ODM EDUCATIONAL GROUP
Changing your Tomorrow

PERIOD 7

MATHEMATICS

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

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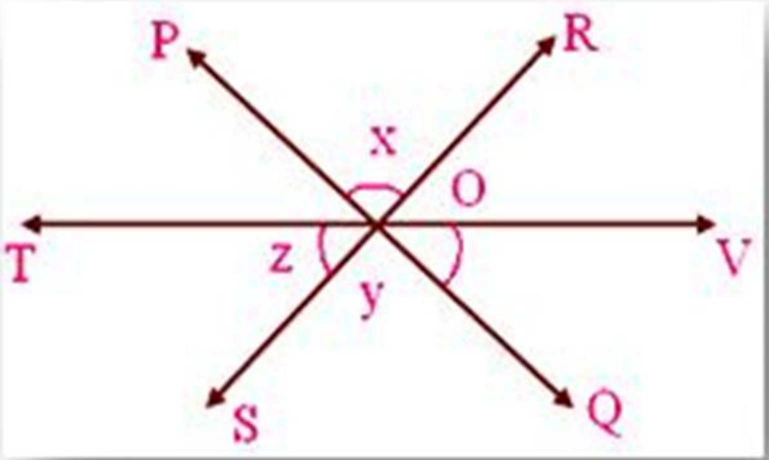
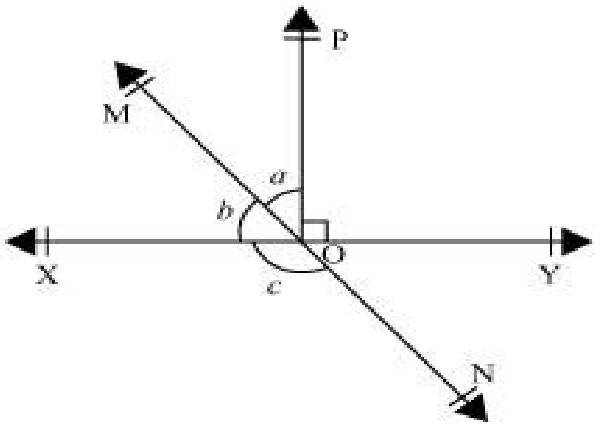
PREVIOUS KNOWLEDGE TEST

1. 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.



LEARNING OUTCOME:-

1. Students will be able to learn basic terms and definitions of lines and angles.
2. Students will be able to learn different types of angle.
3. Students will get to know about vertically opposite angles.
4. Students will be able to prove the theorem by logical reasoning.
5. Students will able to understand vertically opposite angle theorem.
6. Students will be able solve different sums based on vertically opposite angle



In the given figure, lines XY and MN intersect at O. If ∠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.

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

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

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

$5x = 90^\circ$

$x = 18^\circ$

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

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

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

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

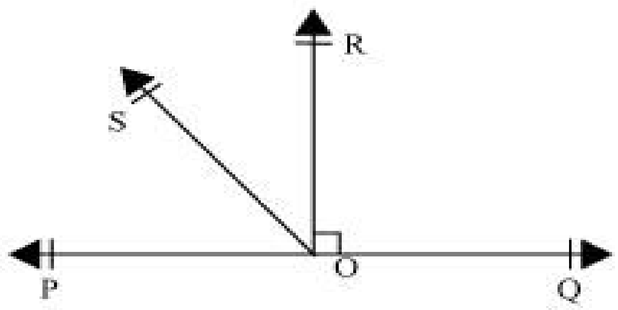
$54^\circ + c = 180^\circ$

$c = 180^\circ - 54^\circ = 126^\circ$

$\therefore c = 126^\circ$

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 ⊥ PQ

$\therefore \angle POR = 90^o$

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

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

$\angle QOR = 90^o$ (As OR ⊥ PQ)

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

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

adding both the equation we get: $2\angle ROS = \angle QOS - \angle POS$

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

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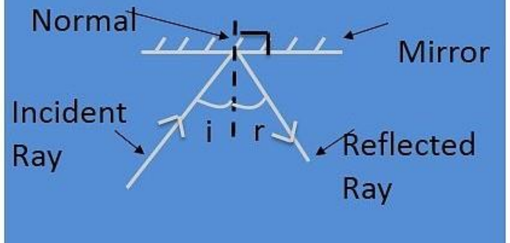
Ex6.2, 6

In the given figure, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB || CD.

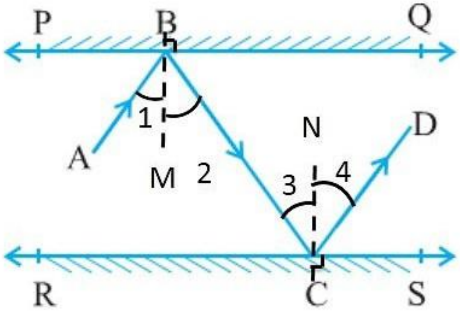
Here AB is incident ray and BC is reflected ray.

From law of reflection,

Incident angle = Reflected Angle



So, $\angle i = \angle r$

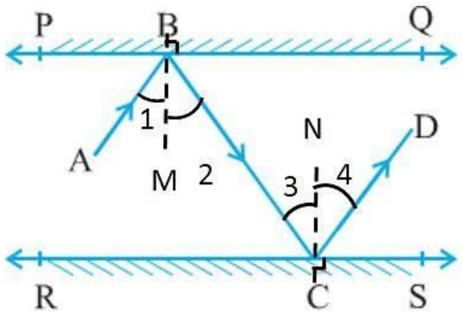


From laws of reflection,

$\angle 1 = \angle 2$

$\angle 3 = \angle 4$

$\angle 1 = \angle 2$ & $\angle 3 = \angle 4$



So, $\angle 1 = \angle 2 = \frac{1}{2} \angle ABC$

and $\angle 3 = \angle 4 = \frac{1}{2} \angle BCD$

We have to prove AB || CD

Here, BM & CN are normal

So, $BM \perp PQ$ and $CN \perp RS$.

But PQ || RS,

So, BM || CN

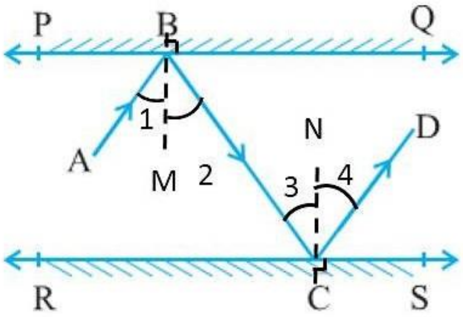
Now, BM || CN & BC is the transversal

$\therefore \angle 2 = \angle 3$ (Alternate interior angles)

$\angle 2 = \angle 3$

$\frac{1}{2}\angle ABC = \frac{1}{2}\angle BCD$

$\angle ABC = \angle DCB$



Since, $\angle ABC = \angle DCB$

But $\angle ABC$ & $\angle DCB$ are alternate interior angles for lines AB & CD with transversal BC

From theorem 6.3: *If a transversal intersects two lines such that pair of interior angles is equal, then lines are parallel.*

Since alternate interior angles are equal,

$\therefore$ AB || CD

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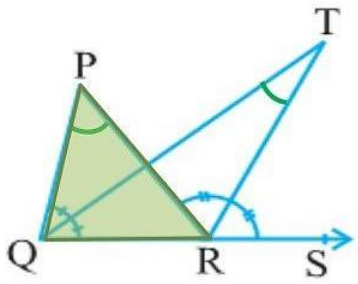
Ex 6.3 ,6

In the given figure, the side QR of ΔPQR is produced to a point S. If the bisectors of ∠PQR and ∠PRS meet at point T, then prove that $\angle QTR = \frac{1}{2}\angle QPR$



Given

TQ is the bisector of ∠ PQR.

So, $\angle PQT = \angle TQR = \frac{1}{2}\angle PQR$

Also,

TR is the bisector of ∠ PRS

So, $\angle PRT = \angle TRS = \frac{1}{2}\angle PRS$

In Δ PQR,

∠ PRS is the external angle

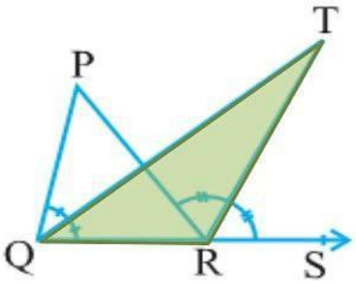
$\angle PRS = \angle QPR + \angle PQR$ (External angle is sumof two interior opposite angles) ...(1)

In Δ TQR,

∠ TRS is the external angle

$\angle TRS = \angle TQR + \angle QTR$ (External angle is sumof two interior opposite angles) ...(2)

Putting $\angle TRS = \frac{1}{2} \angle PRS$ & $\angle TQR = \frac{1}{2} \angle PQR$



$$\frac{1}{2} \angle PRS = \frac{1}{2} \angle PQR + \angle QTR$$

$$\frac{1}{2} \angle PRS = \frac{1}{2} \angle PQR + \angle QTR$$

Putting $\angle PRS = \angle QPR + \angle PQR$ *from (1)*

$$\frac{1}{2} (\angle QPR + \angle PQR) = \frac{1}{2} \angle PQR + \angle QTR$$

$$\frac{1}{2} \angle QPR + \frac{1}{2} \angle PQR = \frac{1}{2} \angle PQR + \angle QTR$$

$$\frac{1}{2} \angle QPR + \frac{1}{2} \angle PQR - \frac{1}{2} \angle PQR = \angle QTR$$

$$\frac{1}{2} \angle QPR = \angle QTR$$

$$\angle QTR = \frac{1}{2} \angle QPR$$

Hence proved

HOMEWORK ASSIGNMENT

Practice chapter 6

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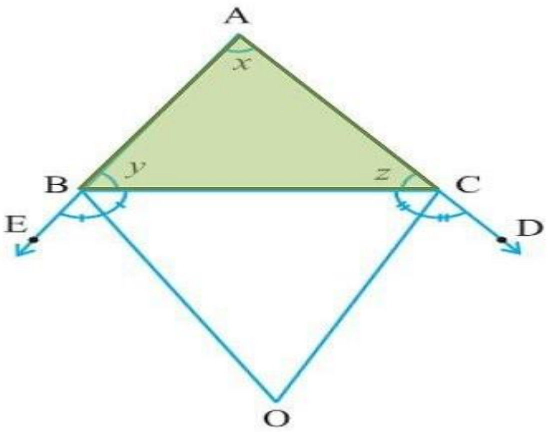
AHA

- 1. In figure, the sides AB and AC of ΔABC are produced to points E and D respectively. If bisectors BO and CO of $\angle CBE$ and $\angle BCD$ respectively meet at point O, then prove that $\angle BOC = 90° - \frac{1}{2}\angle BAC$.



THANKING YOU

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