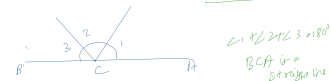
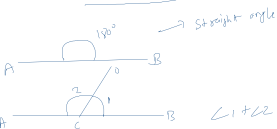


Lines and Angles



Theorem 6.1 : If two lines intersect each other, then the vertically opposite angles are equal.

Given: PO and BC are two lines intersecting each other at O.

To prove: $\angle AOB = \angle COD$

Proof: AOB is a straight line
 $\angle AOB + \angle BOD = 180^\circ$ (Linear pair)

BOC is a straight line
 $\angle BOD + \angle COD = 180^\circ$ (Linear pair)

From (i) and (ii)
 $\angle AOB + \angle BOD = \angle BOD + \angle COD$
 $\angle AOB = \angle COD$

Similarly we can prove $\angle BOD = \angle AOC$



Given: $\angle AOC + \angle AOE = 70^\circ$
 $\angle BOD = 40^\circ$

To find: $\angle BOE$ & reflex $\angle COE$

$\angle AOC = \angle BOD$ (Vertically opposite angles)
 $\angle AOC = 40^\circ$ — (1)

$\angle AOC + \angle BOE = 70^\circ$ (Given)

$40^\circ + \angle BOE = 70^\circ$ (From (1))
 $\angle BOE = 70^\circ - 40^\circ$
 $= 30^\circ$

AB is a straight line.

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

$40^\circ + \angle COE + 30^\circ = 180^\circ$

$\angle COE = 180^\circ - 70^\circ$
 $= 110^\circ$

Reflex $\angle COE = 360^\circ - \angle COE$
 $= 360^\circ - 110^\circ$
 $= 250^\circ$



Given: $x + y = w + z$

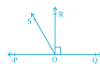
To prove: AOB is a line

Proof: $x + y + w + z = 360^\circ$ (Complete angle)

$(x + y) + (w + z) = 360^\circ$ (Given)
 $= 2(x + y) = 360^\circ$
 $\therefore x + y = 180^\circ$

but x & y are also linear pair.
 \therefore AOB is a line.

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



To prove:

Given: POQ is a line,
 $\angle ROQ = 90^\circ$

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

Proof:

$\angle QOS = \angle ROQ + \angle ROS$

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

$\angle QOS - 90^\circ = \angle ROS$ — (i)

Add (i) & (ii)

$2\angle ROS = \angle QOS - 90^\circ + 90^\circ - \angle POS$

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

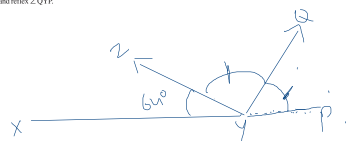
From the figure

$\angle POR = \angle ROS + \angle POS$

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

$90^\circ - \angle POS = \angle ROS$ (ii)

6. It is given that $\angle XYZ = 64^\circ$ and XY is produced to point P. Draw a figure from the given information. Ray YQ bisects $\angle ZYP$ and $\angle X Y Q$ and reflex $\angle QYP$.



XYZ is a str

$64^\circ + \angle ZYQ + \angle QYP = 180^\circ$
 $\angle ZYQ + \angle QYP = 116^\circ$