



MATHS

BOOKS - KUMAR PRAKASHAN

CONSTRUCTIONS

Textual Examples

1. Construction 11.1: To divide a line segment in a given ratio.



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2. To construct the tangents to a circle from a point outside it.



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Other Important Examples

1. Draw triangle ABC with $BC = 4\text{cm}$, $AC = 5\text{cm}$ and $\angle C = 120^\circ$.

Then construct a triangle whose side are $\frac{4}{5}$ of the corresponding side of $\triangle ABC$.



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2. Draw a pair of tangents to a circle with radius 4 cm which are inclined to each other at an angle of 45° .



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Exercise 11 1

1. Draw a line segment of length 7.6cm and divide it in the ratio $5:8$ Measure the two parts.



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2. Construct a triangle of sides 4 cm , 5 cm and 6 cm and then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.



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3. Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle.



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4. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the isosceles triangle.



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5. Draw a triangle ABC with side $BC = 6\text{cm}$, $AB = 5\text{cm}$ and $\angle ABC = 60^\circ$.

Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC



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6. Draw a triangle ABC with side $BC = 7\text{cm}$, $\angle B = 45^\circ$, $\angle A = 105^\circ$. Then,

construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of $\triangle ABC$.



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7. Draw a right triangle in which the sides (other than hypotenuse) are of length 4 cm and 3 cm. Then construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.



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Exercise 11 2

1. Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.



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2. Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of

radius 6 cm and measure its length. Also verify the measurement by actual calculation.



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3. Draw a circle of radius 3 cm. Take two point 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 P and Q.



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4. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60° .



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5. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.



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6. Let ABC be a right triangle in which $AB = 6\text{cm}$, $BC = 8\text{cm}$ and $\angle B = 90^\circ$. BD is the perpendicular from B on AC . The circle through B, C, D is drawn. Construct the tangents from A to this circle.



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7. Draw a circle with the help of a bangle. Take a point outside the circle. Construct the pair

of tangents from this point to the circle.



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Test Your Skills

1. Draw a line segment AB of length AB of length 8.5cm and divide it internally in the ratio $2:3$.



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2. Construct a triangle of sides 3 cm, 4 cm and 5 cm. Then construct a triangle similar to it whose sides are $\frac{5}{4}$ times the corresponding sides of the first triangle.



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3. Draw a $\triangle ABC$ with $AB = 6\text{cm}$, $BC = 5\text{cm}$ and $\angle B = 45^\circ$.

Then construct a triangle similar to $\triangle ABC$

whose sides are $\frac{3}{4}$ of the corresponding sides of $\triangle ABC$.



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4. Draw a $\triangle ABC$ with $AB = 6\text{cm}$, $BC = 4\text{cm}$ and $\angle B = 45^\circ$.

Then construct a triangle similar to $\triangle ABC$ whose sides are $\frac{3}{4}$ of the corresponding sides of $\triangle ABC$.



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5. Draw a $\triangle ABC$ with $AB = 4\text{cm}$, $BC = 9\text{cm}$ and $AC = 6\text{cm}$.

Then construct a triangle similar to $\triangle ABC$ whose sides are $1\frac{1}{2}$ times the corresponding sides of $\triangle ABC$.



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6. Draw a circle of radius 5 cm. From a point 9 cm away from the centre, construct a pair of tangents to the circle.



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7. Draw a circle of radius 4 cm. From a point 10 cm away from the centre, construct a pair of tangents to the circle.



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8. Draw a circle with radius 4 cm and a diameter AB of the circle. Extend AB on both the sides and take one point each on both the

extended parts. Draw of pair of tangnets to the circle from each of these points.



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9. Draw line segment AB of length 10 cm. Draw a circle with centre A and radius 4 cm and another circle with centre B and radius 3 cm, Construct pair of tangents to each circle from the centre of the other circle.



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Practice Thoroughly

1. Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle.



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2. Draw $\triangle ABC$ with $BC = 6$ cm, $AB = 5$ cm and $\angle B = 60^\circ$. Then, construct a triangle similar

to $\triangle ABC$ whose sides are $\frac{3}{4}$ of the corresponding sides of $\triangle ABC$.



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3. Determine a point which divides a line segment of length 10 cm internally in the ratio 3:4.



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4. Draw a line segment of length 8 cm and divide it internally in the ratio 4:5.



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5. Draw $\triangle ABC$ with $AB = 6\text{cm}$, $BC = 8\text{cm}$ and $\angle B = 90^\circ$.

Then, construct another triangle similar to $\triangle ABC$ whose sides are $\frac{3}{4}$ of the corresponding sides of $\triangle ABC$.



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6. Construct an isosceles triangle whose base is 10 cm and altitude is 4 cm. Then, construct another triangle similar to it whose sides are $\frac{6}{5}$ times the corresponding sides of the first triangle.



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7. Draw a circle of radius 4 cm and take a point P on it. Without using the centre of the circle, draw a tangent to the circle at P.



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8. Draw two concentric circles with centre O and radii 3 cm and 5 cm. From a point on the bigger circle, draw tangents to the smaller circle.



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9. Draw a circle with centre and radius 4 cm and take a point P 7.5 cm away from the centre

O. Then, from P draw a pair of tangents to the circle.



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10. Draw a segment AB of length 11 cm. Draw circles with centres A and B with radius 4 cm and 3 cm respectively. Then, draw a pair of tangents to each circle from the centre of the other circle.



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Objective Questions

1. To draw a pair of tangents to a circle which are inclined to each other at an angle of 35° , it is required to draw tangents at the end points of two radii which are inclined to each other at an angle of



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2. To divide a line segment in the ratio $\sqrt{3} : \frac{1}{\sqrt{3}}$ is same as dividing it in the ratio



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3. P is a point in the plane of a circle with centre O and radius 4 cm. If $OP = 3$ cm, tangent/s can be drawn to the circle from point P.



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4. The two tangents drawn to a circle at the end points of a diameter are to each

other.



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5. If two radii of a circle are inclined to each other at an angle of 70° , then the tangents at the end points of those radii are inclined to each other at an angle of.....



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6. To divide segment AB in the ratio $3:5$, ray AX is drawn such that $\angle BAX$ is an acute angle. Then, the number of points to be marked at equal distance on AX must be at least

- A. 3
- B. 5
- C. 8
- D. 15

Answer:



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7. To construct a triangle similar to $\triangle ABC$ using a scale factor $\frac{3}{7}$, BC should be divided internally in the ratio.....

A. 3 : 4

B. 3 : 7

C. 3 : 10

D. 4 : 7

Answer: C::D





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8. Point P lies on segment AB such that

$\frac{AP}{AB} = \frac{2}{5}$. Then, point P divides AB internally

in the ratio.....

A. 2: 5

B. 2: 3

C. 3: 5

D. 5: 2

Answer: B::C



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9. A segment AB is divided at a point P such that $7PB = 3AB$. Then, the ratio AP: PB =.....

A. 4: 7

B. 7: 4

C. 7: 3

D. 4: 3

Answer: C::D



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10. To divide a line segment internally in the ratio 4:7, the number of arcs to be drawn on a ray inclined to the line segment is

A. 4

B. 7

C. 11

D. 28

Answer: A



11. To draw two tangents to a circle which are inclined at an angle of 60° the perpendiculars are to be drawn at the ends of two radii which are inclined at an angle of

A. 60°

B. 120°

C. 90°

D. 75°

Answer: A::B



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12. To draw two tangents to a circle which are perpendicular to each other, the perpendiculars are to be drawn at the ends of two radii which are inclined at an angle of.....

A. 120°

B. 60°

C. 30°

D. 90°

Answer:



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13. If two tangents to a circle are inclined at an angle of 35° , the radii through the points of contact of those tangents are inclined at an angle of

A. 35°

B. 55°

C. 125°

D. 145°

Answer: A::D



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14. To draw two tangents to a circle with centre O and radius 3 cm from a point P, 8 cm from O, we draw a circle with centre at the midpoint of OP and radius cm.

A. 8

B. 3

C. 5

D. 4

Answer: D



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15. If two tangents to a circle are inclined at an angle of 75° , then the radii through their

points of contact are inclined at an angle of

.....

A. 15°

B. 75°

C. 105°

D. 125°

Answer: A



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16. Point P lies in the exterior of a circle with centre O and radius 5 cm. If $OP = 13\text{cm}$, then what is the length of a tangent from P to the circle ?



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17. Point P lies on segment AB such that $\frac{AP}{AB} = \frac{3}{8}$. In what ratio does the point P divide AB internally ?



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18. If two tangents from point P to a circle are inclined to each other at an angle of 140° , at what angle will the radii from the points of contact of those tangents be inclined?



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19. Point P lies on segment AB such that $3AB = 10AP$. In which ratio does the point P divide AB internally?



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20. If a triangle is to be constructed similar to a given triangle ABC with scale factor $\frac{4}{7}$, in what ratio should BC be divided internally ?



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21. It is possible to divide a line segment in the ratio $\sqrt{5} : \frac{1}{\sqrt{5}}$.



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22. It is possible to divide a line segment in the ratio $2 + \sqrt{3} : 2 - \sqrt{3}$.



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23. Check whether statement is true or False :
A pair of tangents can be constructed to a circle of radius 5 cm from a point P situated at a distance of 4 cm from the centre.



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24. True or False: A pair of tangents can be constructed to a circle of radius 4 cm from a point P situated at a distance 8 cm from the centre.



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25. True or False : A pair of tangents to a circle can be constructed which are inclined at an angle of 170° .



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