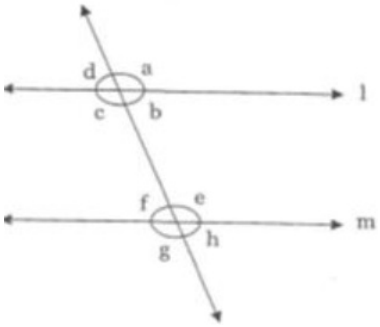
CBSE Test Paper 05

CH-11 Constructions

1. How many angles are formed by a transversal with a pair of lines?

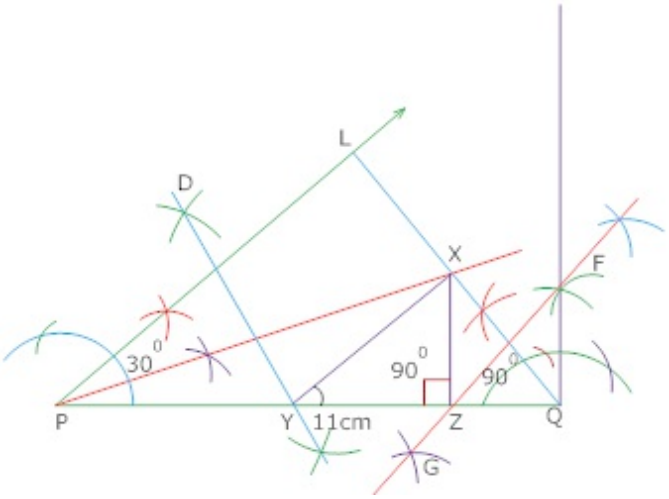


   a. 4
   b. 8
   c. 6
   d. 3
2. An angle greater than 180^0 but less than 360^0 is called _____.
   a. right angle
   b. an acute angle
   c. an obtuse angle
   d. reflex angle
3. Among the following, find the set of measures which can form triangle.
   a. $70^0, 90^0, 25^0$
   b. $45^0, 45^0, 80^0$
   c. $65^0, 85^0, 30^0$
   d. $65^0, 85^0, 40^0$
4. With the help of a ruler and a compass, it is possible to construct an angle of ____.
   a. 40^0
   b. 7.5^0
   c. 35^0
   d. 47.5^0
5. In $\triangle ABC$, which of the following information is needed to construct it if it is known that measure of $\angle B = 60^0$ and BC = 6 cm :
   a. AB - AC
   b. AB - AC or AB+AC

c. AB+AC

d. Area of triangle

6. Construct a triangle PQR whose perimeter is equal to 14 cm, ∠P = 45° and ∠Q = 60°.
7. Divide a line segment AB of length 8 cm into 4 equal parts.
8. Construct the bisector of a given angle.
9. Construct a triangle ABC in which BC = 4.6 cm, ∠B = 45^{o} and AB + CA = 8.2 cm.
10. Draw a line segment of length 8.6 cm. Bisect it and measure the length of each part.
11. Construct an equilateral triangle, given its side 6 cm and justify the construction.
12. Construct equilateral triangle whose side is 4 cm.
13. Draw a line segment AB and by ruler and compasses, obtain a line segment of length $\frac{3}{4}$ (AB).
14. Construct a triangle XYZ in which ∠y = 30° ∠Z = 90° and XY + YZ + ZX = 11cm



15. A triangle PQR given that QR = 3cm, $\angle PQR = 45^{\circ}$ and QP – PR = 2 cm.

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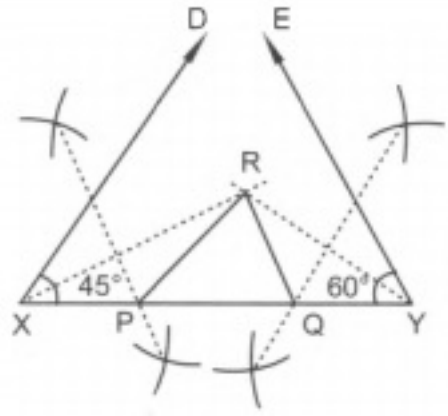
Solution

1. (b) 8

   Explanation: This can easily be done by counting the number of angles given in the figure.
2. (d) reflex angle

   Explanation: An angle whose measure is greater than 180^0 but less than 360^0 is called Reflex Angle.
3. (c) $65^0, 85^0, 30^0$

   Explanation: As the sum of the interior angles of a triangle should be 180^0 and in this case $65^0 + 85^0 + 30^0 = 180^0$ so this set of measures form a triangle.
4. (b) 7.5^0 **Explanation:** With the help of a ruler and a compass, we can construct an angle which is a multiple of 15^0. Since 7.5^0 is multiple of 15^0, so, we can construct it.
5. (b) AB - AC or AB+AC

   Explanation: To construct a triangle, we need measurements of its base, base angle and sum or difference of other two sides i.e to construct a $\triangle ABC$, we need BC, $\angle B$ and AB-AC or AB+AC.
6. 

   To draw $\triangle$PQR, we follow the following steps:

   Steps of Construction:

   i. Draw a line segment XY = 14 cm
   ii. Construct $\angle$YXD = $\angle$P = 45° and $\angle$XYE = $\angle$Q = 60°

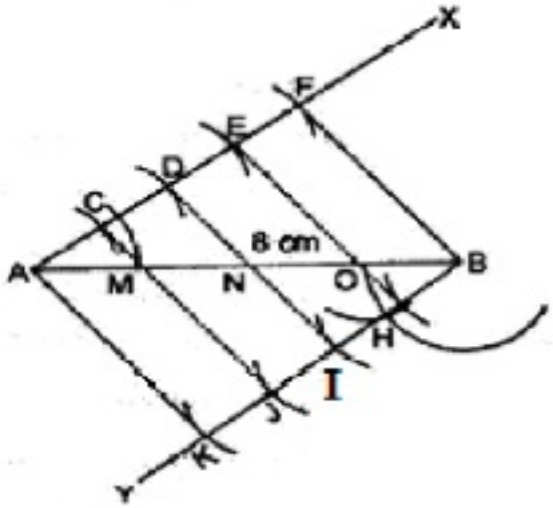
iii. Draw the bisectors of angles ∠YXD and ∠XYE mark their point of intersection as R.

iv. Draw right bisectors of RX and RY meeting XY at P and Q respectively.

v. Join PR and QR to obtain the required triangle PQR.

7. Given: A line segment AB of length 8 cm.

Required: To divide the line segment of 8 cm into 4 equal parts.



Steps of construction :

i. Draw a line segment AB = 8 cm.

ii. At A, construct any acute angle BAX.

iii. At B, construct ∠ABY = ∠BAX on the other side of the line AB.

iv. From AX, cut off 4 equal distances at the points C, D, E and F such that AC = CD = DE = EF.

v. With the same radius, cut off 4 equal distances along BY at the point H, I, J and K such that BH = HI = IJ = JK.

vi. Join AK, CJ, DI, EH and FB. Let CJ, DI and EH meet the line segment AB at the point M, N and O respectively. Then M, N and O are the points of division of AB such that AM = MN = NO = OB.

8. Given : Any ∠POQ

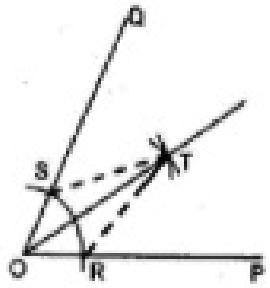
Required : To bisect ∠POQ.

Steps of construction :

i. With O as centre and suitable radius draw an arc to meet OP at R and OQ at S.

ii. With R as centre and any suitable radius draw an arc. With S as centre and same radius draw another arc to meet the previous arc at T.

iii. Join OT and produce it, then OT is the required bisector of $\angle POQ$.



Justification: Join ST and RT.

In triangles OST and ORT,

OS = OR . . . [Radii of the same arc]

ST = RT . . . [arcs of equal radii]

OT = OT . . . [Common]

$\therefore \triangle OST \cong \triangle ORT$ . . .[By SSS rule]

$\therefore \angle SOT = \angle ROT$ . . . [c.p.c.t.]

9. Given : In triangle ABC, BC = 4.6 cm, $\angle B = 45^o$ and AB + AC = 8.2 cm.

Required: To construct the triangle ABC.

Steps of construction.

i. Draw the base BC = 4.6. cm.

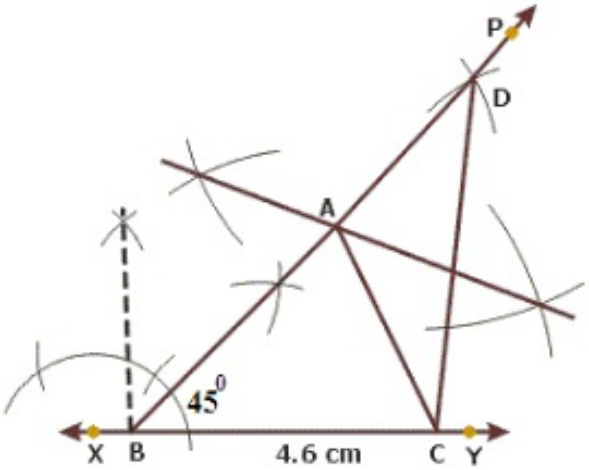
ii. At the point B, construct an angle, say $PBC = 45^o$.

iii. Cut a line segment BD equal to AB + AC = 8.2 cm on the ray BP.

iv. Join DC.

v. Draw the perpendicular bisector of line segment DC which intersects BP at some point name it A.

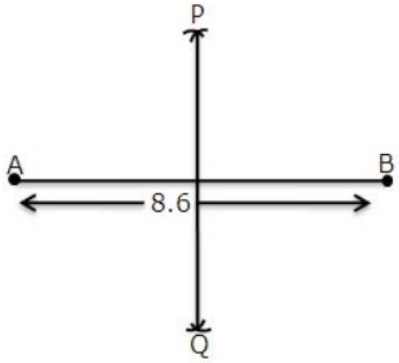
vi. Join AC.



ABC is the required triangle.

10. Steps of construction:

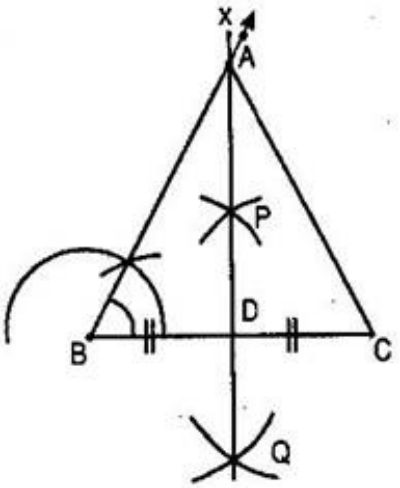
    i. Draw a line segment AB of 8.6 cm.
    ii. With centre A and radius more than $\frac{1}{2}$ AB, draw arcs, one on each side of AB.
    iii. With centre B and same radius, draw arcs cutting the previous arcs at P and Q respectively.
    iv. Join PQ.



$\therefore$ AC = BC = 4.3 cm

11. Steps of construction:

    i. Draw a line segment BC of length 6 cm.
    ii. At B draw$\angle XBC = 60^\circ$.
    iii. Draw perpendicular bisector PQ of line segment BC.
    iv. Let A and D be the points where PQ intersects the ray BX and side BC respectively.
    v. Join AC.



Thus ABC is the required equilateral triangle.

Justification:

In right triangle ADB and right triangle ADC,

AD = AD [Common]

$\angle ADB = \angle ADC = 90^\circ$ [By construction]

BD = CD [By construction]

$\therefore \Delta ADB \cong \Delta ADC$ [By SAS congruency]

$\therefore \angle B = \angle C = 60^\circ$ [By CPCT]

$\therefore \angle A = 180^\circ - (\angle B + \angle C)$

$=180^\circ - (60^\circ + 60^\circ)$ = 180^o - (60^o + 60^o) = 180^o - 120^o = 60^o

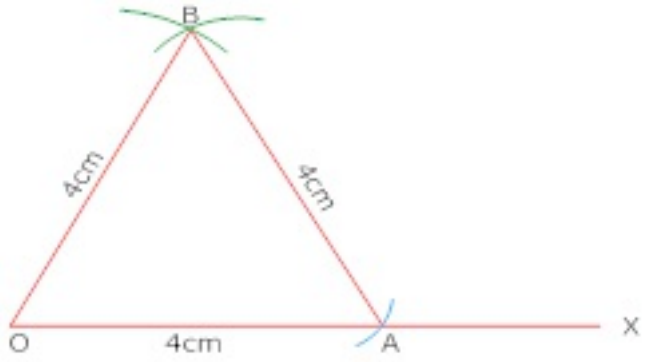
$= 180^\circ - 120^\circ = 60^\circ$

$\therefore \angle A = \angle B = \angle C = 60^\circ$

$\therefore$ ABC is an equilateral triangle.

$\therefore \Delta ABC$ is an equilateral triangle.

12. Steps of Construction:



i. Draw a ray OX

ii. Taking O as a centre draw an arc of radius 4cm which cut OX at A.

iii. Now taking O and A as a centre now draw two arcs with radius of 4 cm which intersects each other at B

iv. Join OB and AB

v. ΔOAB is required triangle.

13. Steps of construction:-

i. Draw a line segment AB.

ii. With centre A and radius more than $\frac{1}{2}$ AB, draw arcs, one on each side of AB.

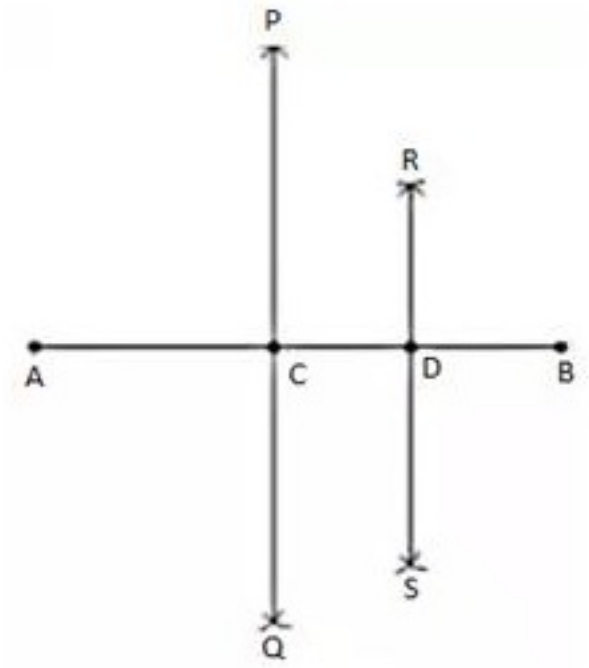
iii. With centre B and same radius, draw arcs cutting previous arcs at P and Q respectively.

iv. Join PQ which intersect AB at C.

v. With centre C and radius more than $\frac{1}{2}$ CB, draw arcs, one on each side of CB.

vi. With cnetre B and same radius, draw arcs cutting previous arcs at R and S respectively.

vii. Join RS which intersect CB at D.



$\therefore$ AD = $\frac{3}{4}$ AB

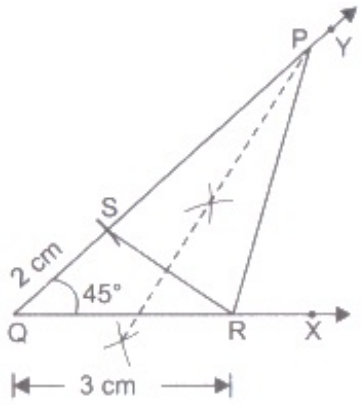
14. Steps of construction:

i. Draw line segment PQ = 11cm

ii. At P construct an angle 30° and at Q an angle 90°

iii. Bisect these angles. Let the bisectors of these angles intersect each other at point X.
iv. Draw perpendicular bisector DE of PX and FG of XQ intersect PQ at point Y and Z respectively.
v. Join XY and XZ
vi. XYZ is required triangle

15.



i. Draw a ray OX and cut off a line segment QR = 3 cm.
ii. AT Q, construction $\angle PQR = 45^\circ$.
iii. From QY, cut off QS = 2 cm.
iv. Join RS.
v. Draw perpendicular bisector of RS to Meet QY at P.
vi. Join PR. Then PQR is the required triangle.