 70° -40° = 30°

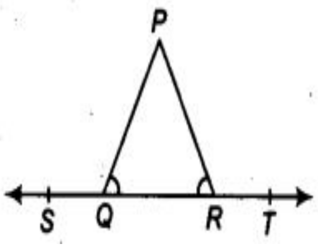
Thus, ∠BOE = 30° and reflex ∠COE = 250°.

Question 2.
In figure, lines XY and MN intersect at 0. If ∠POY = 90° , and a : b = 2 : 3. find c.



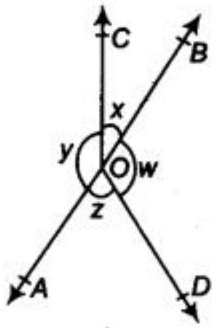
Solution:
Since XOY is a straight line.
∴ b+a+∠POY= 180°.
. ∠POY = 90° [Given]
∴ b + a = 180° – 90° = 90° …(i)
Also a : b = 2 : 3 ⇒ b = 3a/2 …(ii)
Now from (i) and (ii), we get
3a/2 + a = 90°
⇒ 5a/2 = 90°
⇒ a = 90/5×2=36◦ = 36°
From (ii, we get
b = 32 x 36°= 54°
Since XY and MN interstect at O,
∴ c = [a + ∠POY] [Vertically opposite angles]
or c = 36° + 90° = 126°
Thus, the required measure of c = 126°.

Question 3.
In figure, ∠PQR = ∠PRQ, then prove that ∠PQS = ∠PRT.



Solution:
ST is a straight line.
∴ ∠PQR + ∠PQS = 180° …(1) [Linear pair]
Similarly, ∠PRT + ∠PRQ = 180° …(2) [Linear Pair]
From (1) and (2), we have
∠PQS + ∠PQR = ∠PRT + ∠PRQ
∠PQR = ∠PRQ [Given]
∴ ∠PQS = ∠PRT

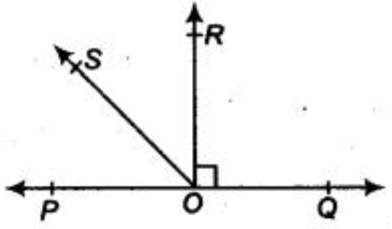
Question 4.
In figure, if x + y = w + z, then prove that AOB is a line.



Solution:
Sum of all the angles at a point = 360°
∴ x + y + z + w = 360°. ,
(x + y) + (z + w) = 360°.
(x + y) = (z + w) [Given]
∴ (x + y) + (x + y) = 360° ,
2(x + y) = 360°
(x + y) = 360/2 = 180°
∴ AOB is a straight line.

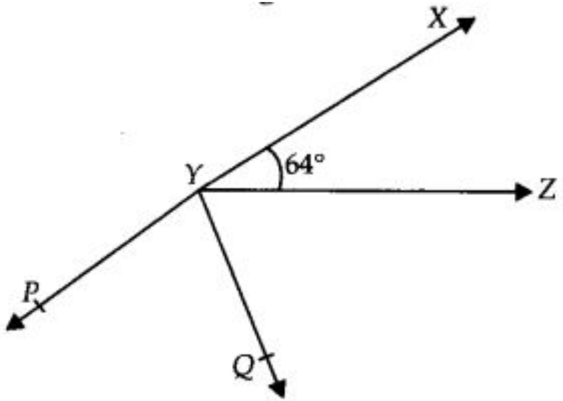
Question 5.
In figure, POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that

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



Solution:
rara POQ is a straight line. [Given]
$\therefore$ $\angle POS + \angle ROS + \angle ROQ = 180°$
But $OR \perp PQ$
$\therefore$ $\angle ROQ = 90°$
$\Rightarrow$ $\angle POS + \angle ROS + 90° = 180°$
$\Rightarrow$ $\angle POS + \angle ROS = 90°$
$\Rightarrow$ $\angle ROS = 90° - \angle POS$ … (1)
we have $\angle ROS + \angle ROQ = \angle QOS$
$\Rightarrow$ $\angle ROS + 90° = \angle QOS$
$\Rightarrow$ $\angle ROS = \angle QOS - 90°$ ……(2)
Adding (1) and (2), we have
$2\angle ROS = (\angle QOS - \angle POS)$
$\therefore$ $\angle ROS = 1/2(\angle QOS - \angle POS)$

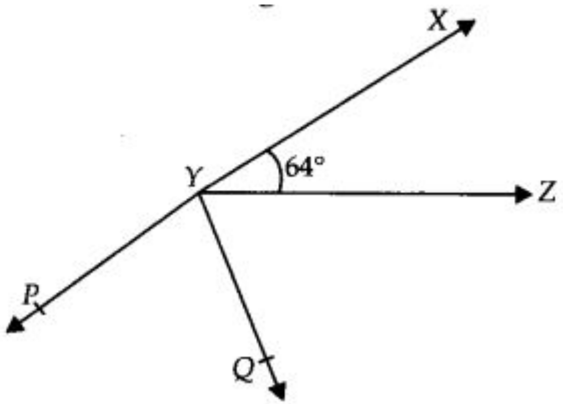
Question 6.
It is given that $\angle XYZ = 64°$ and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects $\angle ZYP$, find $\angle XYQ$ and reflex $\angle QYP$.

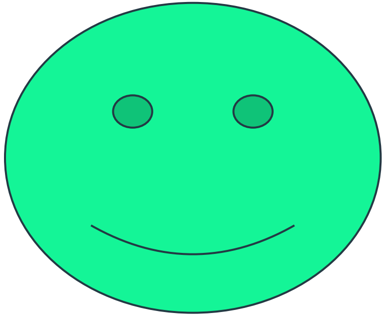


Solution:
XYP is a straight line.

$\angle XYZ + \angle ZYQ + \angle QYP = 180°$
$\Rightarrow 64° + \angle ZYQ + \angle QYP = 180°$
[$\because$ $\angle XYZ = 64°$ (given)]
$\Rightarrow 64° + 2\angle QYP = 180°$
[YQ bisects $\angle ZYP$. so, $\angle QYP = \angle ZYQ$]
$\Rightarrow 2\angle QYP = 180° – 64° = 116°$
$\Rightarrow \angle QYP = 116 \circ 2 = 58°$
$\therefore$ Reflex $\angle QYP = 360° – 58° = 302°$

Since $\angle XYQ = \angle XYZ + \angle ZYQ$
$\Rightarrow \angle XYQ = 64° + \angle QYP$.
[$\because \angle XYZ = 64°$(Given) and $\angle ZYQ = \angle QYP$]
$\Rightarrow \angle XYQ = 64° + 58° = 122°$ [$\angle QYP = 58°$]
Thus, $\angle XYQ = 122°$ and reflex $\angle QYP = 302°$.





Thank you