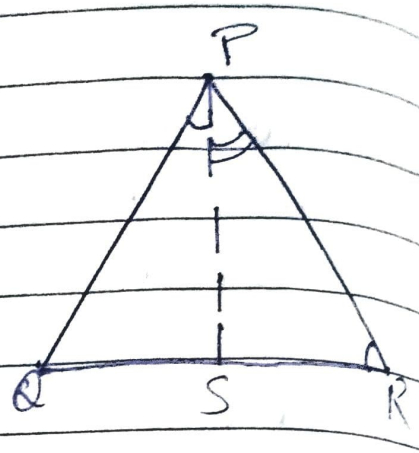
16.07.21 Ch - 7 Triangles

Ex - 7.4

Ans, Given,

In figure, PR > PQ and PS bisects ∠QPR



To prove : ∠PSR > ∠PSQ

Proof :- In △ PQR,

PR > PQ (given)

∴ ∠PQR > ∠PRQ ... ① [Angle opp. to larger side is greater]

∴ PS is the bisector of ∠QPR

∴ ∠QPS = ∠RPS ... ②

In △ PQS,

∠PQS + ∠QPS + ∠PSQ = 180° ... ③ [The sum of the three angles of a △ is 180°].

In △ PRS. (Similarly as ③)

∠PRS + ∠SPR + ∠PSR = 180° ... ④ [The sum of the three angles of a △ is 180°].

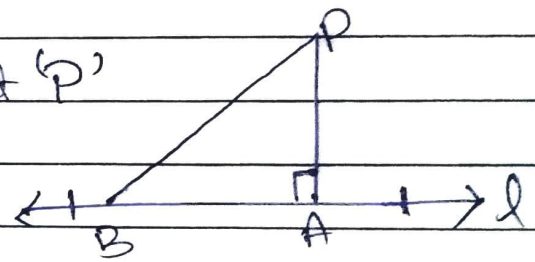
Sum of the three angles of triangle is 180°
from (3) and (4),

$\angle PQR + \angle QPS + \angle PSQ = \angle PRS + \angle SPR + \angle PSR$

$\Rightarrow \angle PQR + \angle PSQ = \angle PRS + \angle PSR$ (from (2))
$\Rightarrow \angle PRS + \angle PSR = \angle PQR + \angle PSQ$
$\Rightarrow \angle PRS + \angle PSR > \angle PRQ + \angle PSQ$ (from (1))
$\Rightarrow \angle PRQ + \angle PSR > \angle PRS + \angle PSQ$ (∵ $\angle PRQ = \angle PRS$)
$\Rightarrow \angle PSR > \angle PSQ$.

6Ans, Given,

(1) A line 'l' and a point 'P' (2) not on it,
(3) PA and PB are two line segments.
(4) PA ⊥ l.



TO prove :- PA < PB

Proof :- In △PAB,

$\angle A = 90°$ [PA ⊥ l]
$\angle P$ and $\angle B$ must be an acute angle.
$\angle A > \angle B$
PB > PA [side opp. to greater angle is larger].

⇒ Out of all the line segment drawn from a point to a line, perpendicular is the shortest.