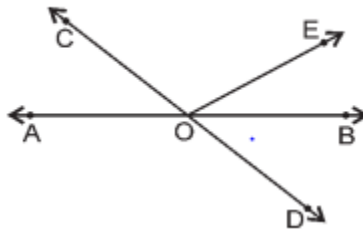


# NCERT solutions of Line and angles part 1

## Question 1

In below figure, lines AB and CD intersect at O. If  $\angle AOC + \angle BOE = 70^\circ$  and  $\angle BOD = 40^\circ$ , find  $\angle BOE$  and reflex  $\angle COE$ .



## Answer

Given,

$$\angle AOC + \angle BOE = 70^\circ \text{ and } \angle BOD = 40^\circ$$

Now AOB is a straight line

$$\angle AOC + \angle BOE + \angle COE = 180^\circ$$

$$70^\circ + \angle COE = 180^\circ$$

$$\angle COE = 110^\circ$$

Also COD is a straight line

$$\angle COE + \angle BOD + \angle BOE = 180^\circ$$

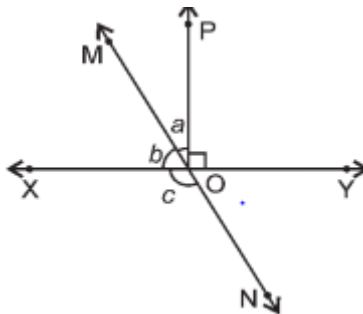
$$110^\circ + 40^\circ + \angle BOE = 180^\circ$$

$$150^\circ + \angle BOE = 180^\circ$$

$$\angle BOE = 30^\circ$$

## Question 2

In below figure lines XY and MN intersect at O. If  $\angle POY = 90^\circ$  and  $a : b = 2 : 3$ , find c.



### Answer

Given,  
 $\angle POY = 90^\circ$  and  $a : b = 2 : 3$

Let  $x$  be the common ratio, then  $a=2x$  and  $b=3x$

Now  $XOY$  is a straight line

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

$$90^\circ + a + b = 180^\circ$$

$$a + b = 90^\circ$$

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

$$5x = 90^\circ$$

$$x = 18^\circ$$

$$\text{So } a = 2 \times 18^\circ = 36^\circ$$

$$\text{and } b = 3 \times 18^\circ = 54^\circ$$

Also, now angle  $b$  and Angle  $c$  forms a linear pair

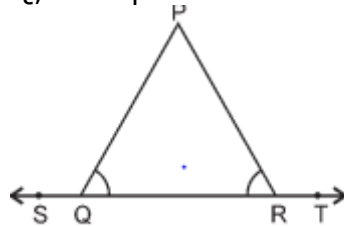
$$b + c = 180^\circ$$

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

$$c = 126^\circ$$

### Question 3

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



### Answer

Given  
 $\angle PQR = \angle PRQ$   
 To prove,  
 $\angle PQS = \angle PRT$

Now  $\angle PQR$  and  $\angle PQS$  forms a linear pair

$$\angle PQR + \angle PQS = 180^\circ$$

$$\angle PQS = 180^\circ - \angle PQR \text{ --- (a)}$$

Also,  $\angle PRQ$  and  $\angle PRT$  forms a linear pair

$$\angle PRQ + \angle PRT = 180^\circ ($$

$$\angle PRT = 180^\circ - \angle PRQ$$

Now as ( $\angle PQR = \angle PRQ$

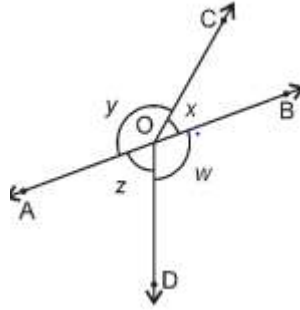
$$\angle PRQ = 180^\circ - \angle PQR \text{ --- (b)}$$

From (a) and (b)

$\angle PQS = \angle PRT = 180^\circ - \angle PQR$   
 Therefore,  $\angle PQS = \angle PRT$

#### Question 4

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



#### Answer

Given,

$$x + y = w + z$$

To Prove,

AOB is a line or  $x + y = 180^\circ$

Now O is the point and we have four angles around it

$$x + y + w + z = 360^\circ$$

$$(x + y) + (w + z) = 360^\circ$$

Now Given  $x + y = w + z$

$$(x + y) + (x + y) = 360^\circ$$

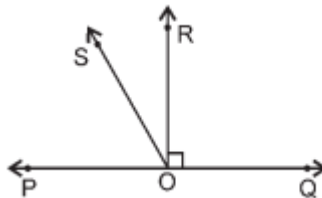
$$2(x + y) = 360^\circ$$

$$(x + y) = 180^\circ$$

Hence,  $x + y$  makes a linear pair. Therefore, AOB is a straight line.

#### Question 5

In below 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

Given,

OR is perpendicular to line PQ

To prove,

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

**Proof**

$\angle POR = \angle ROQ = 90^\circ$  (Perpendicular)

From the figure, it is clear that

$$\angle QOS = \angle ROQ + \angle ROS = 90^\circ + \angle ROQ \text{ --- (a)}$$

$$\angle POS = \angle POR - \angle ROS = 90^\circ - \angle ROQ \text{ --- (b)}$$

Subtracting (b) from (a)

$$\angle QOS - \angle POS = 90^\circ + \angle ROQ - (90^\circ - \angle ROQ)$$

$$\Rightarrow \angle QOS - \angle POS = 90^\circ + \angle ROQ - 90^\circ + \angle ROQ$$

$$\Rightarrow \angle QOS - \angle POS = 2\angle ROQ$$

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

Hence, proved.

**Question 6**

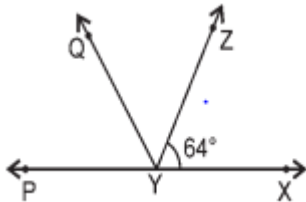
It is given that  $\angle XYZ = 64^\circ$  and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects  $\angle ZYP$ , find  $\angle XYQ$  and reflex  $\angle QYP$ .

**Answer**

Given,

$$\angle XYZ = 64^\circ$$

YQ bisects  $\angle ZYP$



Now angle  $\angle XYZ$  and  $\angle ZYP$  forms a linear pair

$$\angle XYZ + \angle ZYP = 180^\circ$$

$$64^\circ + \angle ZYP = 180^\circ$$

$$\angle ZYP = 116^\circ$$

Now YQ bisects  $\angle ZYP$

$$\angle ZYQ = \angle QYP$$

$$\text{Also } \angle ZYP = \angle ZYQ + \angle QYP$$

$$\text{So } \angle ZYP = 2\angle ZYQ$$

$$2\angle ZYQ = 116^\circ$$

$$\angle ZYQ = 58^\circ = \angle QYP$$

Now,

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

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

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

Also,

$$\text{reflex } \angle QYP = 180^\circ + \angle XYQ$$

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

$$= 302^\circ$$