Lines and Angles

CHAPTER 6

NCERT FOCUS — SOLUTIONS

EXERCISE - 6.1

1. Since, AB is a straight line.

$\therefore$ $\angle AOC + \angle COE + \angle EOB = 180°$

or $(\angle AOC + \angle BOE) + \angle COE = 180°$

or $70° + \angle COE = 180°$ [$\because$ $\angle AOC + \angle BOE = 70°$ (Given)]

or $\angle COE = 180° - 70° = 110°$

$\therefore$ Reflex $\angle COE = 360° - 110° = 250°$

Now, as AB and CD intersect at O.

$\therefore$ $\angle COA = \angle BOD$ [Vertically opposite angles]

But $\angle BOD = 40°$ [Given]

$\therefore$ $\angle COA = 40°$

Also, $\angle AOC + \angle BOE = 70°$

$\therefore$ $40° + \angle BOE = 70° \Rightarrow \angle BOE = 70° - 40° = 30°$

Thus, $\angle BOE = 30°$ and reflex $\angle COE = 250°$.

2. Since, XOY is a straight line.

$\therefore$ $b + a + \angle POY = 180°$

But $\angle POY = 90°$ [Given]

$\therefore$ $b + a = 180° - 90° = 90°$ ...(i)

Also, we have $a : b = 2 : 3$

$\therefore$ $a = \frac{2}{5}(a+b) = \frac{2}{5} \times 90° = 36°$

and $b = \frac{3}{5} \times 90° = 54°$ (Using (i))

Since, XY and MN intersect at O.

$\therefore$ $c = a + \angle POY$ [Vertically opposite angles]

$\Rightarrow$ $c = 36° + 90° = 126°$

Thus, the required measure of $c = 126°$.

3. Since, ST is a straight line.

$\therefore$ $\angle PQR + \angle PQS = 180°$ ...(i) [Linear pair]

Similarly, $\angle PRT + \angle PRQ = 180°$ ...(ii) [Linear Pair]

From (i) and (ii), we have

$\angle PQR + \angle PQS = \angle PRT + \angle PRQ$

But $\angle PQR = \angle PRQ$ [Given]

$\therefore$ $\angle PQS = \angle PRT$

4. Since, sum of all the angles around a point = 360°

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

But $(x + y) = (z + w)$ [Given]

$\therefore$ $(x + y) + (x + y) = 360° \Rightarrow 2(x + y) = 360°$

$\Rightarrow$ $(x+y) = \frac{360°}{2} = 180°$

$\therefore$ AOB is a straight line. [By linear pair axiom]

5. Since, POQ is a straight line. [Given]

$\therefore$ $\angle POS + \angle ROS + \angle ROQ = 180°$

But $OR \perp PQ$ $\therefore$ $\angle ROQ = 90°$

$\Rightarrow$ $\angle POS + \angle ROS + 90° = 180°$

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

$\Rightarrow$ $\angle ROS = 90° - \angle POS$ ...(i)

Also, we have $\angle ROS + \angle ROQ = \angle QOS$

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

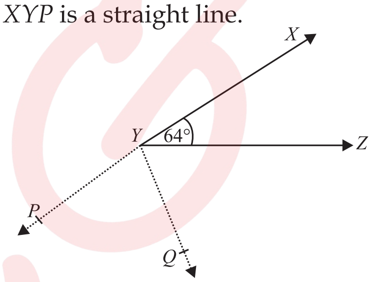
$\Rightarrow$ $\angle ROS = \angle QOS - 90°$ ...(ii)

Adding (i) and (ii), we have

$2\angle ROS = (\angle QOS - \angle POS)$

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

6. Since, XYP is a straight line.



$\therefore$ $\angle XYZ + \angle ZYQ + \angle QYP = 180°$

$\Rightarrow$ $64° + \angle ZYQ + \angle QYP = 180°$ [$\because$ $\angle XYZ = 64°$ (given)]

$\Rightarrow$ $64° + 2\angle QYP = 180°$

[$\because$ YQ bisects $\angle ZYP$, so $\angle QYP = \angle ZYQ$]

$\Rightarrow$ $2\angle QYP = 180° - 64° = 116°$

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

$\therefore$ 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 $\angle ZYQ = \angle QYP$]

$\Rightarrow$ $\angle XYQ = 64° + 58° = 122°$ [$\because$ $\angle QYP = 58°$]

Thus, $\angle XYQ = 122°$ and reflex $\angle QYP = 302°$

EXERCISE - 6.2

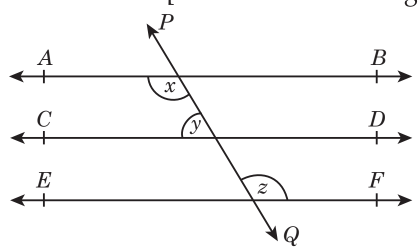
1. Given, $AB \parallel CD$ and $CD \parallel EF$

Let PQ be the given transversal

Then, we have $AB \parallel EF$ and PQ is a transversal.

[$\because$ $AB \parallel CD$ and $CD \parallel EF \Rightarrow AB \parallel EF$]

$\therefore$ $x = z$ [Alternate interior angles] ...(i)



Again, $AB \parallel CD$ and PQ is a transversal

$\therefore$ $x + y = 180°$ [Co-interior angles]

$\Rightarrow$ $z + y = 180°$ [Using (i)]

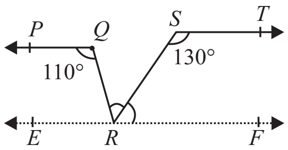
But $y : z = 3 : 7$

$\therefore \quad z = \left[\frac{7}{(3+7)}\right] \times 180° = \frac{7}{10} \times 180° = 126°$ ...(ii)

From (i) and (ii), we get

$x = 126°$.

2. Let us first draw a line parallel to ST through R.



Since $PQ \parallel ST$ [Given]

and $EF \parallel ST$ [By construction]

$\therefore \quad PQ \parallel EF$ and QR is a transversal.

$\Rightarrow \quad \angle PQR = \angle QRF$ [Alternate interior angles]

But $\angle PQR = 110°$ [Given]

$\therefore \quad \angle QRF = \angle QRS + \angle SRF = 110°$ ...(i)

Again $ST \parallel EF$ and RS is a transversal

$\therefore \quad \angle RST + \angle SRF = 180°$ [Co-interior angles]

or $\quad 130° + \angle SRF = 180°$

$\Rightarrow \quad \angle SRF = 180° - 130° = 50°$ ...(ii)

Now, from (i) and (ii), we have

$\angle QRS + 50° = 110°$

$\Rightarrow \quad \angle QRS = 110° - 50° = 60°$

Thus, $\angle QRS = 60°$.