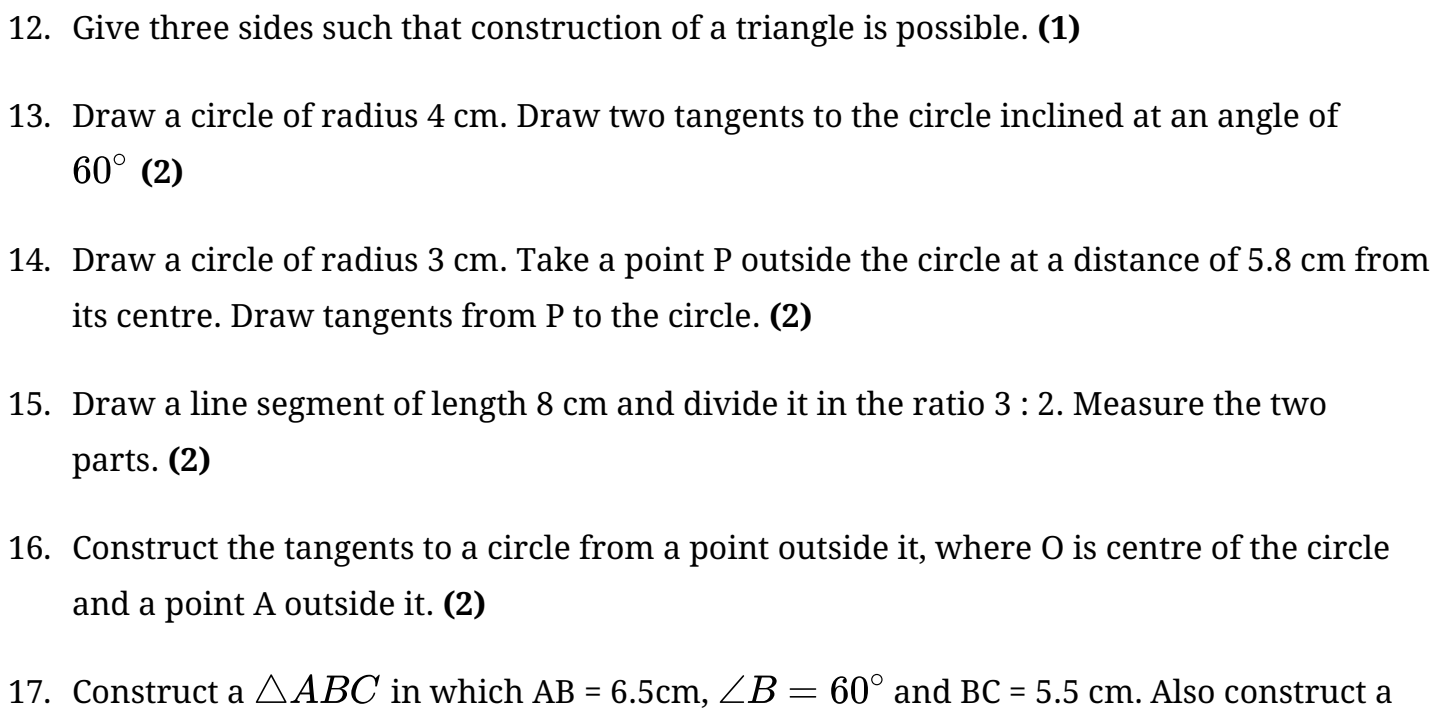1. To construct a triangle similar to a given $\triangle ABC$ with its sides $\frac{5}{4}$ of the corresponding sides of $\triangle ABC$, first draw ray AX such that $\angle BAX$ is an acute angle and X is on the opposite side of C with respect to AB. Then locate the points $A_1, A_2, A_3, \ldots$ on AX at equal distances and next step is to join: **(1)**

    a. $A_5 C$

    b. $A_5 B$

    c. $A_4 C$

    d. $A_4 B$

2. To divide a line segment LM in the ratio a : b, where a and b are positive integers, draw a ray LX so that $\angle MLX$ is an acute angle and then mark points on the ray LX at equal distances such that the minimum number of these points is : **(1)**

    a. greater of a and b

    b. a + b

    c. ab

    d. a + b − 1

3. A draw a pair of tangents to a circle which are inclined to each other at an angle of 65°, it is required to draw tangents at the end points of those two radii of the circle, the angle between which is : **(1)**

    a. 115°

    b. 105°

    c. 95°

    d. 110°

4. To construct a triangle similar to a given with $\triangle ABC$ its sides $\frac{4}{5}$ of the corresponding sides of the $\triangle ABC$, first draw a ray BX such that $\angle CBX$, is an acute angle and X lies on the opposite side of A with respect to BC. Then locate points B_1, B_2, B_3, B_4, B_5 on BX at equal distances and join B_5 to C. Now, next step is to draw a line parallel to $B_5 C$ and passing through: **(1)**

    a. B_4

    b. B_5

    c. B_2

    d. B_3

5. To divide a line segment AP in the ration 2 : 9, a ray AX is drawn first such that $\angle BAX$ is an acute angle and then points A_1, A_2, A_3... are located of equal distances on the ray AX and the points P is joined to **(1)**

    a. A_{12}

    b. A_{11}

    c. A_8

    d. A_3

6. To construct a triangle similar to given ΔABC with its sides $\frac{3}{7}$ of the corresponding sides of ΔABC, first draw a ray BX such that $\angle CBX$ is an acute angle and X lies on the opposite side of A with respect to BC. Then locate points B_1, B_2, B_3, ... on BX at equal distance and next step is to join: **(1)**

    a. B_4 to C

    b. B_4 to C

    c. B_{10} to C

    d. B_7 to C

7. To divide a line segment AB in the ratio 5 : 7, first a ray AX is drawn so that $\angle BAX$ is an acute angle and then at equal distances points are marked on the ray AX such that the minimum number of these points is: **(1)**

    a. 11

    b. 8

    c. 10

    d. 12

8. The construction of triangle, similar and smaller to a given triangle as per given scale factor $x : y$, is possible only when, **(1)**

    a. $x < y$

    b. Independent of scale factor

    c. $x > y$

    d. $x = y$

9. In the given figure, $\triangle BPQ$ is similar to $\triangle BCA$ with sides $\frac{x}{y}$ of the corresponding sides of $\triangle BCA$. Then , find the value of $\frac{x}{y}$. **(1)**

10. To divide a line segment AB in the ratio 5 : 7, first AX is drawn, so that $\angle BAX$ is an acute angle and then at equal distance, points are marked on the ray AX, find the minimum number of these points. **(1)**

11. In the given figure of construction $\triangle QST \sim \triangle QRP$, then find QT : QP. **(1)**

12. Give three sides such that construction of a triangle is possible. **(1)**

13. Draw a circle of radius 4 cm. Draw two tangents to the circle inclined at an angle of $60°$ **(2)**

14. Draw a circle of radius 3 cm. Take a point P outside the circle at a distance of 5.8 cm from its centre. Draw tangents from P to the circle. **(2)**

15. Draw a line segment of length 8 cm and divide it in the ratio 3 : 2. Measure the two parts. **(2)**

16. Construct the tangents to a circle from a point outside it, where O is centre of the circle and a point A outside it. **(2)**

17. Construct a $\triangle ABC$ in which AB = 6.5cm, $\angle B = 60°$ and BC = 5.5 cm. Also construct a

triangle ABC similar to $\triangle ABC$ whose each side is $\frac{3}{2}$ times the corresponding side of the $\triangle ABC$. **(3)**

18. Draw a circle of radius 6 cm. Draw a tangent to this circle making an angle of 30° with a line passing through the centre. **(3)**

19. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm. Draw its incircle and measure its radius. Write steps of construction also. **(3)**

20. Let ABC be a right triangle in which AB = 3 cm, BC = 4 cm and $\angle B$ = 90°. BD is the perpendicular from B on AC. The circle through B, C, D is drawn. Construct the tangents from A to this circle. **(3)**

Solution

1. d. A_4B

   Explanation: According to the question, the next step is to join
   Then we have to draw a parallel side of A_4B given with A_5. which cuts extended
   BC at C' .now $\triangle ABC'$ is the required triangle

2. b. a + b

   Explanation: According to the question, the minimum number of those points
   which are to be marked should be (Numerator + Denominator) i.e., a + b

3. a. 115^0

   Explanation: According to the question, the angle between the radii should be
   180^0 - 65^0 = 115^0
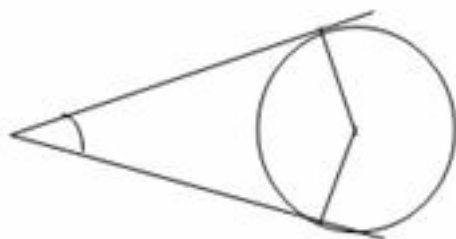
4. a. B_4

   Explanation: According to the question, the next step is to draw a line parallel
   to B_5C and passing through B_4
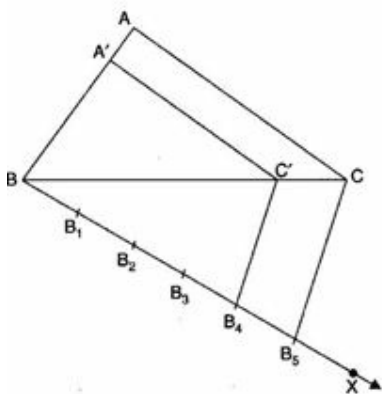
5. b. A_{11}

Explanation: According to the question, the points P is joined to A_{11}.
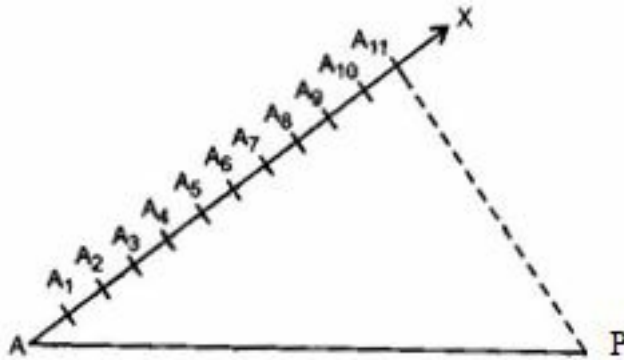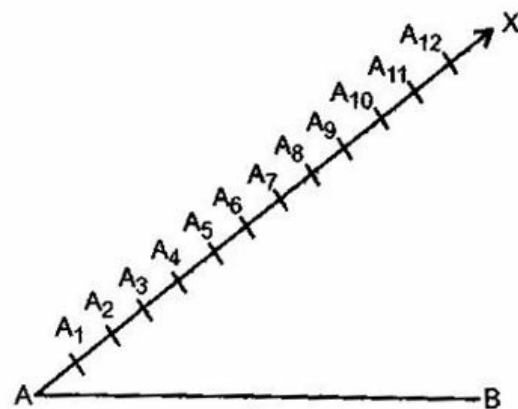

6.   d. B_7 to C

Explanation: According to the question, the next step is to join B_7 to C.
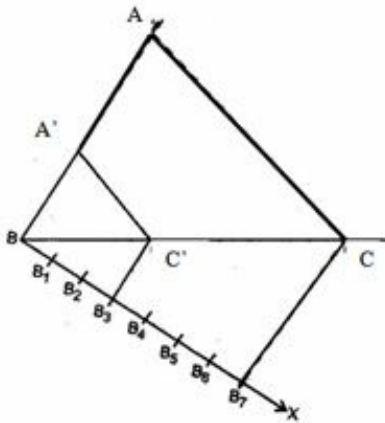
7.   d. 12

Explanation: According to the question, the minimum number of those points which are to be marked should be (Numerator + Denominator) i.e., 5 + 7 = 12.

8.   a. $x < y$

Explanation: The construction of triangle, similar and smaller to a given triangle as per given scale factor $x : y$, is possible only when

9. In the given figure, $\triangle BPQ$ is similar to $\triangle BCA$ with sides $\frac{x}{y}$ of the corresponding sides of $\triangle BCA$.

$$\frac{x}{y} = \frac{3}{5}$$

10. We have to divide a line segment AB in the ratio 5 : 7, first AX is drawn, so that $\angle BAX$ is an acute angle and then at equal distance, points are marked on the ray AX, Minimum number of points marked on AX = 5 + 7 = 12
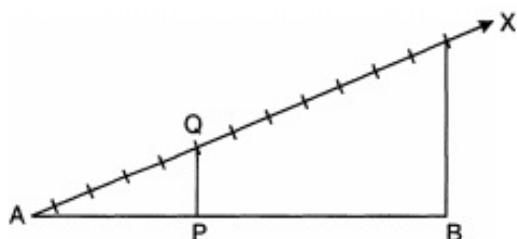

11. $\triangle QST \sim \triangle QRP$

$$\frac{QT}{QP} = \frac{2}{3}$$

QT : QP = 2 : 3

12. To construct a triangle sum of two sides of a triangle must be greater than largest side. Let the sides are 2.5 cm, 4.5 cm and 6.5 cm

13. Steps of construction:
    1. Take a point O on the plane of the paper and draw a circle of radius OA = 4cm.
    2. Produce OA to B such that OA = AB = 4cm
    3. Draw a circle with centre at A and radius AB.
    4. Suppose it cuts the circle drawn in step (i) at P and Q.
    5. Join BP and BQ to get the desired tangets.
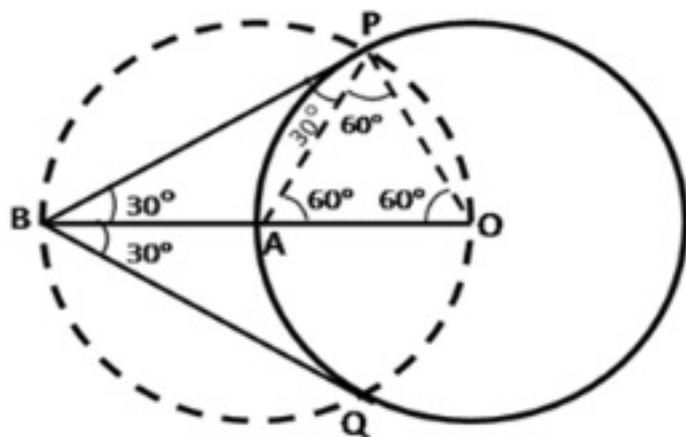
Justification:

In △ OAP, OA = OP = 4 cm.. (radii of the same circle)

Also, AO = 4cm ..(Radius of the circle with centre A)

△ OAP is equilateral.

∠PAO = 60°

∴ ∠BAP = 120°

In BAP, we have BA = AP and ∠BAP = 120°

∴ ∠ABP = ∠APB = 30°
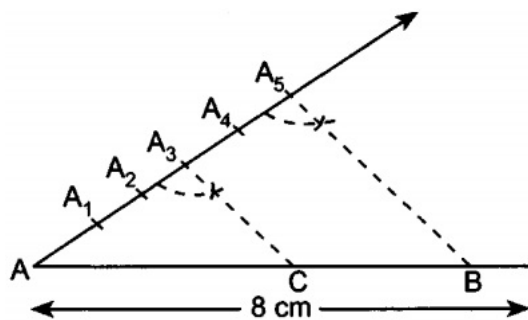
Similarly, we can get ∠ABQ = 30°

∴ ∠PBQ = 60°

14. Steps of construction:

   i. Draw a circle of radius 3 cm, whose centre is O.

   ii. Take a point P at a distance of 5.8 cm from its centre.

   iii. Join OP.

   iv. Draw perpendicular bisector of OP which cuts OP in M.

   v. With M as a centre and radius MO, draw a circle which cuts the given circle at X and Y.

   vi. Join PX and PY.
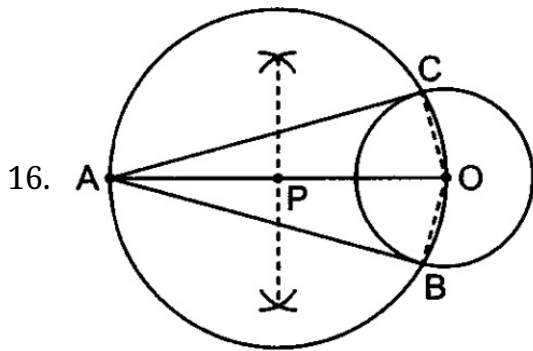
      PX and PY are the required tangents.
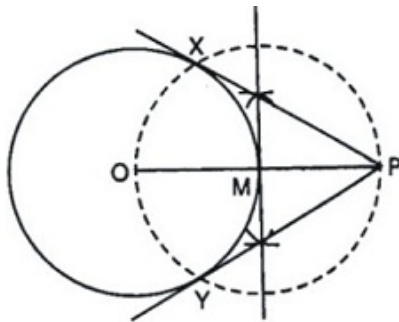
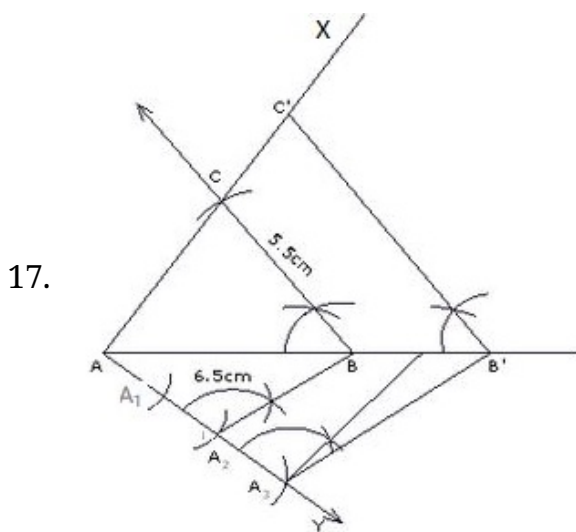
15.

AC : BC = 3 :2

AC ≃ 4.8 cm

BC ≃ 3.2 cm

16.

Steps of Construction:

   i. Let O be the center and A is any point outside it. Join AO and bisect it. Let P be the mid-point of AO.

  ii. Taking P as centre and PO as radius, draw a circle. Let it intersect the given circle at the points B and C.

 iii. Join AB and AC. AB and AC are the required tangents as shown in given figure.
Note: AC $\perp$ OC; AB $\perp$ OB

17.

Steps of construction:

   i. Draw a line segment AB = 6.5cm.

  ii. At B construct $\angle ABX = 60°$.

 iii. With B as centre and radius BC = 5.5cm draw an arc intersecting BX at C.

 iv. Join AC. Triangle so obtained is the required triangle.

  v. Construct an acute angle $\angle$BAY at A on opposite side of vertex C of $\triangle ABC$.

 vi. Locate 3 points A_1, A_2, A_3 on AY such that AA_1 = A_1A_2 = A_2A_3.

 vii. Join A_2 to B and draw the line through A_3 parallel to A_2B intersecting the extended

line segment AB at B'.

viii. Draw a line through B' parallel to BC intersecting the extended line segment AC at C'.

ix. △AB'C' so obtained is the required triangle

18. Steps of construction

Step I Draw a circle with centre O and radius 3 cm.
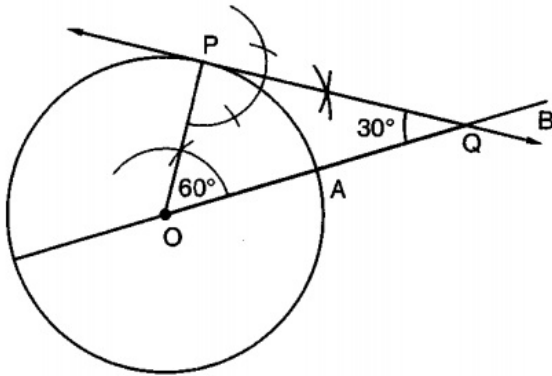
**Step II** Draw a radius OA of this circle and produce it to B.

Step III Construct an angle $\angle AOP$ equal to the complement of 30° i.e. equal to 60°.

Step IV Draw perpendicular to OP at P which intersects OA produced at Q

Clearly, PQ is the desired tangent such at $\angle OQP$ = 30°

19. Steps of construction:

i. Draw BC = 8 cm.

ii. Draw PQ the perpendicular bisector of BC intersecting BC at M.

iii. Taking M as centre and MA as radius equal to the altitude of the triangle of 4 cm intersect PQ at A.

iv. Join A to B and C.

v. Draw bisectors of $\angle B$ and $\angle C$ intersecting AM at I.

vi. Taking I as centre and IM as radius draw an incircle which is the required circle.

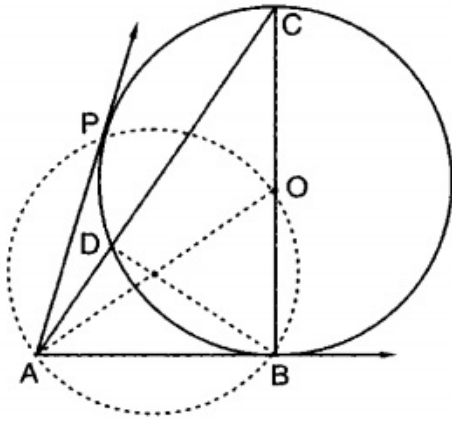vii. Measure radius IM which is equal to 1.7 cm approximately.
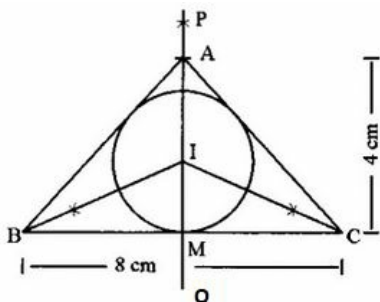
20. We follow the following steps.

    Step I Draw a triangle ABC

    Step II Construct perpendicular BD from B on AC.

    Step III Draw a circle with BC as a diameter. This circle will pass through D.

    Step III Let O be the mid-point of BC. Join AO.

    Step IV Draw a circle with AO as diameter. This circle cuts the circle drawn in step II at B and P.

    Step V Join AP. AP and AB are desired tangents drawn from A to the circle passing through B, C and D.