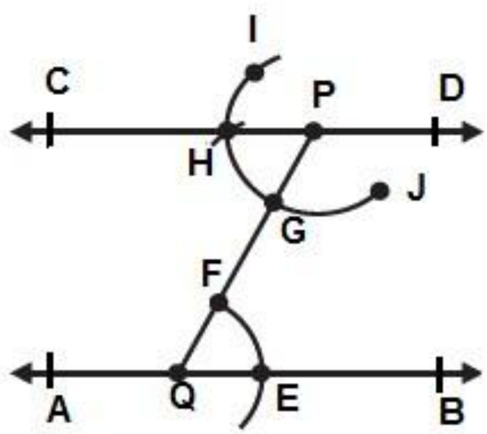
EXERCISE 10.1 PAGE: 196

1. Draw a line, say AB, take a point C outside it. Through C, draw a line parallel to AB using ruler and compasses only.

Solution:-



Steps for construction,

1. Draw a line AB.
2. Take any point Q on AB and a point P outside AB and join PQ.
3. With Q as center and any radius draw an arc to cut AB at E and PQ at F.
4. With P as center and same radius draw an arc IJ to cut QP at G.
5. Place the pointed tip of the compass at E and adjust the opening so that the pencil tip is at F.
6. With the same opening as in step 5 and with G as center, draw an arc cutting the arc IJ at H.
7. Now, join PH to draw a line CD.

2. Draw a line L. Draw a perpendicular to L at any point on L. On this perpendicular choose a point X, 4 cm away from l. Through X, draw a line m parallel to L. Solution:-

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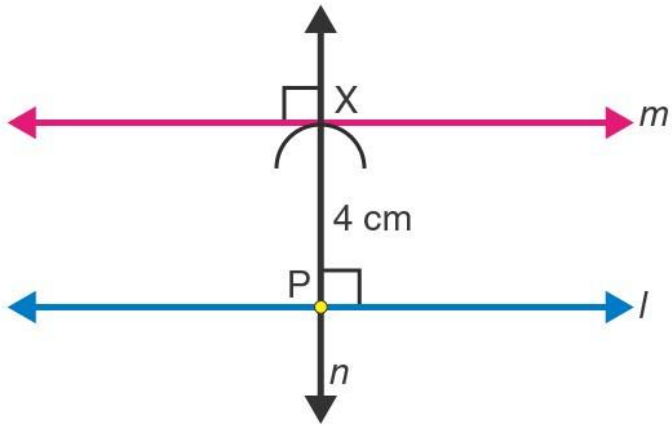
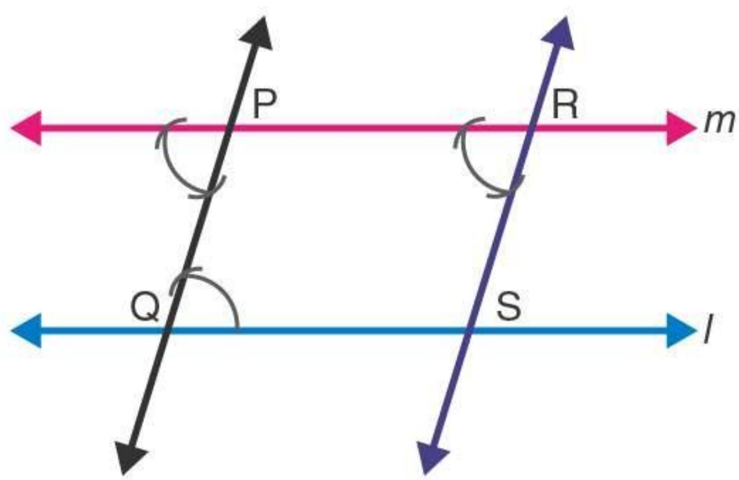


Steps for construction,

1. Draw a line L.
2. Take any point P on line L.
3. At point P, draw a perpendicular line N.
4. Place the pointed tip of the compass at P and adjust the compass up to length of 4 cm, draw an arc to cut this perpendicular at point X.
5. At point X, again draw a perpendicular line M.

3. Let L be a line and P be a point not on L. Through P, draw a line m parallel to L. Now join P to any point Q on L. Choose any other point R on m. Through R, draw a line parallel to PQ. Let this meet L at S. What shape do the two sets of parallel lines enclose? Solution:-



Steps for construction,

1. Draw a line L.

2. Take any point Q on L and a point P outside L and join PQ.
3. Make sure that angles at point P and point Q are equal i.e. ∠ ∠Q = P
4. At point P extend line to get line M which is parallel L.
5. Then take any point R on line M.
6. At point R draw angle such that ∠ ∠P = R
7. At point R extend line which intersects line L at S and draw a line RS.

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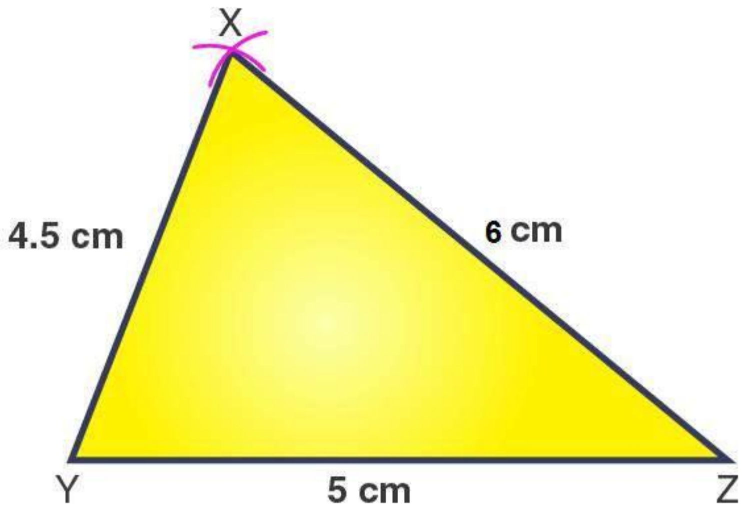
EXERCISE 10.2 PAGE: 199

1. Construct ΔXYZ in which XY = 4.5 cm, YZ = 5 cm and ZX = 6 cm Solution:-



Steps of construction:

1. Draw a line segment YZ = 5 cm.
2. With Z as a center and radius 6 cm, draw an arc.
3. With Y as a center and radius 4.5 cm, draw another arc, cutting the previous arc at X.
4. Join XY and XZ.

Then, ΔXYZ is the required triangle.

2. Construct an equilateral triangle of side 5.5 cm. Solution:-

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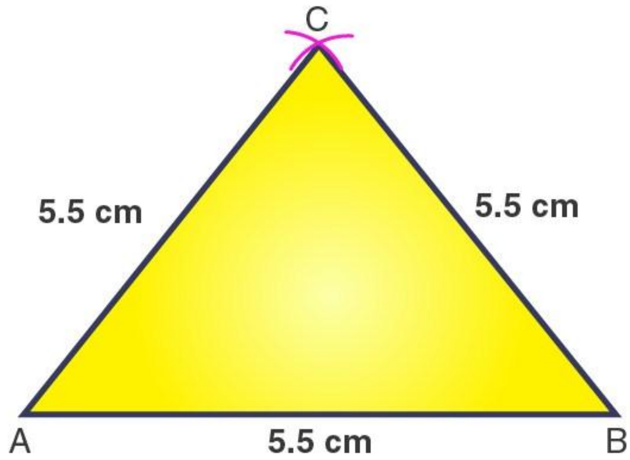
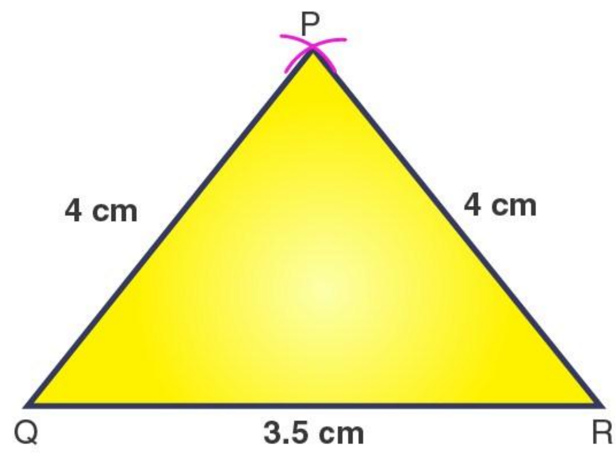


Steps of construction:

1. Draw a line segment AB = 5.5 cm.
2. With A as a center and radius 5.5 cm, draw an arc.
3. With B as a center and radius 5.5 cm, draw another arc, cutting the previous arc at C.
4. Join CA and CB.

Then, ΔABC is the required equilateral triangle.

3. Draw ΔPQR with PQ = 4 cm, QR = 3.5 cm and PR = 4 cm. What type of triangle is this? Solution:-

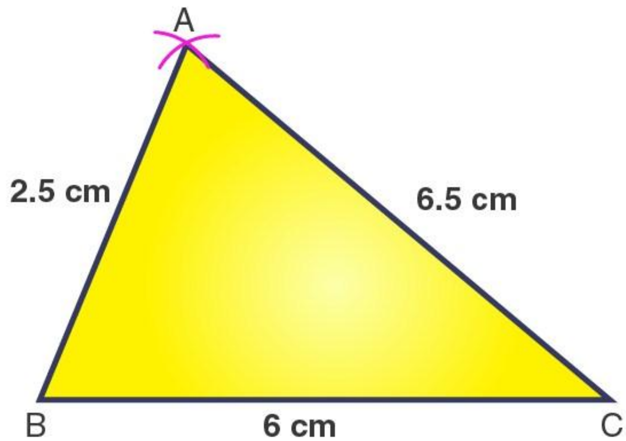


Steps of construction:

1. Draw a line segment QR = 3.5 cm.
2. With Q as a center and radius 4 cm, draw an arc.
3. With R as a center and radius 4 cm, draw another arc, cutting the previous arc at P.
4. Join PQ and PR.

Then, ΔPQR is the required isosceles triangle.

4. Construct ΔABC such that AB = 2.5 cm, BC = 6 cm and AC = 6.5 cm. Measure ∠B.
Solution:-



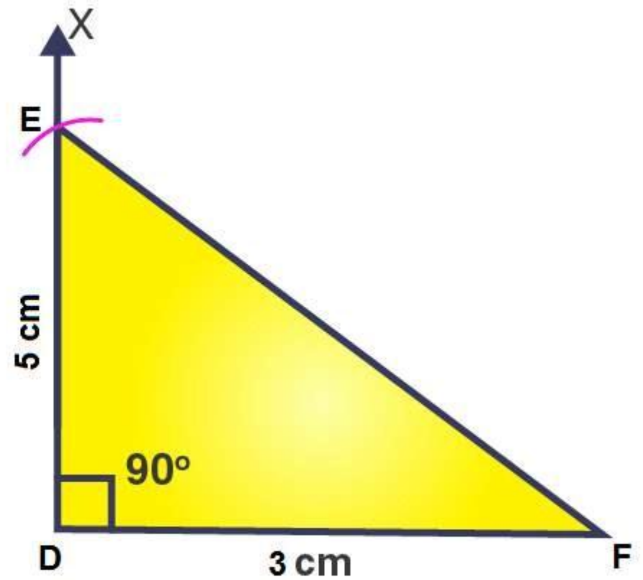
1. Draw a line segment BC = 6 cm.
2. With B as a center and radius 2.5 cm, draw an arc.
3. With C as a center and radius 6.5 cm, draw another arc, cutting the previous arc at A.
4. Join AB and AC.

   Then, ΔABC is the required triangle.
5. When we will measure the angle B of triangle by protractor, then angle is equal to ∠B = 80^{o}

EXERCISE 10.3 PAGE: 200

1. Construct ΔDEF such that DE = 5 cm, DF = 3 cm and m∠EDF = 90°.

Solution:-



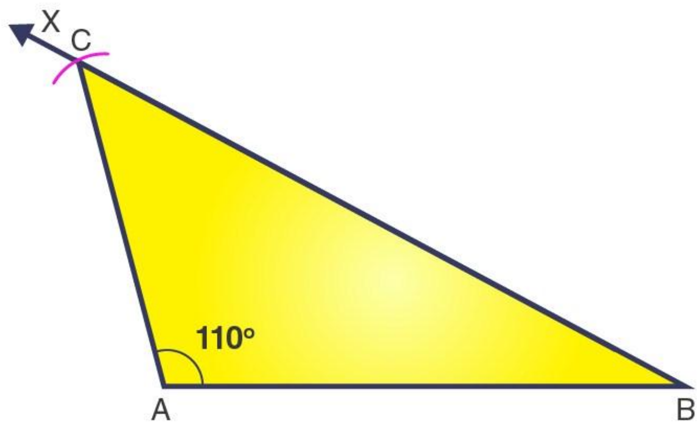
Steps of construction:

1. Draw a line segment DF = 3 cm.
2. At point D, draw a ray DX to making an angle of 90° i.e. ∠XDF = 90°.
3. Along DX, set off DE = 5cm.
4. Join EF.

Then, ΔEDF is the required right angled triangle.

2. Construct an isosceles triangle in which the lengths of each of its equal sides is 6.5 cm and the angle between them is 110°.

Solution:-

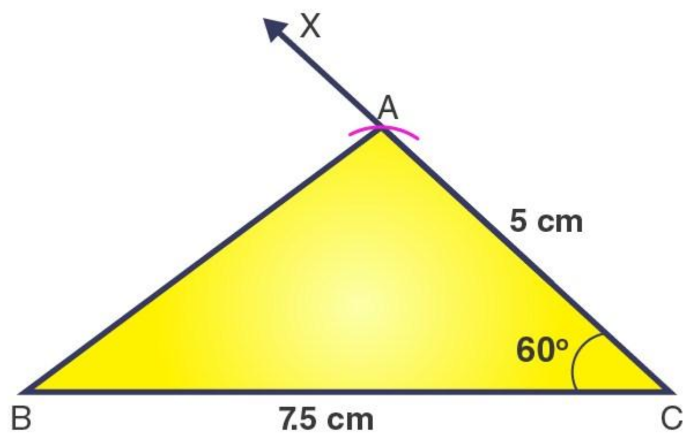


Steps of construction:

1. Draw a line segment AB = 6.5 cm.
2. At point A, draw a ray AX to making an angle of 110° i.e. ∠XAB = 110°.
3. Along AX, set off AC = 6.5cm.
4. Join CB.

   Then, ΔABC is the required isosceles triangle.

3. Construct ΔABC with BC = 7.5 cm, AC = 5 cm and m∠C = 60°. Solution:-



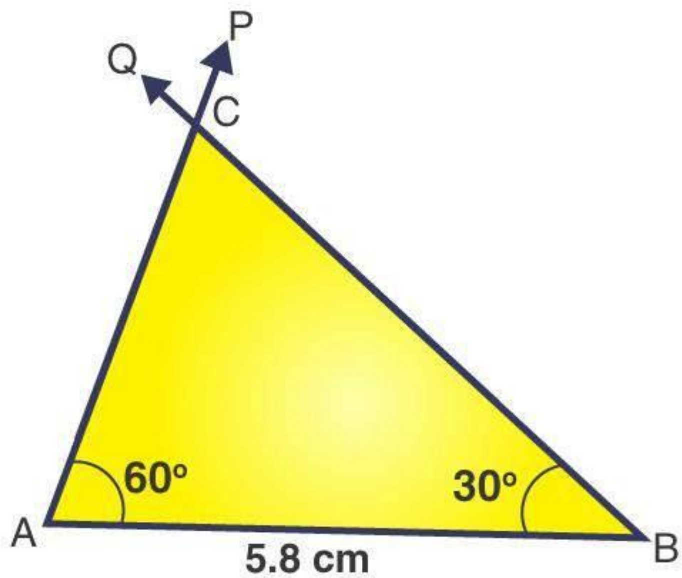
Steps of construction:

1. Draw a line segment BC = 7.5 cm.
2. At point C, draw a ray CX to making an angle of 60° i.e. ∠XCB = 60°.
3. Along CX, set off AC = 5cm.
4. Join AB.

Then, ΔABC is the required triangle.

EXERCISE 10.4 PAGE: 202

1. Construct ΔABC, given m∠A =60°, m ∠B = 30° and AB = 5.8 cm. Solution:-



Steps of construction:

1. Draw a line segment AB = 5.8 cm.
2. At point A, draw a ray P to making an angle of 60° i.e. ∠PAB = 60°.
3. At point B, draw a ray Q to making an angle of 30° i.e. ∠QBA = 30°.
4. Now the two rays AP and BQ intersect at the point C. Then, ΔABC is the required triangle.

2. Construct ΔPQR if PQ = 5 cm, m∠PQR = 105° and m∠QRP = 40°.
(Hint: Recall angle-sum property of a triangle).
Solution:-

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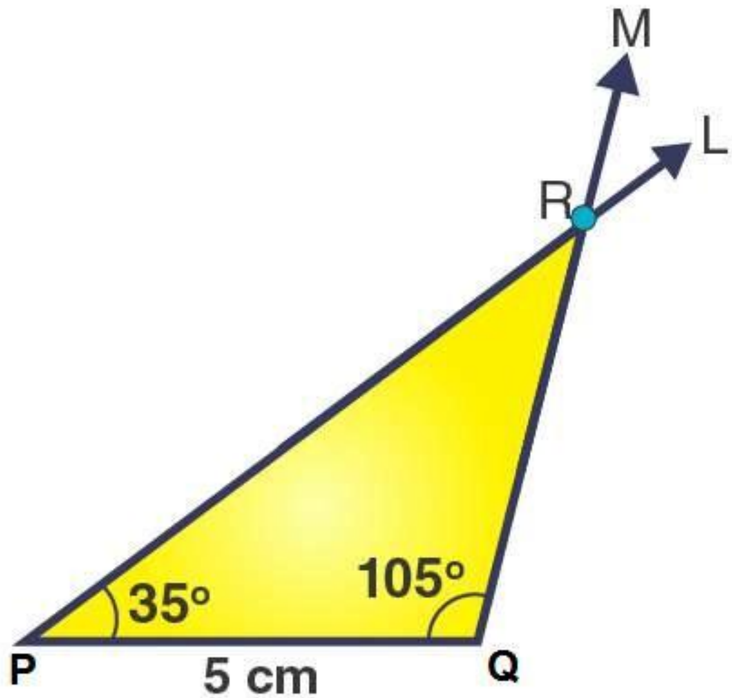

We know that the sum of the angles of a triangle is 180°.

$\therefore \angle PQR + \angle QRP + \angle RPQ = 180^o$

$= 105^o + 40^o + \angle RPQ = 180^o$

$= 145^o + \angle RPQ = 180^o$

$= \angle RPQ = 180^o - 145^0$

$= \angle RPQ = 35^o$

Hence, the measures of ∠RPQ is 35°.

Steps of construction:

1. Draw a line segment PQ = 5 cm.
2. At point P, draw a ray L to making an angle of 105° i.e. ∠LPQ = 105°. 3. At point Q, draw a ray M to making an angle of 40° i.e. ∠MQP = 40°.
4. Now the two rays PL and QM intersect at the point R.

Then, ΔPQR is the required triangle.

3. Examine whether you can construct ΔDEF such that EF = 7.2 cm, m∠E = 110° and m∠F = 80°. Justify your answer.

Solution:-

From the question it is given that,

EF = 7.2 cm

$\angle E = 110^o$

$\angle F = 80^o$

Now we have to check whether it is possible to construct ΔDEF from the given values.

We know that the sum of the angles of a triangle is 180°.

Then,

$\angle D + \angle E + \angle F = 180^o$

$\angle D + 110^o + 80^o = 180^o$

$\angle D + 190^o = 180^o$

$\angle D = 180^o - 190^0$

$\angle D = -10^o$

We may observe that the sum of two angles is 190° is greater than 180°. So, it is not possible to construct a triangle.

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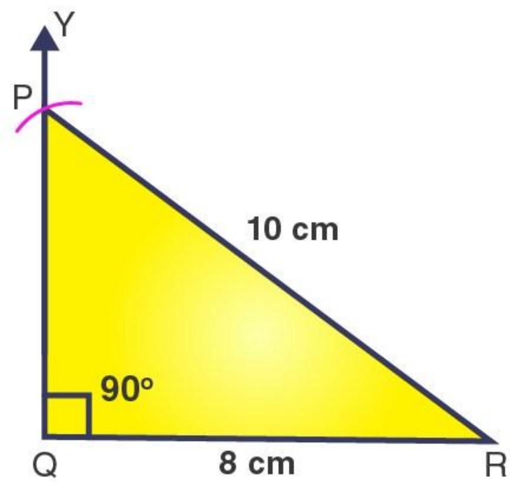
EXERCISE 10.5 PAGE: 203

1. Construct the Construct the right angled ΔPQR, where m∠Q = 90°, QR = 8cm and PR = 10 cm.

Solution:-



Steps of construction:

1. Draw a line segment QR = 8 cm.
2. At point Q, draw a ray QY to making an angle of 90° i.e. ∠YQR = 90°.
3. With R as a center and radius 10 cm, draw an arc that cuts the ray QY at P.
4. Join PR.

Then, ΔPQR is the required right angled triangle.

2. Construct a right-angled triangle whose hypotenuse is 6 cm long and one of the legs is 4 cm long

Solution:-

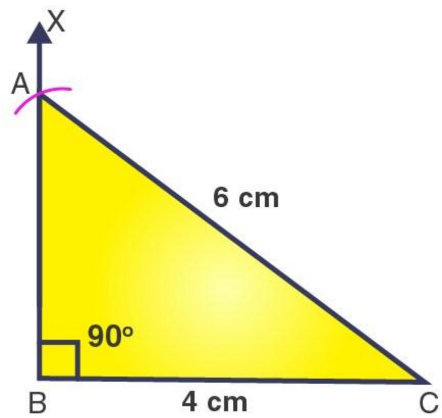
Let us consider ΔABC is a right angled triangle at ∠B = 90°

Then,

AC is hypotenuse = 6 cm ... [given in the question]

BC = 4 cm

Now, we have to construct the right angled triangle by the above values



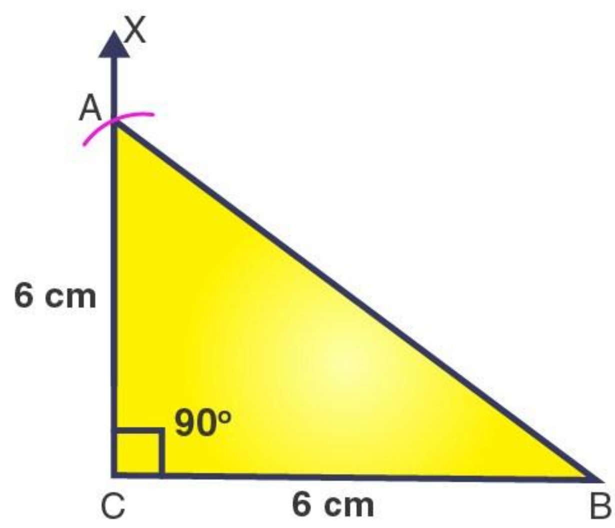
Steps of construction:

1. Draw a line segment BC = 4 cm.
2. At point B, draw a ray BX to making an angle of 90° i.e. ∠XBC = 90°.
3. With C as a center and radius 6 cm, draw an arc that cuts the ray BX at A.
4. Join AC.

Then, ΔABC is the required right angled triangle.

3. Construct an isosceles right-angled triangle ABC, where m∠ACB = 90° and AC = 6 cm.

Solution:-



Steps of construction:

1. Draw a line segment BC = 6 cm.
2. At point C, draw a ray CX to making an angle of 90^o i.e. $\angle XCB = 90^o$.
3. With C as a center and radius 6 cm, draw an arc that cuts the ray CX at A.
4. Join AB.

Then, ΔABC is the required right angled triangle.

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