



MATHS

BOOKS - ZEN MATHS (KANNADA ENGLISH)

CONSTRUCTIONS

Textual Exercises Exercise 6 1

1. Draw a line segment of length 7.6 cm 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. Construct a circumcircle of the triangle ABC where $AB = 5\text{cm}$, $\angle B = 75^\circ$ and $BC = 7\text{cm}$



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6. In each of the following, give the justification of the construction too.

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

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



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7. In each of the following, give the justification of the construction too.

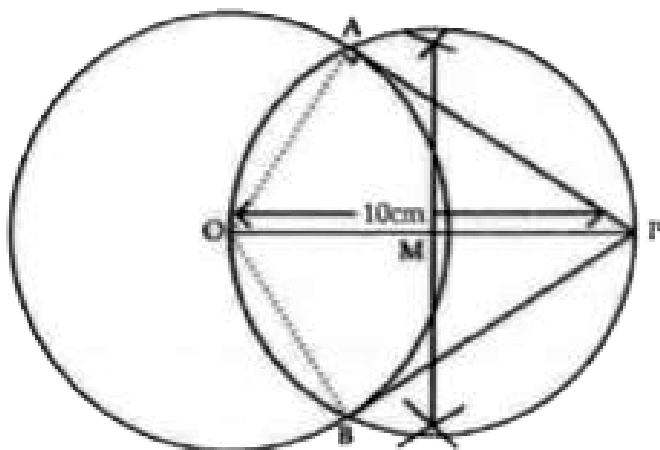
Draw a right-triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm. Then, construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.



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Textual Exercises Exercise 6 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 4cm from a point on the concentric circle of radius 6cm and measure its lengths. Also Verify the measurement by actual calculation.



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3. Draw a line segment AB of length 8 cm . Taking A as centre, draw a circle of radius 4 cm

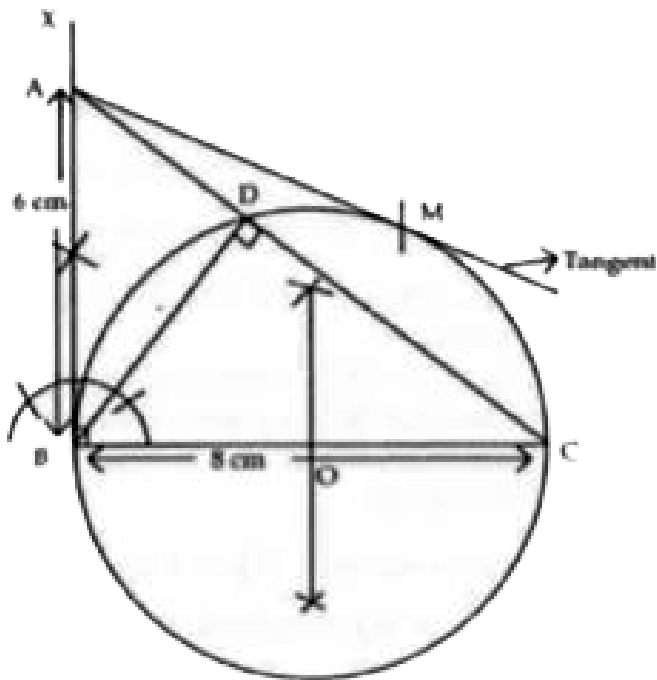
and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.



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4. Let ABC be a right-triangle in which $AB = 6$ cm, $BC = 8$ cm , and $B = 90^\circ$. BD is the perpendicular from B on AC. A circle through B, C, D is drawn. Construct the tangent from A

to this circle.



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5. Draw a circle of radius 3 cm . Take a point P outside the circle without using the centre of

the circle, draw two tangents to the circle from an external point P.



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Zen Additional Questions Multiple Choice Questions

1. Construct a triangle similar to a given $\triangle ABC$ with its sides equal to $\frac{3}{4}$ th of the corresponding sides of the $\triangle ABC$ For this

construction, which of the following statements are true?

A. The required $\triangle A'BC'$ is less than \triangle

ABC

B. The required $\triangle A'BC'$ is greater than

$\triangle ABC$

C. The required $\triangle A'BC'$ is equal to

$\triangle ABC$

D. None of the above

Answer: A



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2. Given a triangle with side $PQ = 8$ cm. To get a line segment $PQ' = \frac{3}{4}$ of PQ , we divide the line segment PQ in the ratio

A. 1)3 : 4

B. 2)4 : 3

C. 3)1 : 3

D. 4)3 : 1

Answer: D



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3. In the construction of triangle similar and smaller to a given triangle as per the given scale factor $m : n$, the construction is possible only when

A. $m > n$

B. $m < n$

C. $m = n$

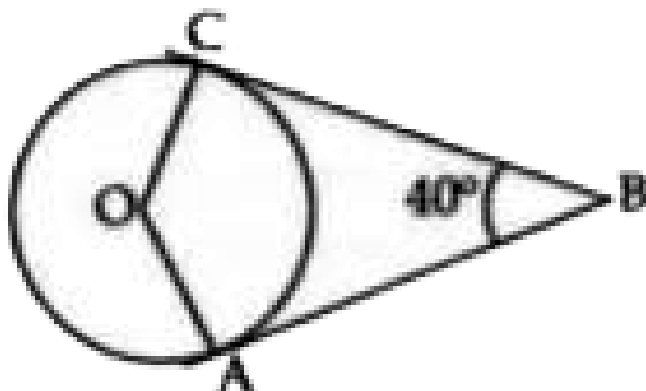
D. Independent of scale factor

Answer: B



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4. To draw a pair of tangents to a circle inclined to each other at 40° , the angle at the centre of the circle between the two radii is



A. 40°

B. 90°

C. 140°

D. 180°

Answer: C



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5. To divide a line segment AB in the ratio $5:7$, first a ray AX is drawn so that 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

A. 1)8

B. 2)10

C. 3)11

D. 4)12

Answer: D



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6. To divide a line segment AB in the ratio 4:7, a ray AX is first drawn such that BAX is an acute angle and then points A_1, A_2, A_3, \dots located at equal distance on the ray AX and the point B is joined to

A. 1) A_{12}

B. 2) A_{11}

C. 3) A_{10}

D. 4) A_9

Answer: B



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7. To divide a line segment AB in the ratio $5 : 6$, draw a ray AX such that BAX is an acute angle, draw a ray BY parallel to AX with the points A_1, A_2, A_3, \dots and B_1, B_2, B_3, \dots located at equal distances on ray AX and BY respectively. Then the points joined are

A. 1) A_5 and B_6

B. 2) A_6 and B_5

C. 3) A_4 and B_5

D. 4) A_5 and B_4

Answer: A



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8. To construct a triangle similar to a given $\triangle ABC$ with its sides $\frac{3^{th}}{7}$ the corresponding sides of $\triangle ABC$, 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, \dots on BX at equal distance and the next step is to join

A. 1) B_{10} to C

B. 2) B_3 to C

C. 3) B_7 to C

D. 4) B_4 to C

Answer: C



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9. To construct a triangle similar to a given $\triangle ABC$ with its sides $\frac{8}{5}$ th the corresponding sides of $\triangle A, B, C$ draw a ray BX such that $\angle CBX$ is an acute angle and X is on the opposite side of A with respect to BC . The minimum number of points to be located at equal distances on the ray BX

A. 5

B. 2)8

C. 3)13

D. 4)3

Answer: B



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10. To draw a pair of tangents to a circle inclined to each other at an angle of 60° , it is required to draw the two radii of the circle intersecting at an angle of

A. 1) 135°

B. 2) 90°

C. 3) 60°

D. 4) 120°

Answer: D



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**Zen Additional Questions Short Answer Sa Type 1
Questions**

1. Draw a line segment AB of length 7 cm.

Using compass and ruler, find the point P on

AB such that $\frac{AP}{AB} = \frac{3}{5}$.



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2. Draw a line segment of length 7.6 cm and divide it in the ratio 3:2.



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3. Draw a pair of tangents to a circle of radius 3 cm inclined to each other at an angle of 45° .



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Zen Additional Questions Short Answer Sa Type 2 Questions

1. Construct a triangle PQR where $PQ = 6$ cm
 $QR = 7$ cm, and $PR = 8$ cm. Then, construct another triangle whose sides are $\frac{4}{5}$ th the corresponding sides of PQR .



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2. Construct a triangle with sides 5 cm, 5.5 cm, and 6.5 cm. Construct another triangle whose sides are $\frac{3}{5}$ times the corresponding sides of the given triangle.



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3. Draw a circle of radius 3 cm. From a point P, 7 cm away from its centre, draw two tangents

to the circle. Measure the length of each tangent.



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4. Draw a circle of radius 3.5 cm. Draw the tangents to the circle perpendicular to each other.



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5. Construct a triangle ABC with sides $BC = 3$ cm, $AB = 6$ cm and $AC = 4.5$ cm. Then construct a triangle whose sides are $\frac{4}{3}$ of the corresponding sides of the triangle ABC .



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Zen Additional Questions Long Answer La
Questions

1. Construct a $\triangle ABC$ where $AB = 6.5\text{cm}$, $B = 60^\circ$, and $BC = 5.5\text{cm}$.

Also construct $\Delta AB'C$ similar to ΔABC , whose each side is $\frac{3}{2}$ times the corresponding side of ΔABC .



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2. Construct a right-triangle where the sides (other than the hypotenuse) are of lengths 5 cm and 7 cm. Then, construct another triangle whose sides are $\frac{4}{5}$ times the corresponding sides of the given triangle.



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3. Draw a right-angled triangle where the sides other than the hypotenuse are of lengths 2.2 cm and 2.2 cm. Then, construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.



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4. Draw an isosceles $\triangle ABC$ where $BC = 5.5$ cm and altitude $AL = 3\text{cm}$. Then, construct

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



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5. Draw a circle of radius 3 cm. Draw a tangent to this circle making an angle of 30° with a line passing through the centre.



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1. Two line segments AB and AC include an angle of 60° , where $AB = 5$ cm and $AC = 7$ cm.

Locate points P and Q on AB and AC respectively such that AP

$$= \frac{3}{4}AB \text{ and } AQ = \frac{1}{4}AC. \text{ Join } P \text{ and } Q$$

and measure PQ .



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2. Draw an isosceles $\triangle ABC$ where

$$AB = AC = 6\text{cm} \text{ and } BC = 5\text{cm}.$$

Construct a triangle PQR similar to $\triangle ABC$ in which $PQ = 8$ cm. Also justify the construction.



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Zen Additional Questions Hots Higher Order Thinking Skills Questions Iit Olympiad Imo

1. Given below are the steps of construction of a pair of tangents to a circle of radius 4 cm from a point on the concentric circle of radius

6 cm. Find which of the following steps is wrong.

(P) Step 1: Take a point O on the plane paper and draw a circle of radius $OA = 4$ cm. Also draw a concentric circle of radius $OB = 6$ cm.

(Q) Step 2: Find the midpoint C of OB and draw a circle of radius $BA = AO$. Suppose this circle intersects the circle of radius 4 cm at P and Q.

(R) Step 3: Join BP and BQ to get the desired tangents.

A. Only (P)

B. Only Q

C. Both (P) and (Q)

D. Both Q and R

Answer: B



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2. Given below are the steps of construction of a pair of tangents to a circle of radius 5 cm inclined to each other at an angle of 60° . Find which of the following steps is wrong.

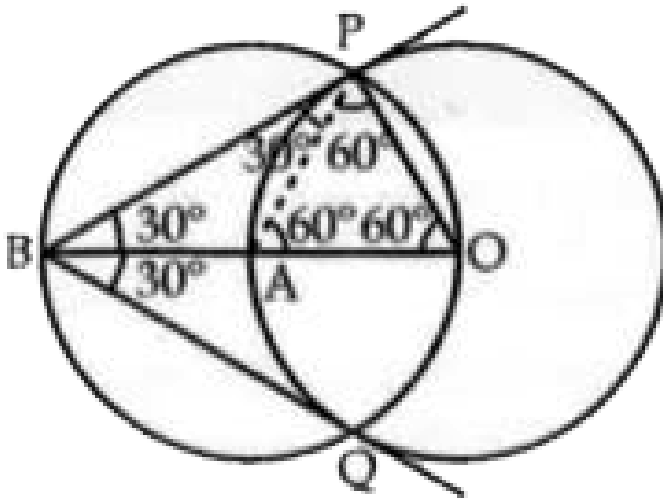
Step 1: Take a point O on the paper and draw a circle of radius $OA = 5$ cm.

Step 2: Produce OA to B such that $OA = AB = 5$ cm.

Step 3: Taking B as centre draw a circle of radius $AO = AB = 5$ cm. Suppose it cuts the circle drawn in step 1 at P and Q.

Step 4: Join BP and BQ to get the desired

tangents.



- A. Only step 1
- B. Only step 2
- C. Only step 3
- D. Only step 4

Answer: C



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3. Draw a circle of radius 2 cm with centre O and take a point P outside the circle such that $OP = 4.5$ cm. From P, draw two tangents to the circle. Given below are the steps of constructing the tangents from P. Find which of the following steps is wrong.

Step 1: Draw a circle with O as centre and radius 2 cm.

Step 2: Mark a point P outside the circle such that $OP = 4.5$ cm.

Step 3: Join OP and bisect it at M.

Step 4: Draw a circle with P as centre and radius = MP to intersect the given circle at the points R and Q.

Step 5: Join PR and PQ.

A. 1)Step 2 only

B. 2)Step 3 only

C. 3)Step 4 only

D. 4)Step 5 only

Answer: C



4. Let ABC be a right-triangle where $AB = 6$ cm, $BC = 8$ cm, and $B = 90^\circ$. BD is the perpendicular from B on AC . The circle through B , C , and D is drawn. Given below are the steps of construction of a pair of tangents from A to this circle. Which of the following steps is incorrect?

Step 1: Draw a line segment $AB = 6$ cm and $BC = 8$ cm perpendicular to each other. Join AC .

Step 2: Draw the perpendicular bisector of BC

which meets BC at O.

Step 3: With O as centre and OB as radius.
draw a circle which intersects AC at D. Thus
 $BD \perp AC$.

Step 4: With A as centre and AO as radius
draw an arc cutting the circle at M.

Step 5: Join AM. Thus AB and AM are the
required tangents.

A. Step 2 only

B. Step 3 only

C. Step 4 only

D. Step 5 only

Answer: C



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5. Divide a line segment 6 cm long in the ratio 4 : 3. Given below are steps of construction.

Which of the following steps is incorrect?

Step 1 : Draw a line segment $AB = 6$ cm.

Step 2 : Draw a ray AX making an acute angle

BAX

Step 3: Along AX mark 4 points

$A_1, A_2, A_3,$ and A_4 such that

$$AA_1 = A_1A_2 = A_2A_3 = A_3A_4.$$

Step 4: Join A_4B .

Step 5: From A_3 drawn $A_3C \parallel A_4B$ meeting
AB at C.

A. Step 3 only

B. Step 4 only

C. Step 3 and 4

D. Step 3, 4, and 5

Answer: D



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