Grade VII

Lesson : 10 Practical Geometry

Objective Type Questions

I. Multiple choice questions

1. Which of the following cannot be the side of a triangle?

a) 8 cm, 5 cm, 4 cm b) 10 cm, 10 cm, 4cm

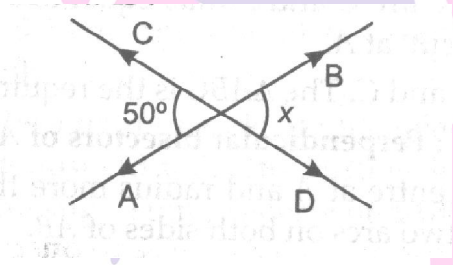
c) 10 cm, 6 cm, 4 cm d) 9 cm, 8 cm, 7 cm .

2. Which of the following is the measures of a right angled triangle?

a) 7cm, 3 cm, 9 cm b) 4.5 cm, 6 cm, 5 cm

c) 8 cm, 15 cm, 17 cm d) 4 cm, 3.5 cm 4 cm.

3. The value of x is :



a) 40^0 b) 50^0 c) 60^0 d) 40^0

1) c	2) c	3) b

II. Multiple choice questions

1. A triangle can be constructed by taking its sides as : (NCERT)

a) 1.8 cm, 2.6 cm, 4.4 cm b) 2 cm, 3 cm, 4cm

c) 2.4 cm, 2.4 cm, 6.4 cm d) 3.2 cm, 2.3 cm, 5.5 cm .

2. A triangle can be constructed by taking two of its angles as : (NCERT)

a) 110^0, 40^0 b) 70^0, 115^0 c) 135^0, 45^0 d) 90^0, 90^0

3. Which of the following sets of triangles could be the lengths of the sides of a right – angled triangle.

a) 3cm, 4 cm, 6 cm b) 9 cm, 16 cm, 26 cm

c) 1.5 cm, 3.6 cm, 3.9 cm d) 7 cm, 24 cm 26 cm.

4. In which of the following cases, a unique triangles can be drawn.

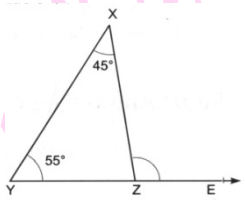
a) AB = 4 cm, BC = 8 cm and CA = 2 cm

b) BC = 5.2 cm, $\angle B = 90^0$ and $\angle C = 110^0$

c) XY = 5cm, $\angle X = 45^0$ and $\angle Y = 60^0$

d) An isosceles triangle with the length of each equal side 6.2 cm.

5. IN Δ XYZ, Side BC has been produced to E. If $\angle YXZ = 45^0$ and $\angle XYZ = 55^0$ then $\angle XZE$ = ?



a) 90^0 b) 110^0

c) 100^0 d) 120^0

6. Construction of a triangle is not possible when

a) two sides and an included angle are given

b) three sides are given

c) three angles are given

d) two angles and any side are given

7. In ΔPQR, if $\angle P = 65^0$ and $\angle R = 85^0$, then $\angle Q$ = ?

a) 35^0 b) 30^0 c) 40^0 d) 45^0

8. The sum of the angles of a triangle is:

a) at least 180^0 b) exactly 180^0 c) at most 180^0 d) less than 180^0

9. Which of the following triangles cannot be constructed?

a) AB = 6 cm, BC = 5 cm, CA = 4 cm

b) AC = 5.2 cm, AB = 4 cm, $\angle C = 60^0$

c) $\angle A = 80^0$ $\angle B = 100^0$, BC = 4cm

d) $\angle B = 90^0$, AB= 3 cm, BC = 4 cm

10. Construction of ΔABC with AB = 9 cm and BC = 6cm is possible when CA is equal to

a) 2cm b) 3 cm c) 12 cm d) 16 cm

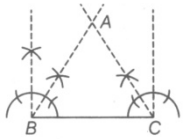
11. If two legs of aright triangle are 6 cm and 8cm, then its hypotenuse is.

a) 14 cm b) 12cm c) 10cm d) 9 cm

1. b	2. a	3. c	4. c	5. c	6. c	7. b	8. b	9. c	10. c	11. c

III. Multiple choice questions

1. In the given constructed figure, the value of $\angle BAC$ is



a) 45^0 b) 35^0 c) 30^0 d) 55^0

2. In which of the following cases, a triangle can be drawn?

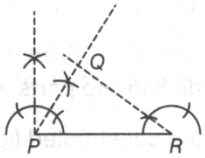
a) AB = 4 cm, BC = 8 cm, CA = 2 cm (NCERT)

b) BC = 5.2 cm, $\angle B = 90^0$, $\angle C = 110^0$

c) XY = 5 cm, $\angle X = 45^0$, $\angle Y = 60^0$

d) An isosceles triangle with the length of each equal side 6.2 cm

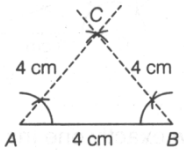
3. In the given figure, the value of $\angle PQR$ is



a) 35^0 b) 45^0

c) 55^0 d) 30^0

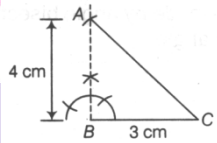
4. In the given figure , AB=AC=BC, then the value of each angle is equal to



a) 40^0 b) 70^0

c) 90^0 d) 60^0

5. In the given constructed figure, the length of segment AC is equal to



a) 7 cm b) 14 cm

c) 1 cm d) 5 cm

Hints / Solutions

I. Fill in the Blanks

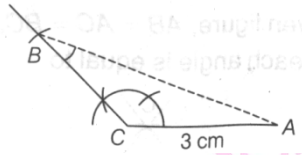
1. The bisector of a line segment, divide the line segment in two **equal** parts.
2. The angle bisector of an angle divide the angle in two **equal** angles.
3. The construction of an equilateral triangle cane done, if the value of the given angles should be equal to **60^0** .
4. A triangle can be constructed only if the sum of its any two sides is **greater** than the third side.
5. In a construction of a right angled triangle, one of the exterior angle is 120^0. Then, we take the value of adjacent angle of exterior angle for construction of the right angled triangle is equal to **60^0** .
6. We can construct a right angled triangle, if the value of **One** of the angle is given.

7. If AB = 6 cm and BC = 6 cm are given, then this type of triangle is called **isosceles triangle.**

8. The angle made by perpendicular bisector of line is equal to **90^0**

9. If a line segment AB= 6 cm. Then, the line bisector divide it in two parts, measure $\frac{6}{2}$ = 3 cm

10. In the following constructed figure, the sum of $\angle A$ and $\angle B$ should be equal to **60^0**



I. True or False

1. We can draw exactly one triangle whose angles are 70^0, 30^0 and 80^0 (NCERT)

False given angles are 70^0, 30^0 and 80^0

$\because$ The sum of all three angles in a triangle is equal to 180^0

$\therefore$ $70^0+30^0 + 80^0 = 100^0 + 80^0 = 180^0$

So, triangle of different types can be constructed.

2. The distance between the two parallel lines is the same everywhere (NCERT)

True, the angle between two parallel lines is always equal, so the distance between the two parallel lines is also same everywhere.

3. The angle made by angle bisector is always half of the angle. (NCERT)

True angle bisector divides the angle equally.

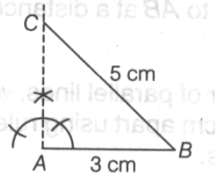
4. In a right angled triangle, the square of hypotenuse is greater than the sum of square of base and perpendicular length.

False in the right angled triangle, by using Pythagoras theorem, we have

$(\text{Hypotenuse})^2 = (\text{Base})^2 + (\text{Perpendicular})^2$

5. In the following constructed figure.

If AB = 3 cm and BC = 5 cm then side AC is equal to 4.5 cm



False in the given right angled triangle,

$(BC)^2 = (AC)^2 + (AB)^2$ (By Pythagoras theorem of right angled triangle)

$= (5)^2 = (AC)^2 + (3)^2$

$= (25) = (AC)^2 + 9 = (AC)^2 = 25 - 9$

$=(AC)^2 = 16 = AC = \sqrt{16} = AC = 4$ cm.

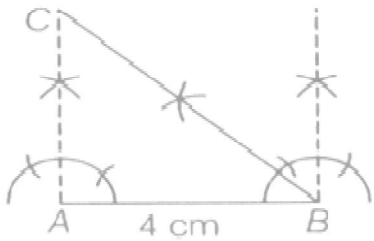
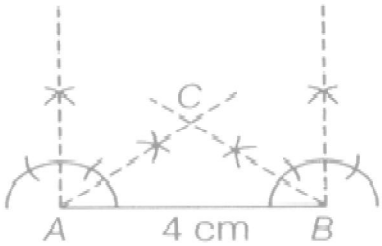
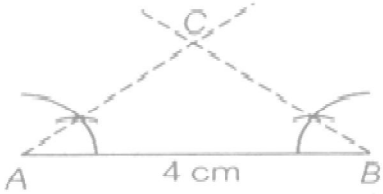
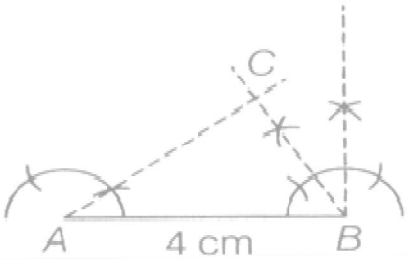
6. A right angled triangle can be constructed, if the given angles are 90^0, 60^0 and 70^0

False, we know that, the sum of all three angles in a triangle is equal to 180^0

Here $90^0 + 60^0 + 70^0 = 90^0 + 130^0 = 220^0 > 180^0$

So triangle cannot be constructed with angles 90^0 , 60^0 and 70^0.

I. Match the following

Column A	Column B
(i) $\angle A = 90°$, $\angle B = 45°$, $AB = 4$ cm	(a) 
(ii) $\angle A = 60°$, $\angle B = 60°$, $AB = 4$ cm	(b) 
(iii) $\angle A = 60°$, $\angle B = 75°$, $AB = 4$ cm	(c) 
(iv) $\angle A = 45°$, $\angle B = 45°$, $AB = 4$ cm	(d) 

i) a	ii) c	iii) d	iv) b

I Very Short Answer Questions

1. Can we draw a triangle having two right angles?

No.

2. What is the each angle of an equilateral triangle?

60^0

3. Can 45^0 , 60^0 and 40^0 be the angles of an acute angled triangle?

No

4. Can we draw a triangle having sides 2,3 and 5?

No, sum of two sides must be greater than the third side.

5. Write the angle measures of an isosceles right angled triangle.

40^0, 45^0 , 90^0 .

II Very Short Answer Questions

1. Can a triangle be constructed of sides 5cm, 6cm and 11 cm?

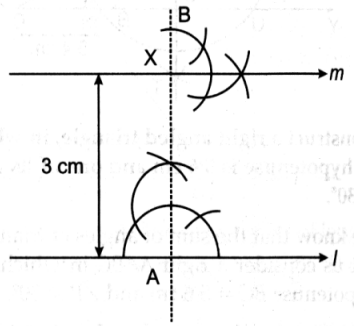
No, because sum of two side is equal to third side. i.e, 5+ 6 =11

2. How many triangles can you draw of having angles 70^0, 30^0 , and 80^0

Infinite number of triangles can be drawn.

I Short Answer Questions

1. Draw a line l. Draw a perpendicular to l at any point on l. On this perpendicular AB take any point X, 3cm away from l. Though X, draw a line m parallel to l.



a) Draw a line l and mark a point A on it.

b) Construct an angle of 90^0 at A to draw AB perpendicular at l.

c) Mark a point X on AB such that AX = 3 cm.

d) At X, construct an angle of 90^0 to draw perpendicular to AB.

Thus, 'm' is the required line through X such that l || l.

II Short Answer Questions

1. Construct a triangle ABC in which BC = 4.5 cm, $\angle B$ = 60^0 and $\angle C$ = 45^0

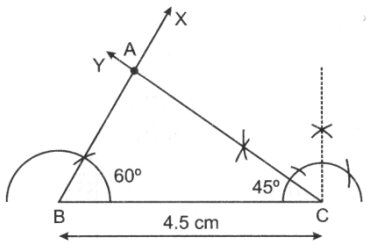
a) Draw a line segment BC = 4.5 cm

b) Construct $\angle CBX$ = 60^0 at B.

c) Construct $\angle BCY$ = 45^0 at C

d) Let the ray $\overrightarrow{BX}$ and $\overrightarrow{CY}$ intersect at A.

Thus, Δ ABC is required triangle.



2. Construct a ΔPQR, where PQ= 5cm, $\angle P$ = 45^0 and $\angle Q$ = 75^0

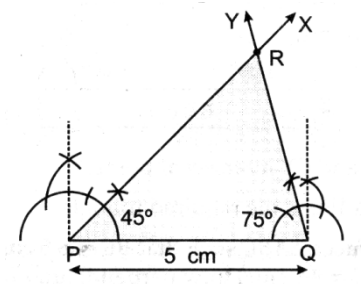
a) Draw a line segment PQ = 5 cm

b) At P, construct $\angle QPX$ = 45^0

c) At Q, construct $\angle PQY$ = 75^0

d) Let the ray $\overrightarrow{PX}$ and $\overrightarrow{QY}$ intersect at R.

Thus, Δ PQR is required triangle.



3. Construct a triangle ABC in which BC = 5.4 cm, $\angle B$ = 120^0 and AB=4.5cm.

Also draw AD perpendicular to BC.

Part 1 : Construction of Δ ABC :

a) Draw BC = 5.4 cm

b) Construct $\angle CBX$ = 120^0

c) From BC cut off BA = 4.5 cm

d) Join A and C.

Now Δ ABC is the required triangle.

Part II : Construction of AD⊥BC :

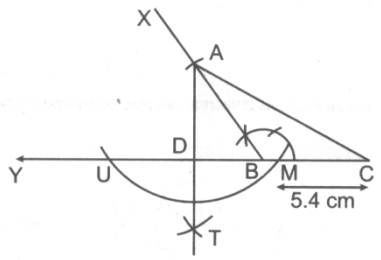
a) Produce CB through B to Y.

b) With centre A and a sufficient radius, draw an arc intersecting BY and BC at U and M respectively.

c) With U as centre and a radius more than half of UM, draw an arc opposite to side A

d) With the same radius and centre M, draw another arc, cutting the previous arc at T.

e) Joint AT such that it meets YB at D. Then AD⊥BC.



4. Construct a right angled triangle, in which length of hypotenuse is 5.6 cm and one of its acute angle is 30^0

We know that the sum of angles of triangle be 180^0 . Let us consider a right Δ ABC in which $\angle A$ = 90^0, hypotenuse BC = 5.6 cm and $\angle B$ = 30^0

We know that the sum of angles of a triangle is 180^0

$\angle A + \angle B + \angle C = 180^0$

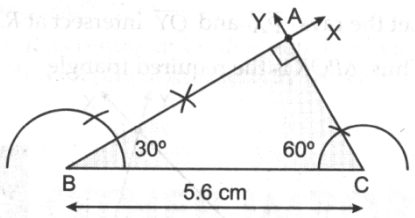
$90^0 + 30^0 + \angle C = 180^0$

$\angle C = 180^0 - 120^0 = 60^0$

Steps of Construction :

a) Draw a line segment BC = 5.6 cm

b) Construct $\angle CBX$ = 30^0 and $\angle BCY$ = 60^0



c) Let BX and CY interest at point A

Then , Δ ABC is the required triangle.

5. Construct a Δ ABC such that BC = 8.5 cm $\angle B$ = 90^0 and AC=9.5 cm. Draw perpendicular bisectors of AC and BC. Do they meet at AC?

Part 1 : To construct the Δ ABC

a) Draw BC = 8.5 cm

b) Construct $\angle CBX$ = 90^0

c) With centre C and radius equal t0 9.5 cm, draw an arc to cut at A.

d) Join A and C. The Δ ABC is the required triangle.

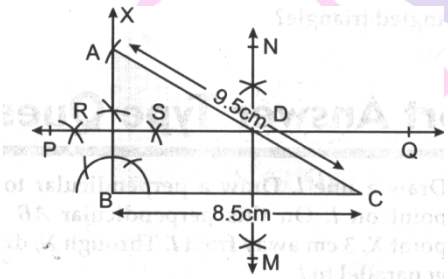
Part I I Perpendicular bisectors of AB and BC.

a) With centre at A and radius more than half of AB, draw two arcs on both sides of AB.

b) With centre at B and the same radius as in step (i) draw two arcs intersecting the arcs drawn in step at R and S.

c) Join R and S and extend it on both sides to P and Q . Now PQ is the perpendicular bisector of AB.

d) Similarly, draw NM perpendicular bisector of BC. We note that PQ and NM meet at a point D, Which is at AC.



6. Construct an isosceles right triangle such that its hypotenuse is 5.5 cm.

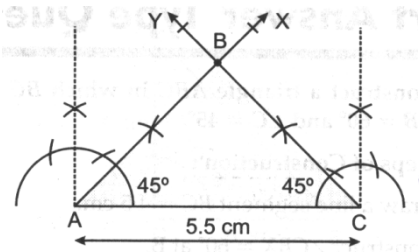
Steps of construction :

a) Draw AC = 5.5 cm

b) At A construct $\angle CAX$ = 45^0

c) At C construct $\angle ACY$ = 45^0, such that CY meets AX at B.

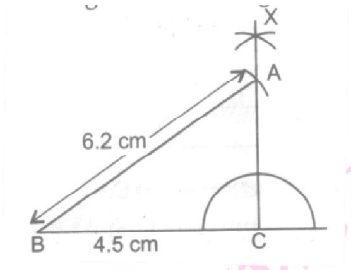
Then ABC is the required isosceles triangle, in which AB = CB and $\angle B$ = 90^0



7. Draw a triangle ABC with $\angle C$ as right angle, AB = 6.2 cm and BC = 4.5 CM.

To construct the Δ ABC, we follow the following steps:

a) Draw a line segment BC if length 4.5 cm.



b) $\angle BCX$ of measure 90^0

c) With centre B and radius AB = 6.2 cm, draw an arc of the circle to intersect ray CX at A.

d) Joint BA to obtain the desired triangle ABC.

8. Draw a right angle triangle having hypotenuse of length 5.4 cm and one of the acute angles of measure 60^0.

Let Δ ABC be a right triangle, right angled at C, such that hypotenuse AB=5.4 cm. Further, let $\angle A = 60^0$.

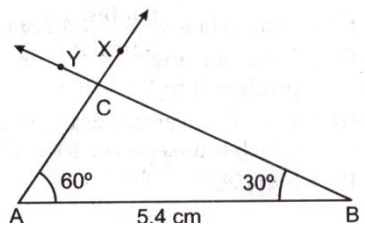
Then by the angle sum property of Δ ABC , we have

$\angle A + \angle B + \angle C = 180^0$.

$\Rightarrow 60^0 + \angle B + 90^0 = 180^0$.

$\Rightarrow 150^0 + \angle B + = 180^0$.

$\Rightarrow \angle B = 180^0 - 150^0 = 30^0$



To draw Δ ABC, we follow the following steps :

a) Draw a line segment AB= 5.4 cm

b) Draw $\angle BAX$ of measure 60^0

c) Draw $\angle ABY$ of measure 30^0 with Y on the same side of AB as X.

Let AX and BY intersect at C.

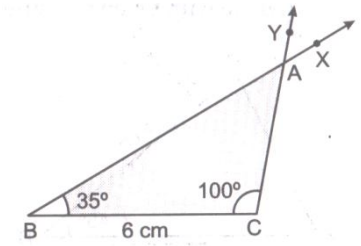
Then, Δ ABC is the required triangle.

9. Draw Δ ABC in which BC = 6 cm $\angle B$ = 35^0 and $\angle C$ =100^0. Measure $\angle A$

To draw the Δ ABC we follow the following steps :

Steps of construction :

a) Draw a line segment BC = 6 cm



b) Draw $\angle CBX$, such that $\angle CBX$ = 35^0

c) Draw $\angle BCY$ with Y on the same side of BC as X, such that $\angle BCY$ = 100^0

d) Let BX and CY intersect at A. Then Δ ABC is the required triangle.

By measurement we find that $\angle A$ =35^0

10. Draw a triangle ABC in which BC = 5.2 cm, $\angle B$ = 60^0 and $\angle A$ = 100^0

Here, we are given the side BC, $\angle B and \angle A$. But to draw the triangle, we required $\angle C$.

We know that

$\angle A + \angle B + \angle C$ = 180^0

$\Rightarrow$ 100^0 + 60^0+$\angle C$ = 180^0

$\Rightarrow$ 1 60^0+$\angle C$ = 180^0

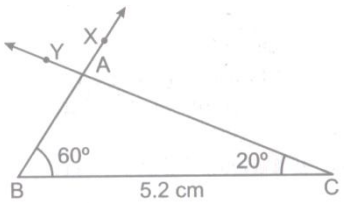
$\Rightarrow$ $\angle C$ = 180^0 - 1 60^0 = 20^0

Thus, we have, BC = 5.2 cm, $\angle B$ = 60^0 and $\angle C$ = 20^0.

Now, to draw the Δ ABC , we follow the following steps:

a) Draw a line segment BC = 5.2 cm.

b) Draw $\angle CBX$, such that $\angle CBX$ = 60^0



c) Draw BCY with Y on the same side of BC as X, such that $\angle BCY$ = 20^0

Let BX and CY intersect at A.

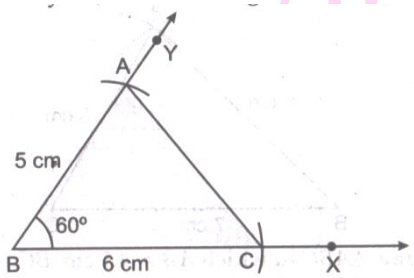
Then Δ ABC is the required triangle.

11. Construct Δ ABC in which $\angle B = 60^0$; AB = 5 cm and BC = 6cm .

In order to construct the Δ ABC we follow the following steps :

a) Draw $\angle XBY = 60^0$

b) From ray BX, cut off line segment BC of length 6 cm.



c) From ray BY, cut off line segment BA of length 5 cm.

d) Join AC to obtain the required triangle ABC, where $\angle B = 60^0$, AB= 5 cm and BC = 6 cm

12. Draw a triangle ABC with BC =3.2 cm AB= 3.6 cm and $\angle B = 120^0$. Also draw perpendicular from A on BC.

We follow the following steps to construct the required triangle.

Steps of construction.

a) Draw $\angle XBY$ of measure 120^0

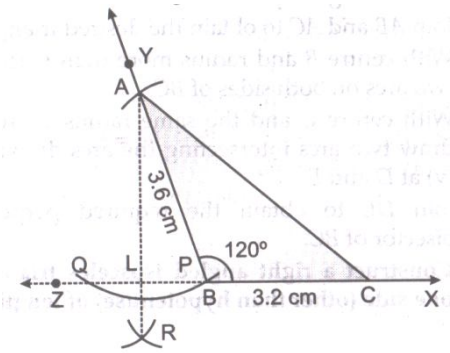
b) From ray BX, cut off line segment BC of length 3.2cm.

c) From ray BY, cut off line segment BA of length 3.6cm

d) Join CA to obtain the required triangle

e) Draw ray BZ.

f) With centre A, draw an arc intersecting rays BX and BZ at P and Q repectively.



g) With centre P and radius more than $\frac{1}{2}$ (PQ) cut an arc on the opposite of A.

h) With centre Q and the same radius as in step VII cur on arc which intersect the arc drawn in step VII at R.

i) Join AT. If it meets BZ at L, then AL is the required perpendicular from A on BC.

13. Construct a triangle ABC if the lengths of its sides are given by AB=6cm, BC=7 cm and AC = 5cm

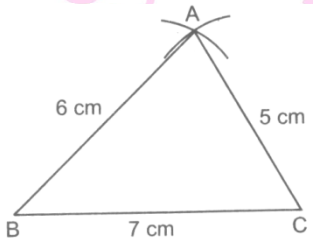
To construct the Δ ABC we follow the following steps.

a) Draw a line segment BC =7 cm

b) With centre B and radius AB=6cm, draw an arc of the circle.

c) With centre C and radius AC= 5cm draw another arc intersecting the arc drawn in step (iii) at A

d) Join AB and AC to obtain the desire triangle.

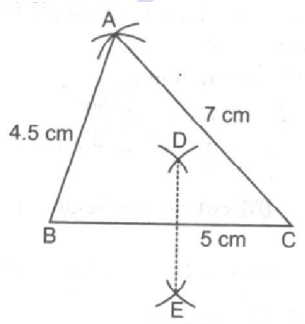


14. Draw Δ ABC in which AB = 4.5 cm, BC=5cm and CA =7 cm. Also draw the perpendicular bisector of BC.

In order to draw the Δ ABC and the perpendicular bisector of BC, we follow the following steps :

a) Draw a line segment BC = 5 cm

b) With centre CB and radius AB= 4.5 cm draw an arc of the circle.



c) With centre C and radius AC=7cm, draw an arc intersecting the previously drawn arc at A.

d) Join AB and AC to obtain the desired triangle.

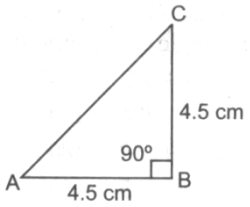
e) With centre B and radius more than $\frac{1}{2}$(BC), draw two arcs on both sides of BC.

f) With centre C and the same radius as in step (v) draw two arcs intersecting the arcs drawn in step (v) at D and E.

g) Join DE to obtain the required perpendicular bisector of BC.

15. Construct a right angled isosceles triangle with one side (other than hypotenuse) of length 4.5 cm

Step1: Firstly we draw a rough sketch of triangle with given measures marked on it.

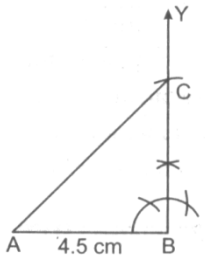


Step I : Draw a line segment AB of length 4.5cm.

Step II : Draw an angle of 90^0 on point B and produce it to Y.

Step III: With B as centre , draw an arc of4.5 cm which intersects ray BY to C.

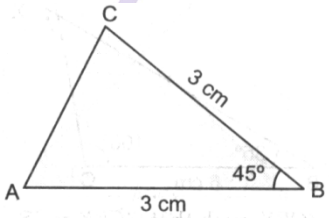
Step IV : Join



Thus, Δ ABC is the required right angled isosceles triangle.

16. Draw an isosceles triangle with each of equal sides of length 3 cm and the angle between them as 45^0.

Step 1 : Firstly, we draw a rough sketch of triangle with given measures marked on it.

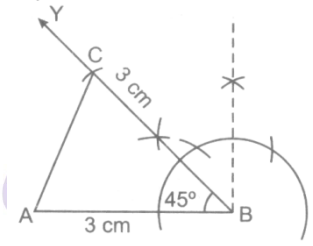


Step II : Draw a line segment AB of length 3 cm.

Step III: Draw an angle of 45^0 on point B and produce it to ray Y.

Step IV : With B as centre, draw an arc of 3 cm which intersects ray BY at C.

Step V : Join AC.



Thus Δ ABC is the required isosceles triangle.

II Short Answer Questions

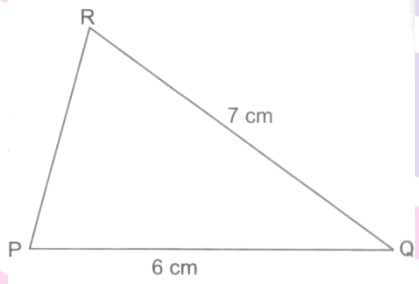
1. Construct a triangle PQR such that PQ = 6 cm, QR = 7 cm and PR = 4.5 cm (NCERT)

i). Draw a line segment PQ of length 6 cm.

ii) With P as centre, draw an arc of radius 4.5 cm

iii) With Q as centre, draw an arc of radius 7 cm which intersects the previous arc at R.

iv) Join PR and QR. Then Δ PQR is the required triangle .



2. Given a line l and point M on it draw a perpendicular MP to l where MP = 5.2 cm and a line q parallel to l through P.

i) Draw a line l.

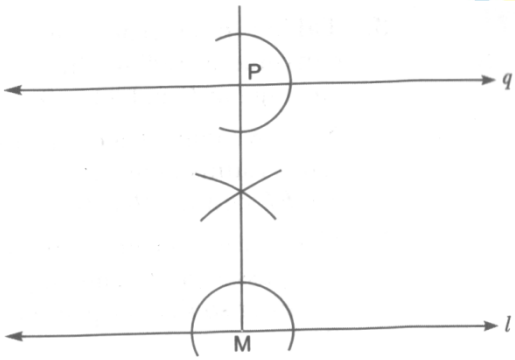
ii) Take a point M on it.

iii) Draw an angle of 90^0 at M with l which is perpendicular to l at M.

iv) With M as centre and radius 5.2 cm draw an arc which intersects the above perpendicular at point P. MP is the required perpendicular.

v) at P, draw an angle of 90^0 with PM and produce to make a line q. Line q.

Line q is the required line parallel to line l.



3. Construct an equilateral triangle ABC of side 6cm.

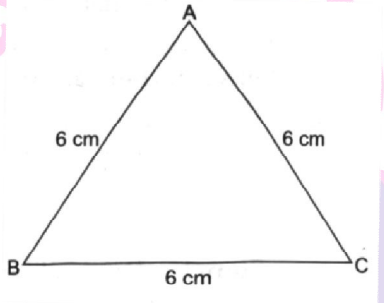
First, we draw a rough sketch with given measure. It will help us in deciding how to proceed.

Step 1: Draw a line segment BC of length 6cm.

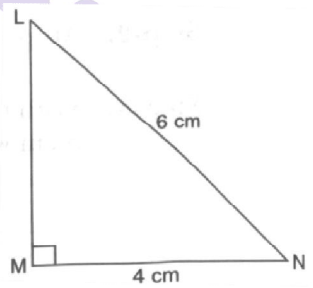
Step 2: From B draw an arc of radius 6cm.

Step :3 Now from C; point A is at a distance of 6cm So, with C as centre, draw an arc of radius 6cm which will cut the previous arc at the distance of 6cm.

Hence, Δ ABC is the required triangle.



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



First, draw a rough sketch with the given measurement.

Step :1 Draw a line segment MN of length 4 cm

Step -2: At M draw MX ⊥ MN.

Step -3: With N as centre, draw an arc of radius 6 cm

Step-4: L must be the meeting point of length drawn in step 2 and step 3.

Hence, Δ LMN is the required triangle.

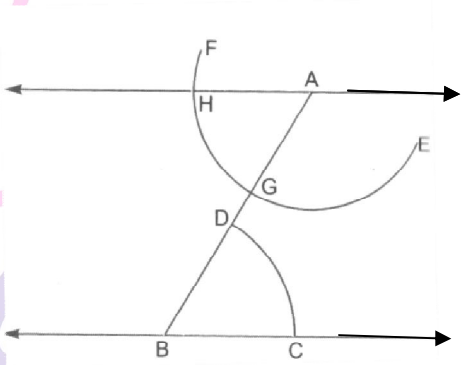
II Long Answer Questions

1. Draw two parallel line at a distance of2.8 cm apart.

1. Take a line 'l' and a point 'A' outside 'l '.

2. Take any point B on l and join B to A.

3. Taking B as centre and with a convenient radius, draw an arc cutting l at C and BA at D.



4. Now by taking A as centre and the same radius as in step 3, draw an arc EF cutting AB at G.

5. Place the pointed tip of the compasses at C and adjust the opening so that the pencil tip is at D,

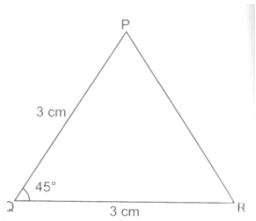
6. By taking same radius as in step 5 and with G as centre, draw an arc cutting the arc EF at H.

7. Now join AH to draw a line 'm'.

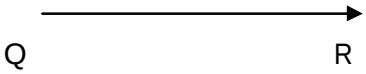
Note that ∠ABC and ∠BAH are alternate interior angles. Therefore m ∥ L.

2. Draw an isosceles triangle with each of equal sides of length 3 cm and the angle between them as 60^0.

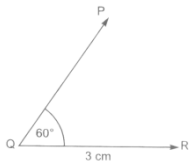
First, we draw a rough sketch with given measured. (It helps us to determine the procedure in construction.)



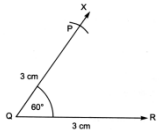
Step 1: Draw a line segment QR of length 3 cm



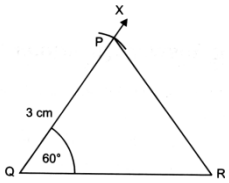
Step 2: At point Q draw an angle of 45^0 with QR.



Step 3 : With Q as centre, draw an arc of radius 3cm which cuts QX at point P.



Step 4: Join PR. Δ PQR is now obtained.



3. Construct Δ PQR if PQ = 5cm, m $\angle PQR$ = 105 ^{0} and m∠QRP = 40^0

(Hint : Recall angle-sum property of a triangle)

In this question, angle P can be found out as $\angle P$ = 180^0 - $\angle Q$ - $\angle R$.

(BY Angle Sum property of Triangle)

∠P = 180 – 105 - 40^0

∠P = 35^0

Draw a rough figure with measurements.

Step – 1. : Draw a line segment of length 5 cm.

Step-2 : By taking Q as centre draw an angle of 105^0

Step -3: By taking P as centre draw an angle of 35^0 which will cut at point R.

Step-4. : PQR is the required triangle.