CBSE Test Paper 04

CH-11 Constructions

1. If lines AB, AC, AD and AE are parallel to a line m, then_____.
   a. AB & AC are parallel and AD & AE are perpendicular
   b. none of these
   c. A, B, C, D, E are collinear points
   d. A, B, C, D, E are non-collinear points
2. The construction of a $\triangle ABC$ with AB = 4 cm and $\angle A = 60^0$ is not possible when difference of BC and AC is equal to_____.
   a. 3.5 cm
   b. 4.5 cm
   c. 3 cm
   d. 2.5 cm
3. The construction of $\triangle ABC$, given that BC = 5 cm, $\angle B = 45^0$ is not possible when difference of AB and AC is equal to _____.
   a. 3 cm
   b. 4 cm
   c. 2 cm
   d. 5.1 cm
4. It is possible to construct a $\triangle ABC$ whose sides are_____.
   a. 2 cm, 3 cm and 5 cm
   b. 3 cm, 2 cm and 6 cm

c. 4 cm, 3 cm and 8 cm

d. 3 cm, 4 cm and 5 cm.

5. Radius of a circle is _____ to tangent.

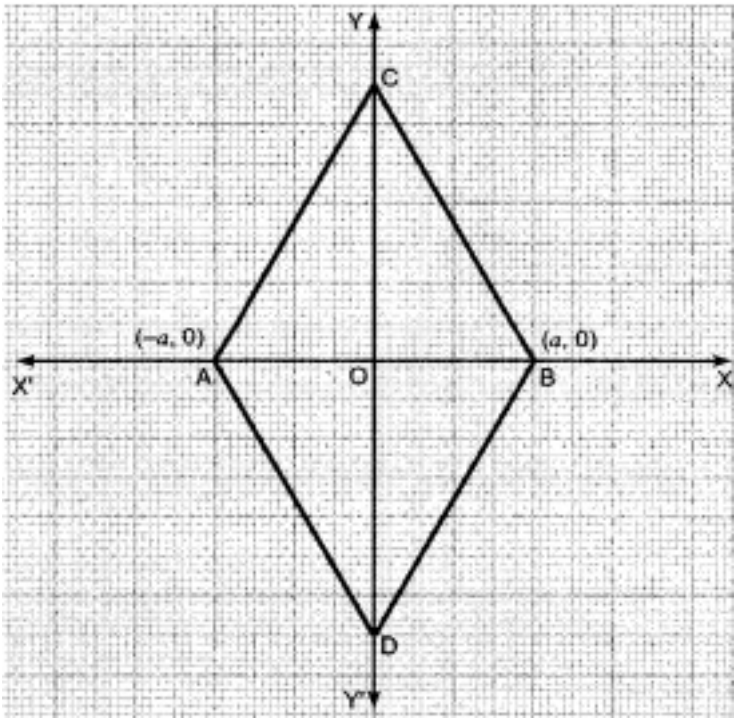
   a. none

   b. parallel

   c. perpendicular

   d. No relation

6. In Fig., if ABC and ABD are equilateral triangles then find the coordinates of C and D.



7. Construct a triangle ABC such that BC = 6 cm, AB = 6 cm and median AD = 4 cm.

8. Construct a $\triangle$ABC in which BC = 3.4 cm, AB - AC = 1.5 cm and $\angle$B = 45°.

9. Draw a line segment PQ of length 8.4 cm. Draw the perpendicular bisector of this line segment.

10. Draw a line segment of length 6.6 cm. Bisect it and measure the length of each part.

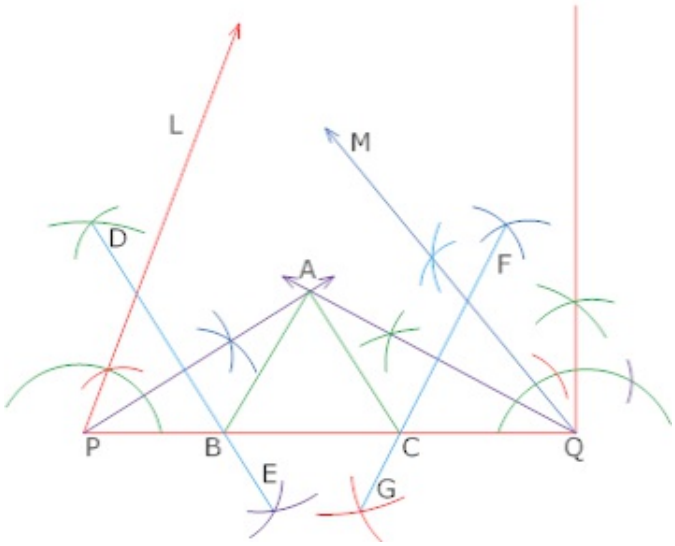
11. Construct a triangle ABC, in which BC = 3.8 cm, $\angle$B = 45° and AB + AC = 6.8 cm.

12. Construct a $\triangle$PQR, in which QR = 6.5 cm, $\angle$Q = 60° and PR - PQ = 1.5 cm and justify it.

13. Construction a triangle with base of length 7.5 cm, the difference of the other two sides 2.5 cm and one base angle of 45^{o}.

14. A rhombus whose diagonals are 4 cm and 6 cm in lengths.

15. Construct the triangle ABC, in which $\angle B = 60^{\circ}, \angle C = 45^{\circ}$ and AB + BC + CA = 11cm



CBSE Test Paper 04

CH-11 Constructions

Solution

1. (c) A, B, C, D, E are collinear points

   Explanation: If lines AB, AC, AD, AE are parallel to a line m, then either all the lines should be parallel to each other or the the points should be collinear. Since, all the lines originates from point A thus they cannot be parallel, hence, the points A,B,C,D,E are collinear.
2. (b) 4.5 cm

   Explanation: To construct a triangle whose base, base angle and difference of other two sides are given, the difference of other two sides must be less than its base.

   But in this case, BC-AC>AB, so, we cannot construct it.

3. (d) 5.1 cm

   Explanation: To construct a triangle whose base, base angle and difference of other two sides are given, the difference of other two sides should be less than its base.

   But , here, AB - AC > BC, So we can not construct it.

4. (d) 3 cm, 4 cm and 5 cm.

   Explanation: To construct a triangle whose three sides are given, the sum of two sides should always be greater than the third side.

   As here, (3+4)>5; (3+5)>4; (4+5)>3

   So,we can construct this triangle.

5. (c) perpendicular

   Explanation: Consider a circle with Centre O and radius 'r', AB is the tangent on circle O touching the circle at point P. Join OP such that OP becomes the radius of circle O. Now let us take a point Q , other than P, on the tangent AB. Join OQ. Since Q is a point on tangent AB, other than the point of contact P, so Q will be outside the circle.

   Let OQ intersect the circle at R.

Then OQ=OR + RQ

$\Longrightarrow$ OQ>OR

$\Longrightarrow$ OQ>OP (OR=OP=RADIUS)

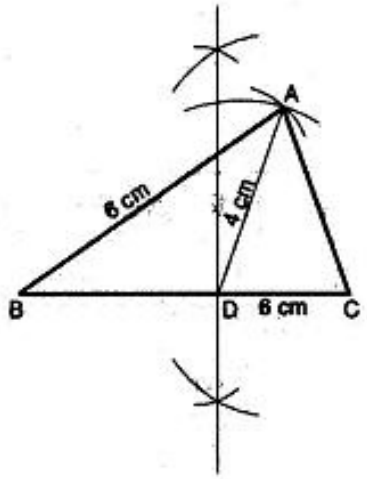
Thus, OP is the shortest distance among all line segments which is thus perpendicular from O on AB.

Hence, OP is perpendicular to AB.

6. Here, AC = $2a$ and AO = a
   By Pythagoras theorem
   $OC^2 = AC^2 - AO^2 = 4a^2 - a^2 = 3a^2$
   OC = $a\sqrt{3}$
   Therefore, coordinates of C are (0, $a\sqrt{3}$)
   And the coordinates of D are (0, -$a\sqrt{3}$).

7. Given: In triangle ABC, BC = 6 cm, AB = 6 cm and median AD = 4 cm.
   Required: To construct the triangle ABC.
   Steps of construction :

   i. Draw a line segment BC = 6 cm.
   ii. Draw the perpendicular bisector of BC which intersects BC at some point name it D. D is the mid-point of BC.
   iii. With D as centre and radius 4 cm, Draw an arc.
   iv. With B as centre and radius 6 cm, draw another arc intersecting the above arc at a point A.
   v. Join AB and AC.
   ABC is the required triangle.



8. Steps of construction:-

   i. Draw a line segment BC of 3.4 cm.

   ii. At B, draw an angle XBC of 45^{o}.

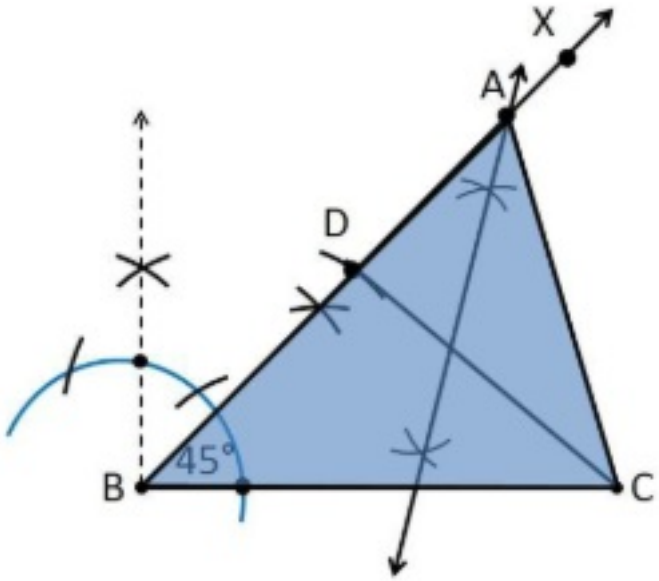
   iii. With centre B and radius 1.5 cm, draw an arc which intersects BX at D.

   iv. Join DC.

   v. Draw the perpendicular bisector of DC which intersects BD produced at A.

   vi. Join AC.

   $\therefore$ $\triangle$ABC is the required triangle.



9. We follow the following steps for constructing the perpendicular bisector of PQ.

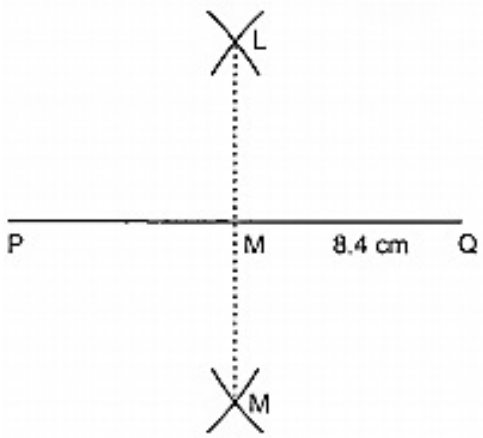
   Steps of Construction

   i. Draw a line segment PQ = 8.4 cm by using a graduated ruler.

ii. With P as centre and radius more than half of PQ, draw two arcs, one on each side of PQ.

iii. With Q as centre and the same radius as in step ii, draw arcs cutting the arcs drawn in the previous step at L and M respectively.

iv. Draw the line segment with L and M as end-points.



The line segment LM is the required perpendicular bisector of PQ.

10. We follow the following steps of construction:

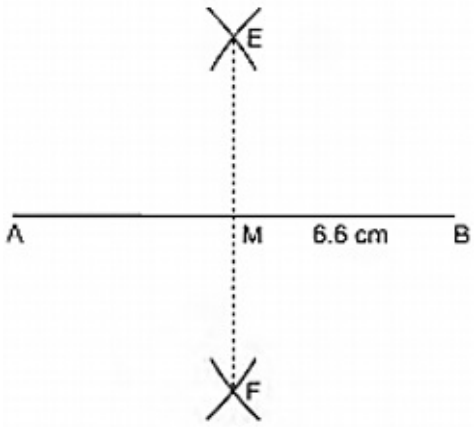
Steps of Construction

i. Draw a line segment AB = 6.6 cm by using a graduated ruler.

ii. With A as centre and radius more than half of AB, draw arcs, one on each side of AB.

iii. With B as centre and the same radius as in step ii, draw arcs cutting the arcs drawn in step ii at E and F respectively.

iv. Draw the line segment with E and F as end-points. Suppose it meets AB at M. Then, M bisects the line segment AB.



By measuring AM and MB, we find that

AM = MB = 3.3 cm

11. In order to construct $\triangle ABC$, we follow the following steps:

    Steps of Construction:

    Justification: Clearly, A lies on the perpendicular bisector of CD.

    $\therefore$ AC = AD

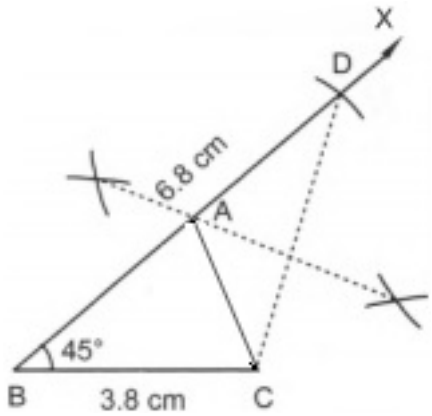
    Now, BD = 6.8 cm

    $\Rightarrow$ BA + AD = 6.8 cm

    $\Rightarrow$ AB + AC = 6.8 cm

    Hence, $\triangle ABC$ is the required triangle.

    i. Draw BC = 3.8 cm.
    ii. Draw $\angle CBX = 45^o$
    iii. From ray BX, cut off line segment BD equal to AB + AC i.e., 6.8 cm.
    iv. Join CD.
    v. Draw the perpendicular bisector of CD meeting BD at A.
    vi. Join CA to obtain the required triangle ABC.



12. Given, in $\triangle PQR$, QR = 6.5 cm, $\angle Q = 60^o$ and PR - PQ = 1.5 cm

    Steps of Construction:

    Justification:

    Base QR and $\angle Q$ are drawn as given.

    Since, AB is the perpendicular bisector of SR and P lies on it.

    $\therefore$ PS = PR

    Now, QS = PS - PQ $\Rightarrow$ QS = PR - PQ

    Thus, construction is justified.

i. Draw the base, QR = 6.5 cm.

At point Q, draw a ray QX making an $\angle XQR = 60°$.

Here, PR - PQ = 1.5 cm

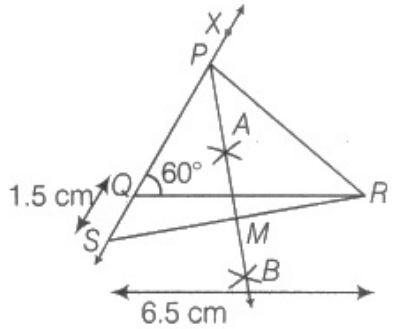
$\therefore$ PR > PQ

i.e. The side containing the base angle Q is less than third side, so it is the case II.

ii. Cut line segment QS equal to PR - PQ, i.e. QS = 1.5 cm from the ray QX extended on opposite side of base QR.

iii. Join SR and draw its perpendicular bisector ray AB, which intersects SR at M (say).

iv. Let P be the intersection point of SX and perpendicular bisector AB. Then, join PR.



Thus, PQR is the required triangle.

13. In $\triangle$ABC, base = 7.5 cm, the difference of the other two sides, AB - AC or AC - AB = 2.5 cm. and one base angle is 45^o.

Required: To construct the $\triangle$ABC

i. AB - AC = 2.5.

Steps of construction :

a. Draw BC = 7.5 cm.

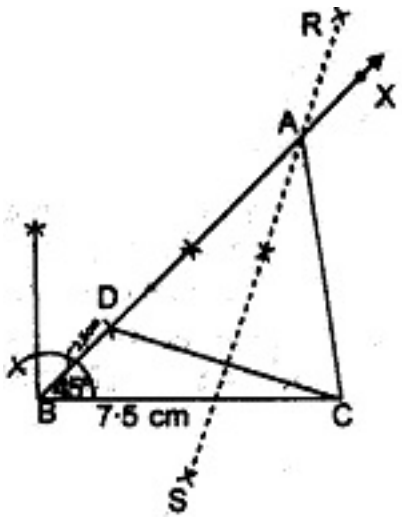
b. At B, construct $\angle CBX = 45^o$

c. On BX, cut off BD = 2.5 cm.

d. Join CD.

e. Draw the perpendicular bisector RS of CD intersecting BX at a point A.

f. Join AC.



ABC is the required triangle.

ii. AC - AB = 2.5 cm.

a. Draw BC = 7.5

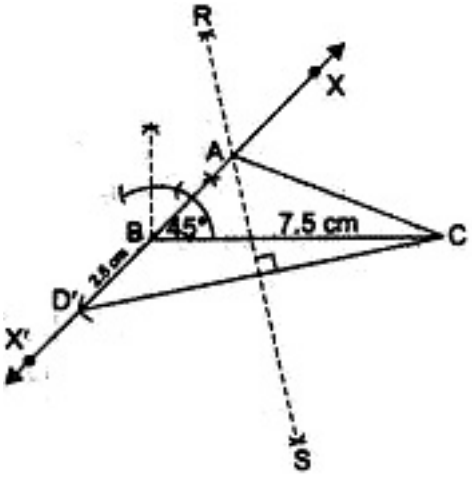
b. At B, construct $\angle CBX = 45^{o}$ and produce XB to form a line XBX'.

c. On BX' cut off BD' = 2.5 cm.

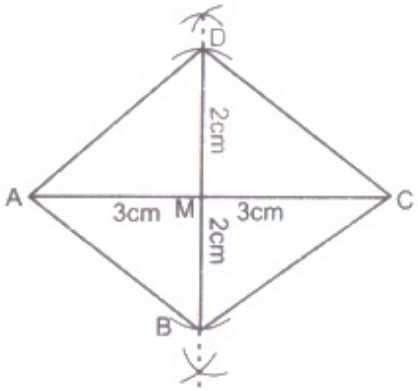
d. Join CD'

e. Draw perpendicular bisector RS of CD' intersecting BX at a point A.

f. Join AC.



ABC is the required triangle.

14. 

Steps of construction:

1. Take AC = 6 cm.
2. Draw BD the right bisectors of AC.
3. Cut off MB = MD = 2 cm.
4. Join AB, BC, CD and DA.
   Hence, ABCD is the required rhombus.

15. steps of construction:

i. Draw a line segment PQ = 11cm (= AB + BC + CA)
ii. At P construct an angle of 60° and at Q an angle of 45°
iii. Bisects these angles let bisectors of these intersect at point A
iv. Draw perpendicular bisectors DE of AP to intersect PQ at B and FG of AQ to intersect PQ at C.
v. Join AB and AC Then ABC is required triangle.