SpeedLabs

MATHS

CBSE 9th

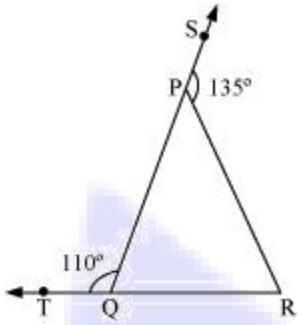
TEEVRA EDUTECH PVT. LTD.

LINES AND ANGLES

Exercise- 6.3

SpeedLabs
Assisted Practice | Expert Guidance | Personalized Insights
"An Innovative Practice Methodology by IITians."

Q.1 In the given figure, sides QP and RQ of ΔPQR are produced to points S and T respectively. If ∠SPR = 135° and ∠PQT = 110°, find ∠PRQ.



Ans. We are given that ∠SPR = 135° and ∠PQT = 110°

We need to find the value of ∠PRQ in the figure given below.

From the figure, we can conclude that ∠SPR and ∠RPQ, and ∠SPR and ∠RPQ form a linear pair.

We know that the sum of angles of a linear pair is 180°

135° + ∠RPQ = 180°, and ∠PQT + ∠PQR = 180°

135° + ∠RPQ = 180°, and 110° + ∠PQR = 180°

Or, ∠RPQ = 45° , and ∠PQR = 70°

From the figure, we can conclude that

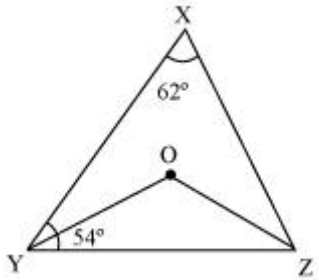
∠PQR + RPQ + ∠RPQ = 180° (Angle sum property)

70°+ 45° + ∠PRQ = 180° ⟹ 115° + ∠PRQ = 180°

∠PRQ = 65°

Therefore, we can conclude that ∠PRQ = 65°

Q.2 In the given figure, ∠X = 62°, ∠XYZ = 54°. If YO and ZO are the bisectors of ∠XYZ and ∠XZY respectively of ΔXYZ, find ∠OZY and ∠YOZ



Ans. We are given that ∠ X = 62°, ∠XYZ = 54° and YO and ZO are bisectors of, respectively.

∠XYZ and ∠XZY, respectively.

We need to find ∠OZY and ∠YOZ in the figure.

From the figure, we can conclude that in Δ XYZ

$\angle X + \angle XYZ + \angle XZY = 180°$

$\Rightarrow \angle XZY = 64°$

We are given that OY and OZ are the bisectors of, respectively.

$\angle OYZ = \angle XYO = \frac{54°}{2} = 27°$, and $\angle OZY = \angle XZO = \frac{64°}{2} = 32°$.

From the figure, we can conclude that in ΔOYZ

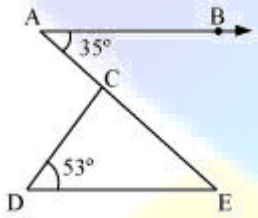
$\angle OYZ + \angle OZY + \angle YOZ = 180°$ (Angle sum property)

$27° + 32° + \angle YOZ = 180° \Rightarrow 59° + \angle YOZ = 180°$

$\Rightarrow \angle YOZ = 121°$.

Therefore, we can conclude that $\angle YOZ = 121°$ and $\angle OZY = 32°$.

Q.3 In the given figure, if AB || DE, $\angle BAC = 35°$ and $\angle CDE = 53°$, find $\angle DCE$.



Ans. We are given that, AB || DE, $\angle BAC = 35°$ *and* $\angle BAC\ CDE = 53°$

We need to find the value of ∠DCE in the figure given below.

From the figure, we can conclude that

$\angle BAC = \angle CED = 35°$ (Alternate interior)

From the figure, we can conclude that in ΔDCE

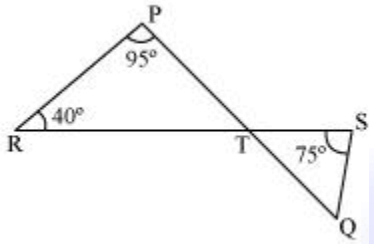
$\angle DCE + \angle CED + \angle CDE = 180°$ (Angle sum property)

$\angle DCE + 35° + 53° = 180° \Rightarrow \angle DCE + 88° = 180°$

$\Rightarrow \angle DCE = 92°$.

Therefore, we can conclude that $\angle DCE = 92°$.

Q.4 In the given figure, if lines PQ and RS intersect at point T, such that ∠PRT = 40°, ∠RPT = 95° and ∠TSQ = 75°, find ∠SQT.



Ans. We are given that ∠PRT = 40°, ∠RPT = 95° and ∠TSQ = 75°

We need to find the value of ∠SQT in the figure.

From the figure, we can conclude that in Δ RTP

∠PRT + ∠RTP + ∠RPT = 180° (Angle sum property)

40° + ∠RTP + 95° = 180°

⟹ ∠RTP + 135° = 180°

⟹ ∠RTP = 45°

From the figure, we can conclude that

∠RTP = ∠STQ = 45° (Vertically opposite angles)

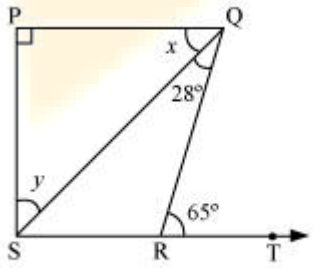
From the figure, we can conclude that in Δ STQ

∠STQ + 45° + 75° = 180° ⟹ ∠STQ + 120° = 180°

⟹ ∠STQ = 60°

Therefore, we can conclude that ∠STQ = 60°

Q.5 In the given figure, if PQ ⊥, PS, PQ || SR, $\angle SQR = 28°$ and ∠ QRT = 65°,then find the values of x and y.



Ans. We are given that PQ ⊥ PS, PQ || SR, $\angle SQR = 28°$ and ∠ QRT = 65°

We need to find the values of x and y in the figure.

We know that "If a side of a triangle is produced, then the exterior angle so formed is equal to the sum of the two interior opposite angles."

From the figure, we can conclude that

$\angle SQR + \angle QSR = 65° \Longrightarrow \angle QSR = 37°$

From the figure, we can conclude that

$x = \angle QSR = 37°$ (Alternate interior angles)

From the figure, we can conclude that Δ PQS

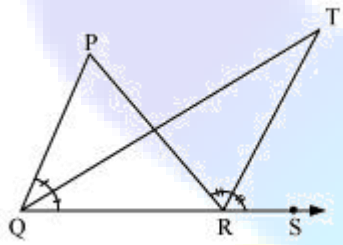
$\angle PQS + \angle QSP + \angle QPS = 180°$ (Angle sum property)

$\angle QPS = 90°$ (PQ ⊥ PS)

$x + y + 90° = 180° \Longrightarrow x = 53°$

Therefore, we can conclude that $x = 53°$ and $y = 37°$

Q.6 In the given figure, the side QR of ΔPQR is produced to a point S. If the bisectors of ∠PQR and ∠ORS meet at point T, then prove that $\angle QTR = \frac{1}{2}\angle QPR$



Ans. We need to prove that $\angle QTR = \frac{1}{2}\angle QPR$ in the figure given below.

We know that "If a side of a triangle is produced, then the exterior angle so formed is equal to the sum of the two interior opposite angles."

From the figure, we can conclude that in ΔQTR, ∠TRS is an exterior angle

$\angle QTR + \angle TQR = \angle TRS$, or

$\angle QTR = \angle TRS - \angle TQR$ .....(i)

From the figure, we can conclude that in ΔQTR, ∠TRS and is an exterior angle

$\angle QPR + \angle PQR = \angle PRS$.

We are given that QT and RT are angle bisectors of ∠PQR and ∠PRS.

$\angle QPR + 2\angle TQR = 2\angle TRS$

$\angle QPR = 2(\angle TRS - \angle TQR)$.

We need to substitute equation (i) in the above equation, to get

$\angle QPR = 2\angle QTR$, or

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

Therefore, we can conclude that the desired result is proved