

CHAPTER -1

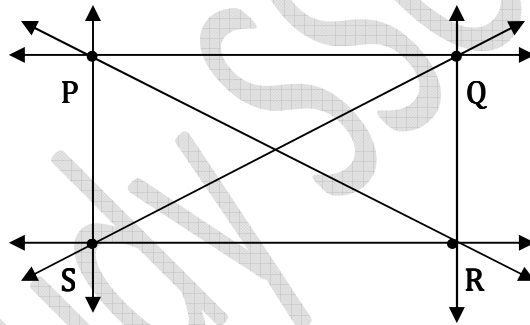
LINES AND ANGLES

EXERCISE - 1.1

Textual

- 1) Take four points P, Q, R, S in a plane. Draw lines by joining different pairs of points. How many lines can you draw in the following cases ?

SOLUTION:



6 lines can be drawn.

- 2) The co-ordinates of two points P and Q are x and y respectively.

Find $d(P, Q)$ in the following cases:

- i) $x = 7, y = 10$
ii) $x = -2, y = 11$

iii) $x = -8, y = -3$

iv) $x = 5, y = -9$

SOLUTION:

$$P = x, \quad Q = y$$

$$d(P, Q) = d(x, y)$$

i) $x = 7, y = 10$

$$d(x, y)$$

$$10 > 7$$

$$\therefore 10 - 7 = 3$$

$$\therefore d(P, Q) = 3$$

ii) $x = -2, y = 11$

$$11 > -2$$

$$\therefore 11 - (-2)$$

$$11 + 2 = 13$$

$$\therefore d(P, Q) = 13$$

iii) $x = -8$, $y = -3$

$$d(x, y)$$

$$-3 > -8$$

$$\therefore d(x, y) = -3 - (-8)$$

$$\therefore = -3 + 8$$

$$= 5$$

$$\therefore d(P, Q) = 5$$

iv) $x = 5$, $y = -9$

$$d(x, y)$$

$$5 > -9$$

$$\therefore d(x, y) = 5 - (-9)$$

$$\therefore = 5 + 9$$

$$= 14$$

$$\therefore d(P, Q) = 14$$

3) Measures of some angles are given below. Find the measures of their Supplementary angles.

i) 60°

ii) 138°

iii) $\frac{3}{5}$ th of a right angle.

iv) $(180 - r)^\circ$

v) $(90 + r)^\circ$

vi) $87^\circ 20' 43''$

vii) $124^\circ 28' 40''$

viii) $108^\circ 48' 32''$

SOLUTION:

i) 60°

$$\begin{aligned}\text{Supplement} &= 180 - 60 \\ &= 120^\circ\end{aligned}$$

ii) 138°

$$\begin{aligned}\text{Supplement} &= 180 - 138 \\ &= 42^\circ\end{aligned}$$

iii) $\frac{3}{5}$ th of a right angle

$$= \frac{3}{5} \times 90^\circ = 3 \times 18 = 54^\circ$$

$$\begin{aligned}\text{Supplement} &= 180^\circ - 54^\circ \\ &= 126^\circ\end{aligned}$$

iv) $(180-r)^\circ$

$$\begin{aligned}\text{Supplement} &= 180^\circ - (180 - r)^\circ \\ &= 180 - 180 + r \\ &= r^\circ\end{aligned}$$

v) $(90+r)^\circ$

$$\begin{aligned}\text{Supplement} &= 180^\circ - (90 - r)^\circ \\ &= 180 - 90 + r \\ &= (90 + r)^\circ\end{aligned}$$

vi) $87^\circ 20' 43''$

$$180^\circ = 179^\circ 59' 60''$$

$$\begin{array}{r} \text{Supplement} = \quad \quad \quad 179^\circ \quad 59' \quad 60'' \\ \quad \quad \quad \quad \quad \quad - \quad 87^\circ \quad 20' \quad 43'' \\ \hline \quad \quad \quad \quad \quad \quad 92^\circ \quad 39' \quad 17'' \end{array}$$

$$= 92^\circ 39' 17''$$

vii) $124^\circ, 28', 40''$

$$180^\circ = 179^\circ 59' 60''$$

$$\text{Supplement} = 179^\circ 59' 60''$$

$$- 124^\circ 28' 40''$$

$$55^\circ 31' 20''$$

$$= 55^\circ 31' 20''$$

viii) $108^\circ, 48', 32''$

$$180^\circ = 179^\circ 59' 60''$$

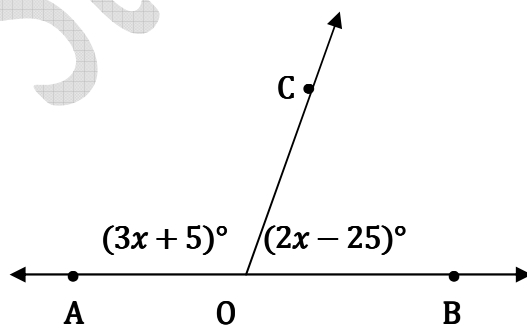
$$\text{Supplement} = 179^\circ 59' 60''$$

$$- 108^\circ 48' 32''$$

$$92^\circ 11' 28''$$

$$= 92^\circ 11' 28''$$

4) Find the measures of $\angle AOC$ and $\angle BOC$



Solution :

$$\angle AOC + \angle BOC = 180^\circ \quad \text{----- (linear pair)}$$

$$3x + 5 + 2x - 25 = 180^\circ$$

$$5x - 20 = 180$$

$$5x = 180 + 20$$

$$5x = 200$$

$$x = \frac{200}{5}$$

$$x = 40$$

$$\angle AOC = 3(40) + 5 \qquad \angle BOC = 2(40) - 25$$

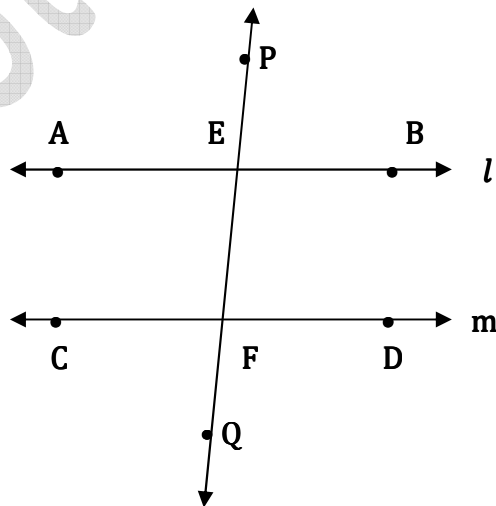
$$= 120 + 5 \qquad = 80 - 25$$

$$= 125^\circ \qquad = 55^\circ$$

$$\therefore \angle AOC = 125^\circ \quad \text{and} \quad \angle BOC = 55^\circ$$

5) In the figure line $l \parallel$ line m and PQ is the transversal.

If $\angle PEB = 70^\circ$. Find the measures of each of the remaining angles.

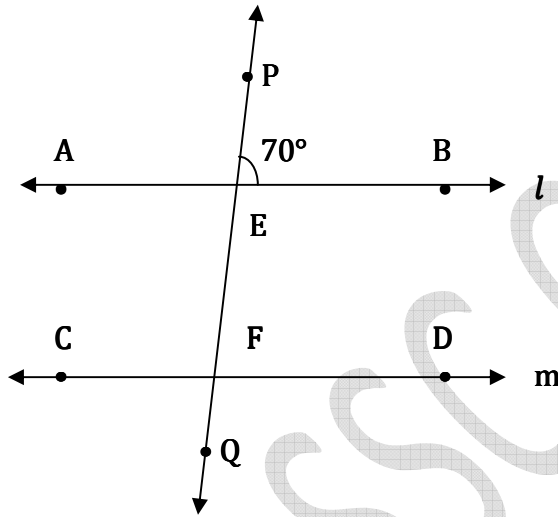


SOLUTION:

Given : line $l \parallel$ line m

PQ is the transversal, $\angle PEB = 70^\circ$

Find: measure of all angles



Solution :

$$\angle PEB = 70^\circ \quad \text{----- (given)}$$

$$\therefore \angle AEF = 70^\circ \quad \text{----- (vertically opposite } \angle s)$$

$$\angle AEP = 180 - 70 = 110^\circ \quad \text{----- (linear pair)}$$

$$\angle BEF = 110^\circ \quad \text{----- (vertically opposite } \angle s)$$

$$\angle EFD = 70^\circ \quad \text{----- (Corresponding } \angle s)$$

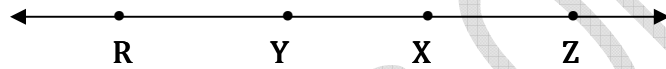
$$\angle CFQ = 70^\circ \quad \text{----- (vertically opposite } \angle s)$$

$$\angle CFE = 180 - 70 = 110^\circ \quad \text{----- (Linear pair)}$$

$$\angle DFQ = 110^\circ \quad \text{----- (Vertically opposite } \angle\text{s)}$$

- 6) Given that a point X is between the points Y and Z and the point Y is in between the points R and X. Draw the figure and write the betweenness of the points R, X, Y and Z on the line.

SOLUTION:

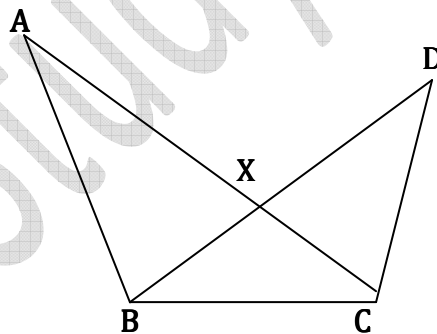


The betweenness of R, X, Y and Z are :

Y - X - Z and R - Y - X

\therefore R - Y - X - Z.

7)



Given : In the figure , $\angle ABC = 135^\circ$

$$\angle ABX = 90^\circ , \angle XCD = 55^\circ , \angle BCD = 100^\circ$$

Show that : $\angle XBC$ and $\angle XCB$ are congruent to each other.

SOLUTION:

Proof: $\angle ABX + \angle XBC = \angle ABC$ ----- (angle addition.)

$$90 + \angle XBC = 135$$

$$\angle XBC = 135 - 90$$

$\therefore \angle XBC = 45^\circ$ ----- (1)

$$\angle XCD + \angle XCB = \angle BCD$$
 ----- (angle addition.)

$$\angle XCD + 55 = 100$$

$$\angle XCD = 100 - 55$$

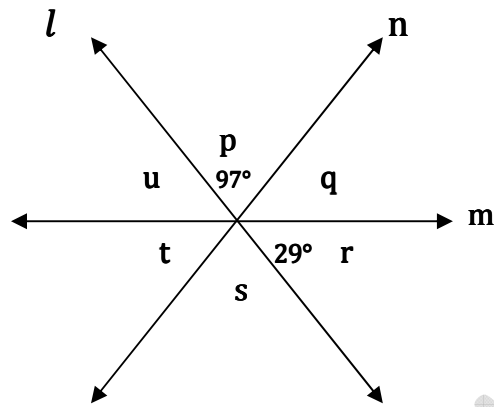
$\therefore \angle XCD = 45^\circ$ ----- (1)

$\therefore \angle XBC = \angle XCD = 45^\circ$ ----- (from (1) and (2))

$\therefore \angle XBC$ and $\angle XCB$ are congruent to each other.

8) **Given:** $p = 97^\circ$, $r = 29^\circ$

Find : The values of q , s , t and u .



Solution:

$$\angle p \cong \angle s = 97^\circ \quad \text{----(vertically opposite } \angle s)$$

$$\angle t = 180 - (29 + 97) \quad \text{---- (sum of m. of } \Delta^s = 180)$$

$$= 180 - 126$$

$$\therefore \angle t = 54^\circ$$

$$\angle q = \angle t = 54^\circ \quad \text{----- (vertically opp. } \angle s)$$

$$\therefore \angle q = 54^\circ$$

$$\angle u \cong \angle r = 29^\circ \quad \text{----- (vertically opp. } \angle s)$$

$$\therefore \angle u = 29^\circ$$

$$\angle s \cong \angle p \cong 97^\circ \quad \text{----- (vertically opp. } \angle s)$$

$$\therefore \angle s = 97^\circ$$