Exercise 6.3

$\Rightarrow \angle DCE = 92^\circ$.

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

Q4. In the given figure, if lines PQ and RS intersect at point T, such that ∠ PRT = 40°, ∠ RPT = 95° and ∠ TSQ = 75°, find ∠ SQT.

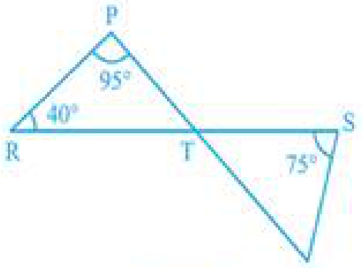


Fig. 6.42

Ans. We are given that
$\angle PRT = 40^\circ$, $\angle RPT = 95^\circ$ and $\angle TSQ = 75^\circ$.

We need to find the value of $\angle SQT$ in the figure.

From the figure, we can conclude that in ΔRTP

$\angle PRT + \angle RTP + \angle RPT = 180^\circ$ (Angle sum property)

$40^\circ + \angle RTP + 95^\circ = 180^\circ$

$\Rightarrow \angle RTP + 135^\circ = 180^\circ$

$\Rightarrow \angle RTP = 45^\circ$.

From the figure, we can conclude that

$\angle RTP = \angle STQ = 45^\circ$ (Vertically opposite angles)

From the figure, we can conclude that in ΔSTQ

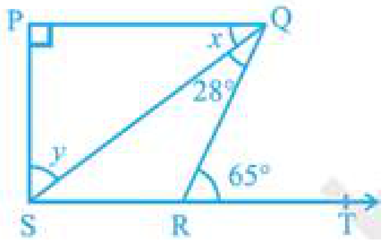
$\angle SQT + \angle STQ + \angle TSQ = 180^\circ$ (Angle sum property)

$\angle SQT + 45^\circ + 75^\circ = 180^\circ \Rightarrow \angle SQT + 120^\circ = 180^\circ$

$\Rightarrow \angle SQT = 60^\circ$.

Therefore, we can conclude that $\angle SQT = 60^\circ$.

Q5. In the given figure, if $PQ \perp PS$, PQ || SR, $\angle SQR = 28^{\circ}$ and $\angle QRT = 65^{\circ}$, then find the values of x and y.



Ans. We are given that

$PQ \perp PS, PQ \parallel SR, \angle SQR = 28^{\circ}$ and $\angle QRT = 65^{\circ}$.

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

$\angle SQR + \angle QSR = \angle QRT$, or

$28^{\circ} + \angle QSR = 65^{\circ} \Rightarrow \angle QSR = 37^{\circ}$

From the figure, we can conclude that

$x = \angle QSR = 37^{\circ}$ (Alternate interior angles)

From the figure, we can conclude that ΔPQS

$\angle PQS + \angle QSP + \angle QPS = 180^{\circ}$ (Angle sum property)

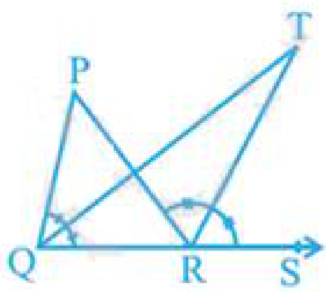
$\angle QPS = 90^{\circ} \quad (PQ \perp PS)$

$x + y + 90^{\circ} = 180^{\circ} \Rightarrow x + 37^{\circ} + 90^{\circ} = 180^{\circ}$

$\Rightarrow x + 127^{\circ} = 180^{\circ} \Rightarrow x = 53^{\circ}$

Therefore, we can conclude that $x = 53^{\circ}$ and $y = 37^{\circ}$.

Q6. In the given figure, the side QR of ΔPQR is produced to a point S. If the bisectors of $\angle PQR$ and $\angle PRS$ 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, $\angle TRS$ 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, $\angle TRS$ is an exterior angle

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

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

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

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

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.

*********** END **********