4) In Fig. 6.16, if $x + y = w + z$, then prove that AOB is a line.

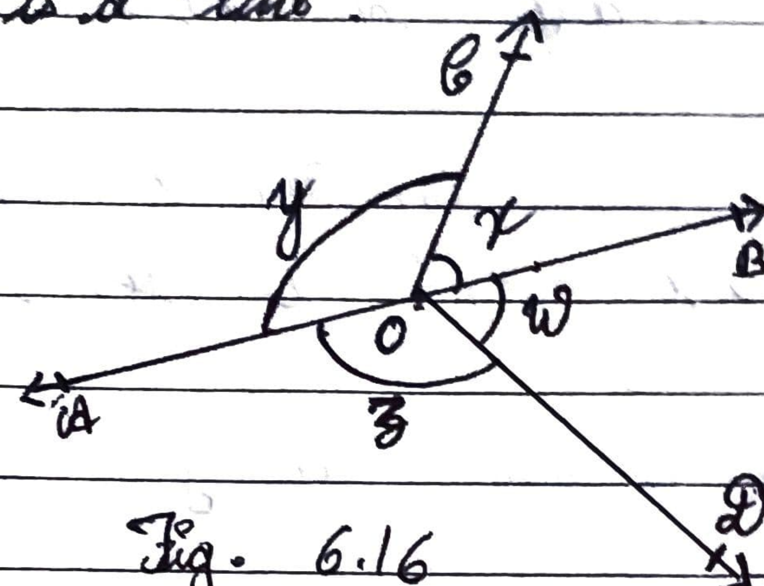


Fig. 6.16

ans) For proving AOB is a straight line, we will have to prove $x + y$ is a linear pair.

i.e. $x + y = 180^\circ$

We know that the angles around a point are 360° so,

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

given,

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

$2(x + y) = 360^\circ$ ∴ It is proved that $(x + y) = 180^\circ$

5) In Fig. 6.17, ~~RQ~~ POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that ROS = $\frac{1}{2}$ (QOS - POS).

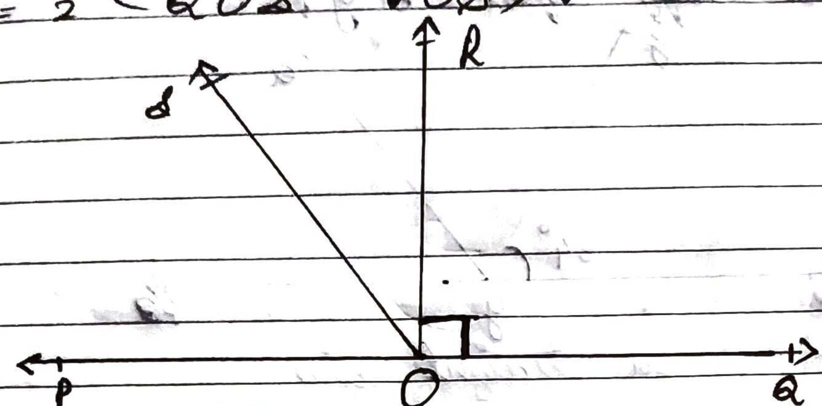


Fig. 6.17

ans) In this question, it is given that (OR ⊥ PQ) and POQ = 180°

So,

$POS + ROS + ROQ = 180^\circ$

Now,

$POS + ROS = 180^\circ - 90^\circ$ (Since POR = ROQ = 90°)

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

Now,

$QOS = ROQ + ROS$

It is given that ROQ = 90°

$\therefore QOS = 90^\circ + ROS$

Or,

$QOS - ROS = 90^\circ$

As $POS + ROS = 90^\circ$ and $QOS - ROS = 90^\circ$, we get

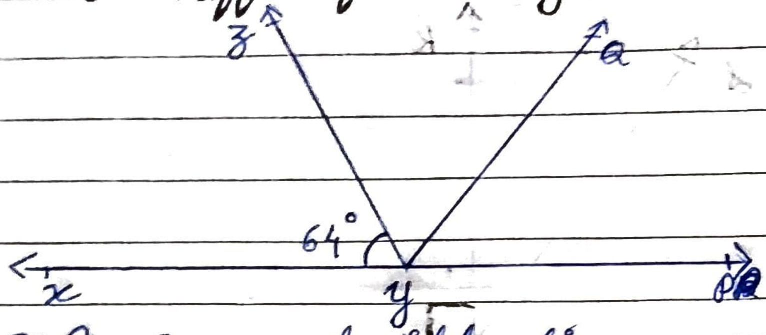
$POS + ROS = QOS - ROS$

$2\ ROS + POS = QOS$

Or, $ROS = \frac{1}{2}(QOS - POS)$ $\therefore$ proved.

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

ans)



Here, XP is a straight line

So,

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

Putting the value of $XYZ = 64^\circ$ we get,

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

$\therefore ZYP = 116^\circ$

From the diagram, we also know that ~~ZYP = ZYQ~~

~~Now~~ $ZYP = ZYQ + QYP$.

Now,

as YQ bisects ZYP,

$ZYQ = QYP$

Or, $ZYP = 2ZYQ$

$\therefore ZYQ = QYZ + ZYQ$

By putting the value of $XYZ = 64^\circ$ and $ZYQ = 58^\circ$ we get,

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

Or, $XYQ = 112^\circ$

Now, Reflex $QYP = 180^\circ + XYQ$

We computed that the value of $XYQ = 112^\circ$

So,

$QYP = 180^\circ + 112^\circ$

$\therefore QYP = 302^\circ$