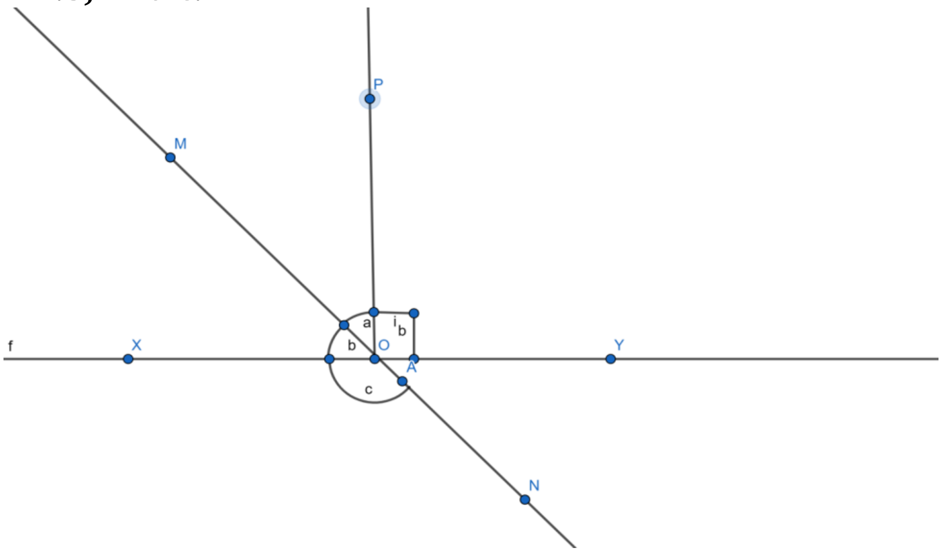
lines and angles

6 Chapter

Exercise 6.1

1.In the given figure, lines XY and MN intersect at O. If $\angle POY = 90^{o}$ and a: b = 2:3, find c.



Ans: Let the common ratio between a and b be x.

$\therefore$ a = 2x , and b = 3x

XY is a straight line, OM and OP are rays from O.

We know that a straight line covers 180°

$\angle XOM + \angle MOP + \angle POY = 180^{o}$

Putting values for $\angle XOM = b$ and $\angle MOP = a$

$\Rightarrow b + a + \angle POY = 180^{o}$

$\Rightarrow 3x + 2x + \angle POY = 180^{o}$

$\Rightarrow 5x = 90^{o}$

o

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$\Rightarrow x = 18$

$\therefore a = 2x$

$\Rightarrow a = 2\times18^\circ$

$= 36^\circ$

$\therefore b = 3x$

$\Rightarrow b = 3\times18^\circ$

$= 54^\circ$

Similarly MN is a straight line, OX is a ray from O

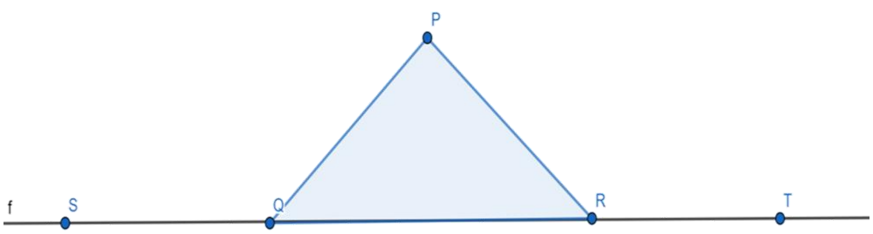
$\therefore b+c=180^\circ$

$54^o + c = 180^o$

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

$c = 126^\circ$

2.In the given figure, $\angle PQR=\angle PRQ$, then prove that $\angle PQS=\angle PRT$.



Ans: ST is a straight line, QP is a line segment from Q in ST to any point P by Linear Pair property

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

$\Rightarrow \angle PQR=180^o-\angle PQS$ ......(1)

Similarly

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

$\Rightarrow \angle PRQ=180^o-\angle PRT$ ......(2)

Now in the question it is given that $\angle PQR=\angle PRQ$

Therefore on equating equation (1) and (2) we get

$180^o-\angle PQS=180^o-\angle PRT$

$\Rightarrow \angle PQS=\angle PRT$

Hence proved

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

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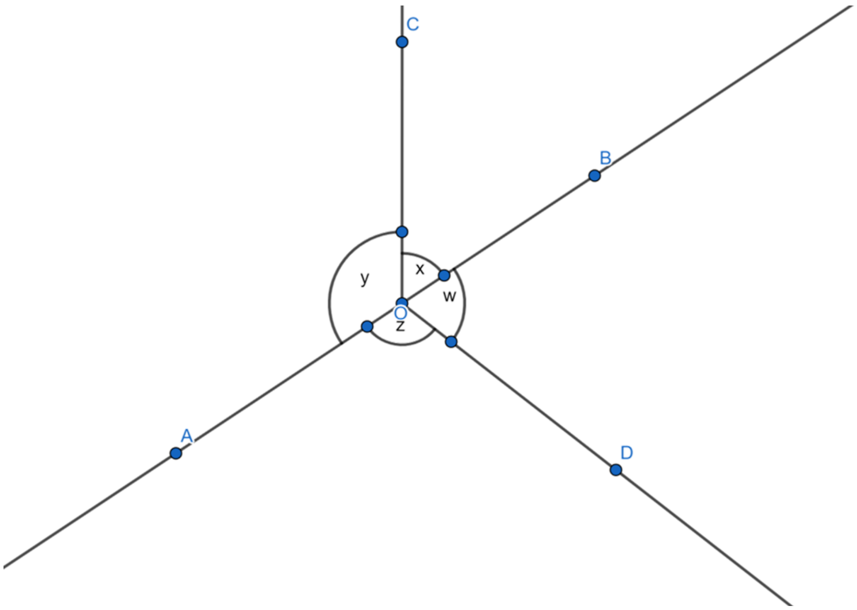

Ans: It can be observed that,

Since there are 360° around a point therefore we can write

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

It is given that,

$x+y=w+z$

Therefore writing $x+y$ in place of $w+z$ so that we can eliminate w and z, we get

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

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

$x+y=180^\circ$

Since x and y form a linear pair, hence we can say that AOB is a line.

Hence proved

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

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

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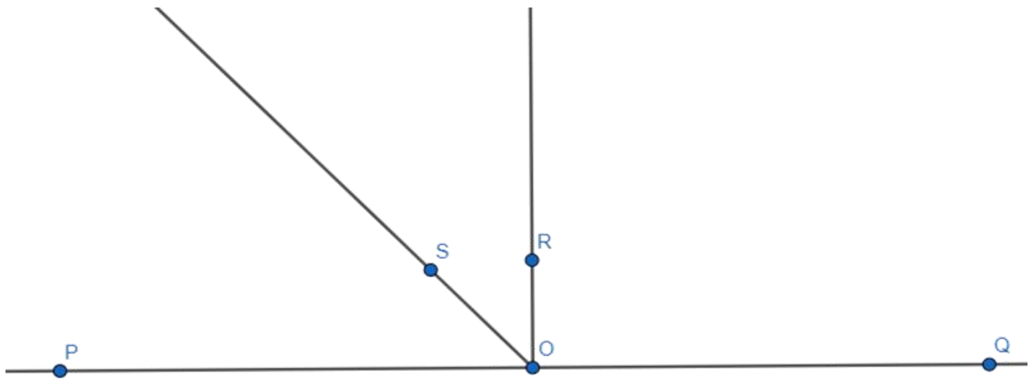

Ans: Since $OR \perp PQ$ therefore

$\angle POR = 90^o$

$\angle POS + ROS = 90^\circ$

$\Rightarrow \angle ROS = 90^o - \angle POS$ ...... (1)

Similarly $\angle QOR = 90^o$ (Since $OR \hat{} PQ$)

$\therefore \angle QOS - \angle ROS = 90^o$

$\Rightarrow \angle ROS = \angle QOS - 90^o$ ......(2)

We can clearly see that on adding equation (1) and (2) 90° get canceled out

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

Which can easily be written as

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

Hence proved

5.It is given that ÐXYZ=64º and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects ÐZYP , find ÐXYQ and reflex ÐQYP .

Ans: It is given that line YQ bisects $\angle ZYP$.

Hence, $\angle QYP = \angle ZYQ$

It can easily be understood that PX is a line, YQ and YZ being rays standing on it.

$\angle XYZ + \angle ZYQ + \angle QYP = 180^o$

From above relation $\angle QYP = \angle ZYQ$ we can write

$64^o + 2\angle QYP = 180^o$

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$\Rightarrow 2\angle QYP = 180^o - 64^o$

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

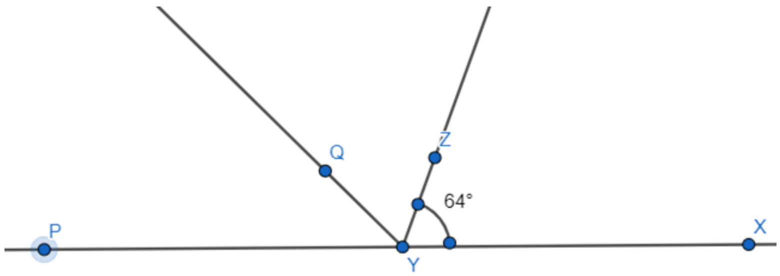
Therefore $\angle ZYQ = 58^\circ$

Also Reflex $\angle QYP = 302^\circ$

Now we can write $\angle XYQ$ as below

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

$64^\circ + 58^\circ = 122^\circ$



Therefore we found $\angle XYQ = 122^\circ$ and so the Reflex $\angle QYP = 302^\circ$