

CHAPTER

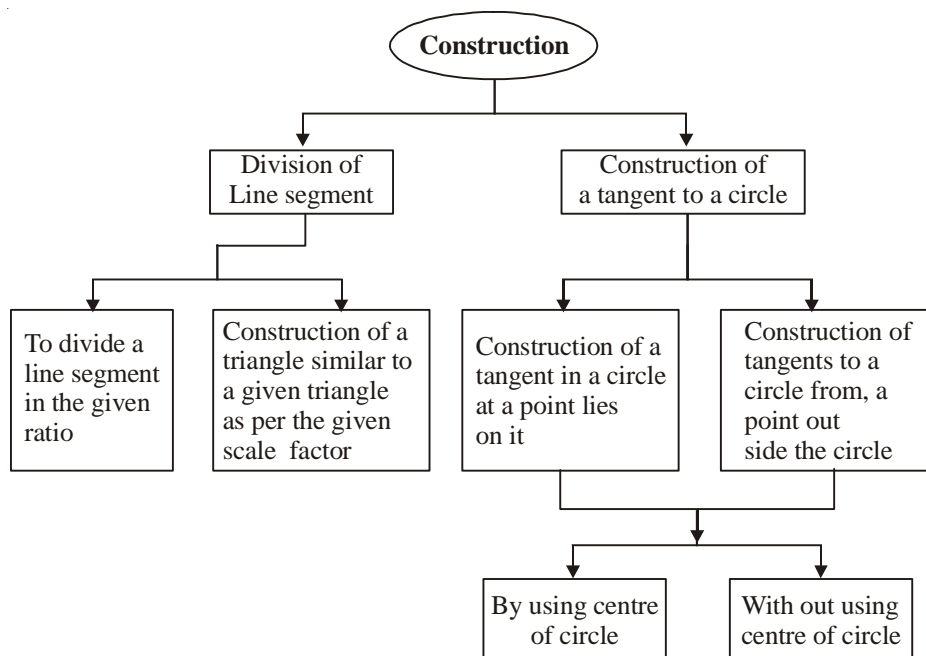
11

Constructions

TOPICS

- Division of a line segment.
- Construction of a Triangle.
- Construction of Tangents of a Circle.

MIND MAPING



KEY POINTS

1. Construction should be neat and clean and there should be no donbling.
2. Construction should be as per a given scale factor which may be less than 1 or greater than 1 for a triangle similar to a given triangle.
3. Step of construction should be provided only when it is mentioned in the question.

4. We make use of compass and ruler only but in case of non-standard angles, protractor can be used.
5. Divide a line segment in the given ratio means to determine a point on the given line segment which divides it in the the given ration.
6. A tangent to a circle is a straight line which touches the circle at a point. This point is called the point of content and the radius through the point of contact is perpendicular to the tangent.
7. Tangents drawn from an external point to a circle are equal.

VERY SHORT ANSWER TYPE QUESTIONS

1. Construct a triangle similar to a given ΔABC with its sides $\frac{5}{3}$ of the corresponding sides of ΔABC , a ray BX is drawn such that CBX is an acute angle and X is on the opposite side od A with respect to BC . What is the minimum no. of points to be located at equal distances on ray BX .
2. Draw a pair of tangents to a circle which are inclined to each other at an angle of 30° . What should be the angle between two radii?
3. Construct a triangle similar to a given ΔABC with its sides $\frac{2}{5}$ of the corresponding sides of ΔABC , firstly a ray BX is drawn such that CBX is an acute angle and X lies on the opposite side of A with respect to BC then points $B_1, B_2, B_3,$ are located on BX at equal distances Which two points will be joined in the next step.
4. Divide a line segment AB in the ratio $3:7$, What is the minimum number of points marked on a ray AX at equal distances?
5. How many tangents can be drawn from a point lying inside a circle?
6. Divide a line segment AB in the ratio $4:5$, 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 at equal distances on the ray AX which should be joined to B ?
7. Divide a line segment AB in the ratio $4:5$, the points $A_1, A_2, A_3,$and $B_1, B_2, B_3,$ are located at equal distances on the ray AX and BY respectively. Which two points should be joined to divide a line segment?
8. Draw a line segment of length 6 cm. Find a point P on it which divides it in the ratio $3 : 4$.

(Delhi-2011)

9. Draw a line segment $AB = 8$ cm and divide it internally in the ratio $3 : 2$.
10. Draw a line segment AB of length 6.5 cm. Find a point P on it such that $\frac{AP}{AB} = \frac{3}{5}$
11. Geometrically divide a line segment of length 8.4 cm in the ratio $5 : 2$. (foreign–2011)
CBSE – 2015
12. Is it possible to divide a line segment in the ratio $\sqrt{5} : \frac{1}{\sqrt{5}}$ by geometrical construction?
13. Draw a line segment of length 7.6 cm and divide it in the ratio $3 : 2$. (Foreign – 2011)
14. Write True or False.
By geometrical construction, it is possible to divide a line segment in the ratio $\sqrt{3} : \frac{1}{\sqrt{3}}$. (NCERT Exemplar)
15. Is it possible to construct a pair of tangents from point P to circle of radius 5 cm situated at a distance of 4.9 cm from the centre?
16. Is it possible to construct a pair of tangents from point A lying on the circle of radius 4 cm and centre O .
17. Compare the length of the tangents drawn from the external point to circle.

LONG ANSWER TYPE QUESTIONS

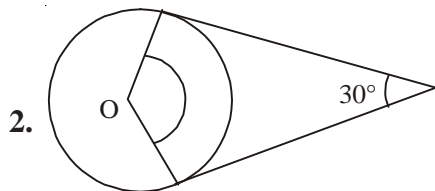
18. AB is a line segment of length 8 cm. Locate a point C on AB such that $AC = \frac{1}{3} CB$.
19. Construct a $\triangle ABC$ in which $AB = 6.5$ cm, $\angle B = 60^\circ$ and $BC = 5.5$ cm. Also construct a triangle $AB'C'$ similar to $\triangle ABC$, whose each side is $\frac{3}{2}$ times the corresponding sides of $\triangle ABC$.
20. Construct a $\triangle ABC$ in which $BC = 5$ cm, $CA = 6$ cm and $AB = 7$. Construct a $\triangle A'BC'$ similar to $\triangle ABC$, each of whose side are times $\frac{7}{5}$ the corresponding sides of $\triangle ABC$.
21. Construct a triangle with side 4 cm, 5 cm, 7 cm. Then construct a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the given triangle.

22. Construct a right triangle in which sides (other than hypotenuse) are of lengths 8 cm and 6 cm. Then construct another triangle similar to this triangle whose sides are times the corresponding sides of the first triangle.
23. Construct a $\triangle ABC$ in which $BC = 8$ cm, $\angle B = 45^\circ$ and $\angle C = 30^\circ$. Construct another triangle similar to $\triangle ABC$ such that each side are $\frac{3}{4}$ of the corresponding sides of $\triangle ABC$
24. A triangle ABC is given such that $AB = 4$ cm, $BC = 7$ cm and $\angle BAC = 50^\circ$. Draw another triangle $A'BC'$ similar to $\triangle ABC$ with sides BA' and BC' equal to 6 cm and 10.5 cm respectively. Find the scale factor.
25. Draw a pair of tangents to a circle of radius 6 cm which are inclined to each other at an angle of 60° . Also justify the construction.
26. Construct a triangle ABC in which $AB = 5$ cm, $\angle B = 60^\circ$ and altitude $CD = 3$ cm. Construct a $\triangle AQR \sim \triangle ABC$ such that each sides is 1.5 times that of the corresponding sides of $\triangle ABC$.
27. Draw an isosceles $\triangle ABC$ with $AB=AC$ and base $BC=7$ cm, vertical angle is 120° . Construct $\triangle A'B'C' \sim \triangle ABC$ with its sides $1\frac{1}{3}$ times of the corresponding sides of $\triangle ABC$.
28. Draw a circle of radius 3 cm. From a point 5 cm from the centre of the circle, draw two tangents to the circle. Measure the length of each tangent.
29. Draw a circle of radius 4 cm with centre O. Draw a diameter POQ. Through P or Q draw a tangent to the circle.
30. Draw two circle of radius 5 cm and 3 cm with their centres 9 cm apart. From the centre of each circle, draw tangents to other circles.
31. Draw two circles of radii 6 cm and 4 cm. From a point on the outer circle, draw a tangent to the inner circle and measure its length.
32. Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points.

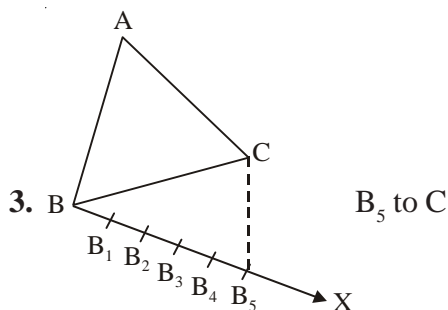
33. Draw a line segment $PQ = 10$ cm. Take a points A on PQ such that $\frac{PA}{PQ} = \frac{2}{5}$
Measure the length of PA and AQ
34. Draw an equilateral triangle PQR with side 5cm. Now construct $\Delta PQ'R' \sim \Delta PQR$ such that $\frac{PQ'}{PQ} = \frac{1}{2}$.
35. Draw a line segment of length 8 cm and divided it in the ratio 5:8. Meeasure the two parts.
36. Construct a triangle ABC with sides $AB = 7$ cm, $BC = 7.5$ cm and $CA = 6.5$ cm.
Construct a Δ similar to ΔABC whose sides are $\frac{3}{2}$ of the corresponding sides of ΔABC .

ANSWERS AND HINTS

1. Since the ratio is $\frac{5}{3}$, 5 is the larger number so Answer is 5.

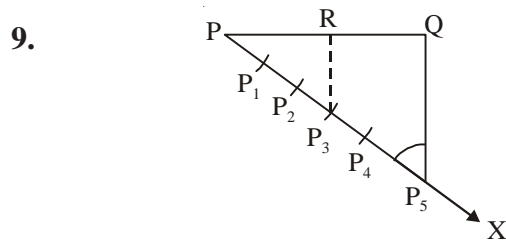
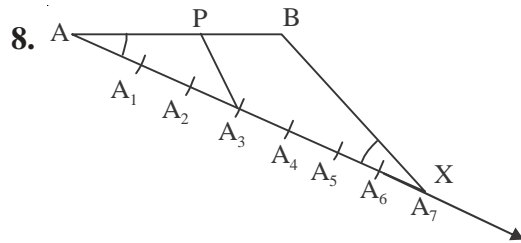
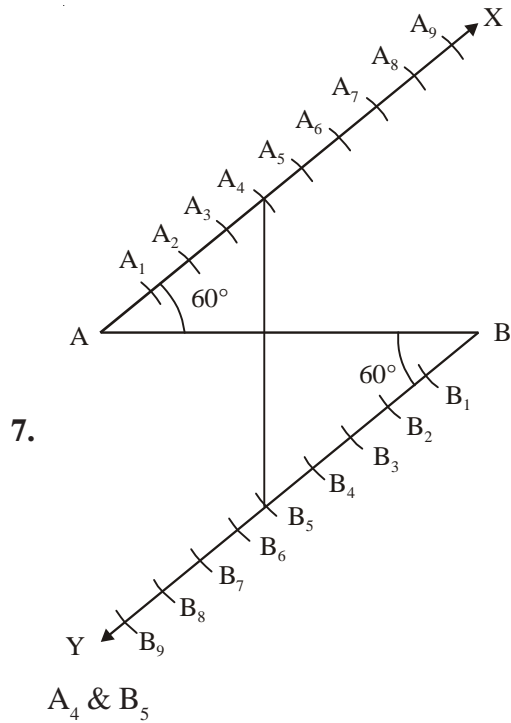


Sum of both the angles shown in figure is 180° if one is 30° the other will be 150° .



4. $3 + 7 = 10$
5. 0

6. As shown in question (3) above it should be A_9



10. Similar to Example 1 (NCERT)

11. As above Question-9.

12. Yes, as $\sqrt{5} : \frac{1}{\sqrt{5}} = 5 : 1$

13. As above question No. 9.

14. True as $\sqrt{3} : \frac{1}{\sqrt{3}}$ can be simplified as 3 : 1.

15. No

16. No

17. Equal.

Questions No. 18 to 36.

Questions are similar to examples given in NCERT. Please refer NCERT example.

PRACTICE-TEST

CONSTRUCTIONS

Time : 1 Hrs.

M.M.: 20

SECTION-A

1. Draw a perpendicular bisector of line segment $AB = 8\text{cm}$. 1
2. Draw a line parallel to a given line. 1
3. Draw the tangent to a circle of diameter 4 cm at a point P on it. 1
4. Draw two tangents to a circle of radius 4 cm from a point T at a distance of 6 cm from its centre. 1

SECTION-B

5. Draw a pair of tangents to a circle of radius 5 cm, which are inclined to each other at an angle of 60° . (Foreign - 2014) 2
6. Draw an angle bisector of 75° . 2
7. Draw a line segment of 5.6cm. Divide it in the ratio 2:3. 2

SECTION-C

8. Draw two tangents to a circle of radius 3.5cm from a point P at a distance of 5.5cm from its centre. Measure its length. 3
9. Draw a circle of radius 3.5cm. Draw two tangents to the circle such that they include an angle of 120° . 3

SECTION-D

10. Construct a $\triangle ABC$ of sides $AB = 4\text{cm}$, $BC = 5\text{cm}$ and $AC = 7\text{cm}$. Construct another triangle similar to $\triangle ABC$ such that each of its sides is $\frac{5}{7}$ of the corresponding sides of $\triangle ABC$. 4

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