Mathematics

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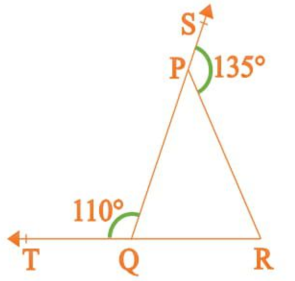
(Chapter – 6)(Lines and Angles)

(Class – 9)

Exercise 6.3

Question 1:

In Figure, sides QP and RQ of ΔPQR are produced to points S and T respectively. If ∠SPR = 135° and ∠PQT = 110°, find ∠PRQ.



Answer 1:

∠PQT + ∠PQR = 180° [∵ Linear Pair]

⇒ 110°+ ∠PQR = 180°

⇒ ∠PQR = 180° − 110° = 70°

∠SPR + ∠QPR = 180° [∵ Linear Pair]

⇒ 135°+ ∠QPR = 180°

⇒ ∠QPR = 180° − 135° = 45°

In ΔPQR,

∠QPR + ∠PQR + ∠R = 180°

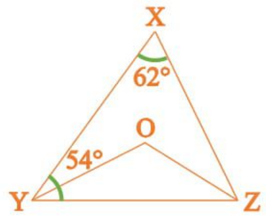
⇒ 70° + 45° + ∠R = 180°

⇒ 115° + ∠R = 180°

⇒ ∠R = 180° − 115° = 65°

Question 2:

In Figure, ∠X = 62°, ∠XYZ = 54°. If YO and ZO are the bisectors of ∠XYZ and ∠XZY respectively of ΔXYZ, find ∠OZY and ∠YOZ.



Answer 2:

Given that: ∠X = 62° and ∠XYZ = 54°

In ΔXYZ, ∠X + ∠XYZ + ∠XZY = 180°

⇒ 62° + 54° + ∠XZY = 180°

⇒ 116° + ∠XZY = 180°

⇒ ∠XZY = 180° − 116° = 64°

YO and ZO are the bisectors of ∠XYZ and ∠XZY respectively. therefore

$$\angle OYZ = \frac{1}{2}\angle XYZ = \frac{1}{2} \times 54° = 27°$$

$$\angle OZY = \frac{1}{2}\angle XZY = \frac{1}{2} \times 64° = 32°$$

In ΔOYZ, ∠OZY + ∠OYZ + ∠YOZ = 180°

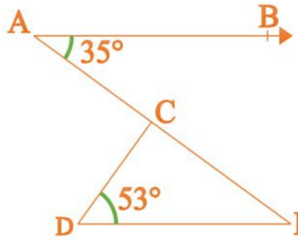
⇒ 32° + 27° + ∠YOZ = 180°

⇒ 59° + ∠YOZ = 180°

⇒ ∠YOZ = 180° − 59° = 121°

Question 3:

In Figure, if AB || DE, ∠BAC = 35° and ∠CDE = 53°, find ∠DCE.



Answer 3:

Given that: AB || DE, therefore

∠CED = ∠BAC [∵ Alternate Angles]

⇒ ∠CED = 35°

In ΔCDE, ∠CED + ∠CDE + ∠DCE = 180°

⇒ 35° + 53° + ∠DCE = 180°

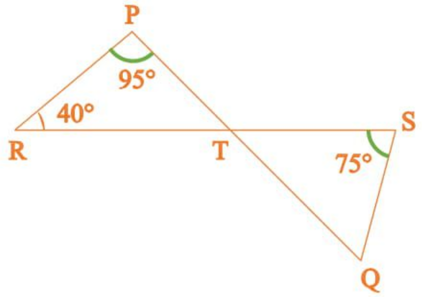
⇒ 88° + ∠DCE = 180°

⇒ ∠DCE = 180° − 88° = 92°

Question 4:

In Figure, if lines PQ and RS intersect at point T, such that ∠PRT = 40°, ∠RPT = 95° and ∠TSQ = 75°, find ∠SQT.

Answer 4:

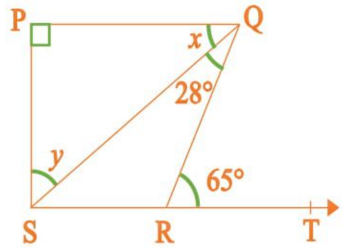


Given that: ∠PRT = 40°, ∠RPT = 95° and ∠TSQ = 75°
In ΔPTR, ∠P + ∠R + ∠PTR = 180°
⇒ 95° + 40° + ∠PTR = 180°
⇒ 135° + ∠PTR = 180°
⇒ ∠PTR = 180° − 135° = 45°
∠STQ = ∠PTR [∵ Vertically Opposite Angles]
⇒ ∠STQ = 45°
In ΔSQT, ∠STQ+ ∠S +∠SQT = 180°
⇒ 45°+ 75° +∠SQT = 180°
⇒ 120°+ ∠SQT = 180°
⇒ ∠SQT = 180° − 120° = 60°

Question 5:

In Figure, if PQ ⊥ PS, PQ || SR, ∠ SQR = 28° and ∠QRT = 65°, then find the values of x and y.

Answer 5:

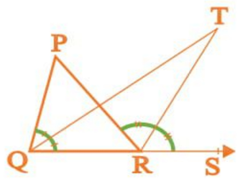


Given that: PQ ⊥ PS, PQ || SR, ∠SQR = 28° and ∠QRT = 65°
∠PQR = ∠QRT [∵ Alternate Angles]
⇒ ∠RQS + ∠PQS = 65°
⇒ $28° + x = 65°$
⇒ $x = 65° - 28° = 37°$
In ΔPQS, ∠P + ∠PQS + ∠PSQ = 180°
⇒ 90°+ 37° + y = 180°
⇒ 127° + y = 180°
⇒ y = 180° − 127° = 53°

Question 6:

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

Answer 6:



∠PRS is the exterior angle of ΔPQR.
Therefore,
$\angle PRS = \angle QPR + \angle PQR$
$\Rightarrow \frac{1}{2}\angle PRS = \frac{1}{2}\angle QPR + \frac{1}{2}\angle PQR$
$\Rightarrow \angle TRS = \frac{1}{2}\angle QPR + \angle TQR$ ... (1) [∵ $\angle TRS = \frac{1}{2}\angle PRS$ and $\angle TQR = \frac{1}{2}\angle PQR$]
∠TRS is exterior angle of ΔTQR.
Therefore,
$\angle TRS = \angle QTR + \angle TQR$ ... (2)
From the equations (1) and (2), we have
$\angle QTR + \angle TQR = \frac{1}{2}\angle QPR + \angle TQR$
$\Rightarrow \angle QTR = \frac{1}{2}\angle QPR$