Exercise: 6.3 **(Page No: 107)**

1. In Fig. 6.39, sides QP and RQ of ΔPQR are produced to points S and T respectively. If ∠SPR = 135° and ∠PQT = 110°, find ∠PRQ.

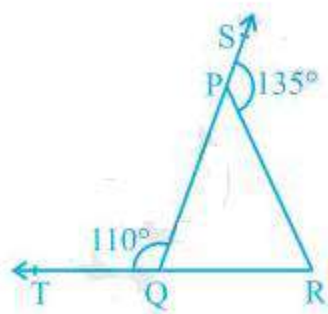

Fig. 6.39

Solution:

It is given the TQR is a straight line and so, the linear pairs (i.e. ∠TQP and ∠PQR) will add up to 180°

So, ∠TQP +∠PQR = 180°

Now, putting the value of ∠TQP = 110° we get,

∠PQR = 70°

Consider the ΔPQR,

Here, the side QP is extended to S and so, ∠SPR forms the exterior angle.

Thus, ∠SPR (∠SPR = 135°) is equal to the sum of interior opposite angles. (Triangle property)

Or, ∠PQR +∠PRQ = 135°

Now, putting the value of ∠PQR = 70° we get,

∠PRQ = 135°-70°

Hence, ∠PRQ = 65°

2. In Fig. 6.40, ∠X = 62°, ∠XYZ = 54°. If YO and ZO are the bisectors of ∠XYZ and ∠XZY respectively of Δ XYZ, find ∠OZY and ∠YOZ.

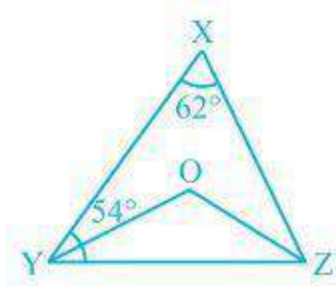

Fig. 6.40

Solution:

We know that the sum of the interior angles of the triangle.

So, ∠X +∠XYZ +∠XZY = 180°

Putting the values as given in the question we get,

62°+54° +∠XZY = 180°

Or, ∠XZY = 64°

Now, we know that ZO is the bisector so,

∠OZY = ½ ∠XZY

∴ ∠OZY = 32°

Similarly, YO is a bisector and so,

∠OYZ = ½ ∠XYZ

Or, ∠OYZ = 27° (As ∠XYZ = 54°)

Now, as the sum of the interior angles of the triangle,

∠OZY +∠OYZ +∠O = 180°

Putting their respective values, we get,

∠O = 180°-32°-27°

Hence, ∠O = 121°

3. In Fig. 6.41, if AB ∥ DE, ∠BAC = 35° and ∠CDE = 53°, find ∠DCE.

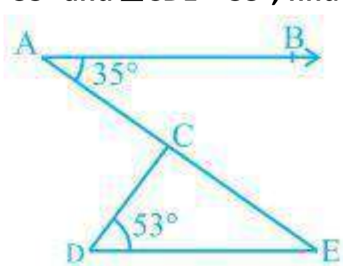

Fig. 6.41

Solution:

We know that

AE is a transversal since AB ∥ DE

Here ∠BAC and ∠AED are alternate interior angles.

Hence, ∠BAC = ∠AED

It is given that ∠BAC = 35°

⇒ ∠AED = 35°

Now consider the triangle CDE. We know that the sum of the interior angles of a triangle is 180°.

∴ ∠DCE+∠CED+∠CDE = 180°

Putting the values, we get

∠DCE+35°+53° = 180°

Hence, ∠DCE = 92°

4. In Fig. 6.42, if lines PQ and RS intersect at point T, such that ∠PRT = 40°, ∠RPT = 95° and ∠TSQ = 75°, find ∠SQT.

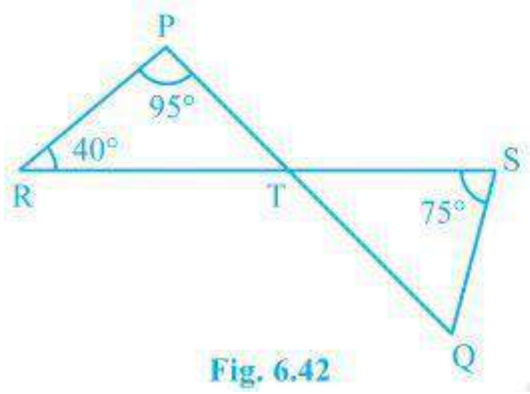

Fig. 6.42

Solution:

Consider triangle PRT.

∠PRT +∠RPT + ∠PTR = 180°

So, ∠PTR = 45°

Now ∠PTR will be equal to ∠STQ as they are vertically opposite angles.

So, ∠PTR = ∠STQ = 45°

Again, in triangle STQ,

∠TSQ +∠PTR + ∠SQT = 180°

Solving this we get,

∠SQT = 60°

5. In Fig. 6.43, if PQ ⊥ PS, PQ ∥ SR, ∠SQR = 28° and ∠QRT = 65°, then find the values of x and y.

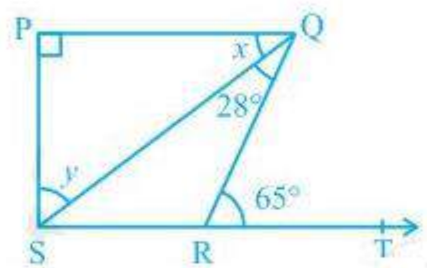

Fig. 6.43

Solution:

x +∠SQR = ∠QRT (As they are alternate angles since QR is transversal)

So, x+28° = 65°

∴ x = 37°

It is also known that alternate interior angles are same and so,

∠QSR = x = 37°

Also, Now,

∠QRS +∠QRT = 180° (As they are a Linear pair)

Or, ∠QRS+65° = 180°

So, ∠QRS = 115°

Now, we know that the sum of the angles in a quadrilateral is 360°. So,

∠P +∠Q+∠R+∠S = 360°

Putting their respective values, we get,

∠S = 360°-90°-65°-115°

Or, ∠QS +y = 360°

⇒y = 360°-90°-65°-115° -37°

Hence, y = 53°

6. In Fig. 6.44, 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 ∠QTR = ½ ∠QPR.

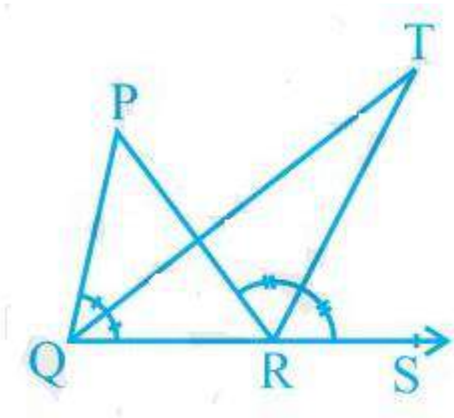

Fig. 6.44

Solution:

Consider the ΔPQR. ∠PRS is the exterior angle and ∠QPR and ∠PQR are interior angles.

So, ∠PRS = ∠QPR+∠PQR (According to triangle property)

Or, ∠PRS -∠PQR = ∠QPR -----------(i)

Now, consider the ΔQRT,

∠TRS = ∠TQR+∠QTR

Or, ∠QTR = ∠TRS-∠TQR

We know that QT and RT bisect ∠PQR and ∠PRS respectively.

So, ∠PRS = 2 ∠TRS and ∠PQR = 2∠TQR

Now, ∠QTR = ½ ∠PRS - ½∠PQR

Or, ∠QTR = ½ (∠PRS -∠PQR)

From (i) we know that ∠PRS -∠PQR = ∠QPR

So, ∠QTR = ½ ∠QPR (hence proved).