PERIOD 3

MATHEMATICS

CHAPTER NUMBER :~ 6
CHAPTER NAME :~ LINES AND ANGLES

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Previous Knowledge Test

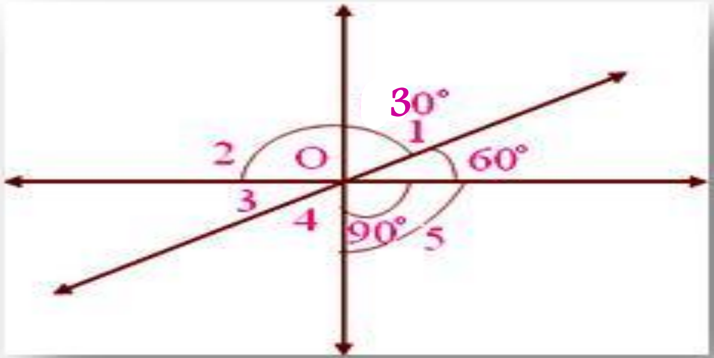
1. Write the statement of Theorem 6.1
2. Explain vertically opposite angle.

LEARNING OUTCOME:~

1. Students will able to understand vertically opposite angle theorem.

2. Students will be able solve different sums based on vertically opposite angle

1. In the given figure, find the measure of unknown angles.



Solution:

(i) $\angle 3 = 60°$ vertically opposite angles

(ii) $\angle 2 = 90°$ vertically opposite angles

(iii) $\angle 2 + \angle 1 + 60° = 180°$ (straight angle)

$90° + \angle 1 + 60° = 180°$

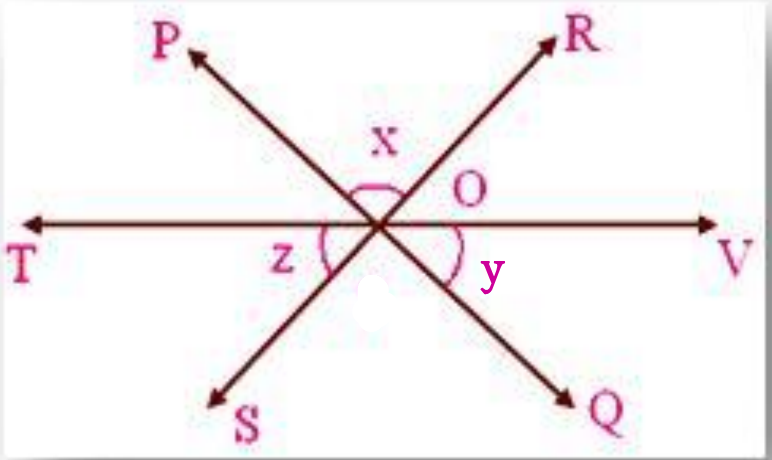
$150° + \angle 1 = 180°$

Therefore, $\angle 1 = 180° - 150° = 30°$

(iv) $\angle 1 = \angle 4$ vertically opposite angles

Therefore, $\angle 4 = 30°$

2. In the given figure, lines PQ, RS, TV intersect at O. If x : y : z = 1 : 2 : 3, then find the values of x, y, z.



Solution:

The sum of all the angles at a point is 360°.

$\angle POR = \angle SOQ = x°$ (Pair of vertically opposite angles are equal.)

$\angle VOQ = \angle POT = y°$ (Pair of vertically opposite angles are equal.)

$\angle TOS = \angle ROV = z°$ (Pair of vertically opposite angles are equal.)

Therefore, $\angle POT + \angle POR + \angle ROV + \angle VOQ + \angle QOS + \angle SOT = 360°$

$$y + x + z + y + x + z = 360°$$
$$\Rightarrow 2x + 2y + 2z = 360°$$
$$\Rightarrow 2(x + y + z) = 360°$$
$$\Rightarrow x + y + z = \cancel{360°}/\cancel{2}$$
$$\Rightarrow x + y + z = 180° \text{ ---------- (i)}$$

Let the common ratio be a.

Therefore, x = a, y = 2a, z = 3a

Therefore, from the equation (i) we get;

$a + 2a + 3a = 180°$

$\Rightarrow 6a = 180°$

$\Rightarrow a = 180°/6$

$\Rightarrow a = 30°$

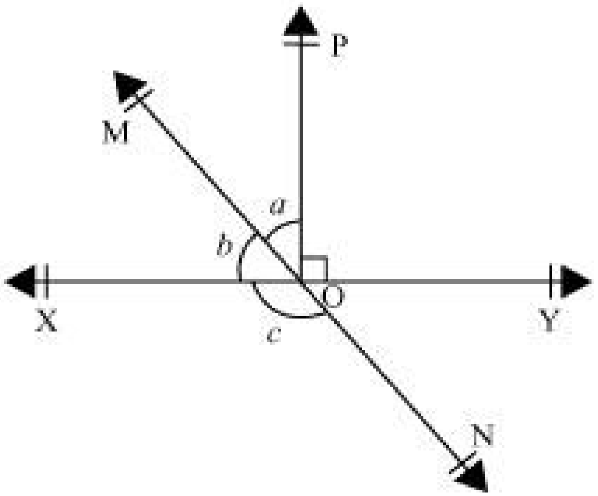
Therefore, $x = a$, means $x = 30°$

$y = 2a$, means $y = 2 \times 30 = 60°$

$z = 3a$, means $z = 3 \times 30 = 90°$

Therefore, the measures of the angles are 30°, 60°, 90°.

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



Let the common ratio between a and b be x.

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

XY is a straight line, rays OM and OP stand on it.

$\therefore \angle XOM + \angle MOP + \angle POY = 180^\circ$

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

$3x + 2x + 90^\circ = 180^\circ$

$5x = 90^\circ$

$x = 18^\circ$

$a = 2x = 2 \times 18 = 36^o$

$b = 3x = 3 \times 18 = 54^o$

MN is a straight line. Ray OX stands on it.

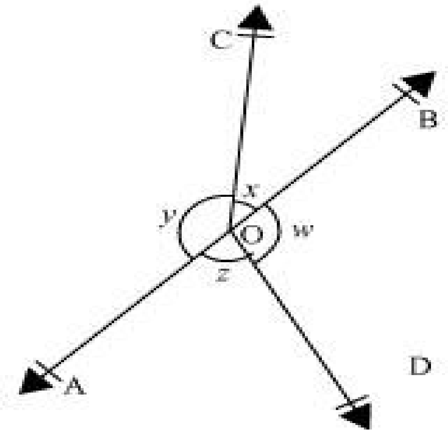
$\therefore b + c = 180^o$ (Linear Pair)

$54^o + c = 180^o$

$c = 180^o - 54^o = 126^o$

$\therefore c = 126^o$

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



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ANSWER:

It can be observed that,

$x + y + z + w = 360^o$ (Complete angle)

It is given that,

$x + y = z + w$

$\therefore x + y + x + y = 360^o$

$2(x + y) = 360^o$

$x + y = 180^o$

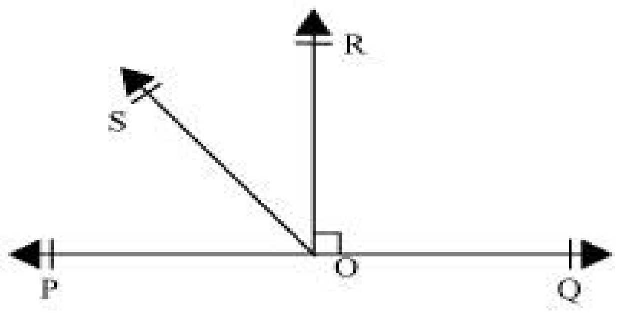
Since x and y form a linear pair, AOB is a line.

Evaluation:-

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

Prove that

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



ANSWER:

It is given that $OR \perp PQ$

$\therefore \angle POR = 90^o$

$\Rightarrow \angle POS + \angle SOR = 90^o$

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

$\angle QOR = 90^o$ (As $OR \perp PQ$)

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

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

On adding equations (1) and (2), we obtain

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

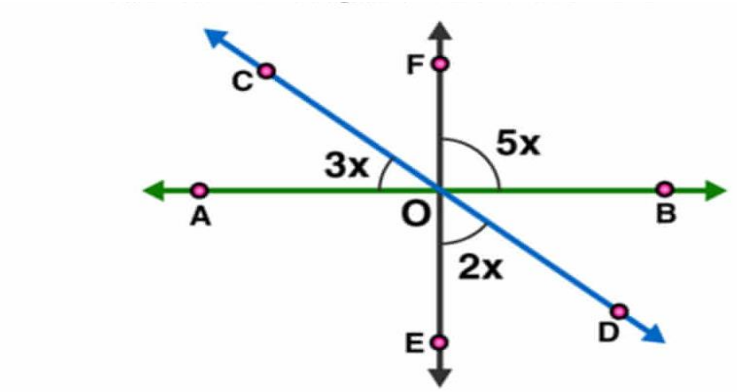
$$\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$$

HOMEWORK ASSIGNMENT

EXERCISE 6.1

AHA:~

1. In the figure find the value of x.



2.If two straight lines intersect each other, prove that the ray opposite to the bisector of one of the angles thus formed bisects the vertically opposite angles.

THANKING YOU

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