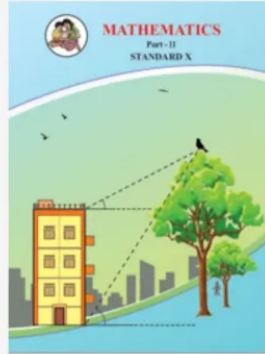


Maharashtra Board Solutions for Class 10-Maths (Part 2): Chapter 4- Geometric Constructions

BOOK SOLUTIONS
CLASS 10
MATHEMATICS PART 2

CHAPTER 4
Geometric Constructions



Maharashtra Board Solutions→

For any clarifications or questions you can write to info@indcareer.com

Postal Address

IndCareer.com, 52, Shilpa Nagar, Somalwada Nagpur - 440015
Maharashtra, India

WhatsApp: +91 9561 204 888, **Website:** <https://www.indcareer.com>

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>



Maharashtra Board Solutions for Class 10-Maths (Part 2): Chapter 4- Geometric Constructions

Class 10: Maths Chapter 4 solutions. Complete Class 10 Maths Chapter 4 Notes.

Maharashtra Board Solutions for Class 10-Maths (Part 2): Chapter 4- Geometric Constructions

Maharashtra Board 10th Maths Chapter 4, Class 10 Maths Chapter 4 solutions

Practice Set 4.1

Question 1.

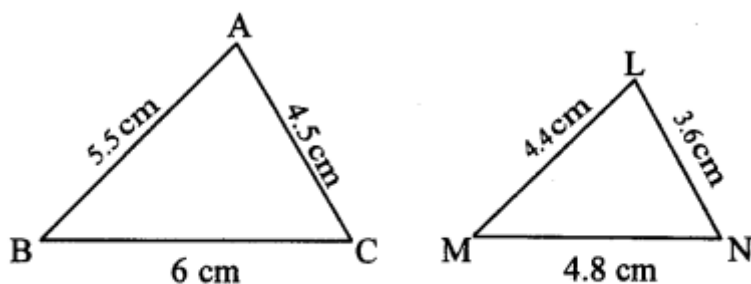
$\triangle ABC \sim \triangle LMN$. In $\triangle ABC$, $AB = 5.5$ cm, $BC = 6$ cm, $CA = 4.5$ cm. Construct $\triangle ABC$ and $\triangle LMN$ such that $BCMN = 54$

Solution:

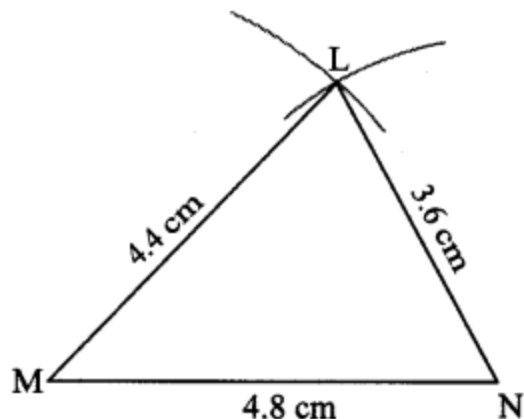
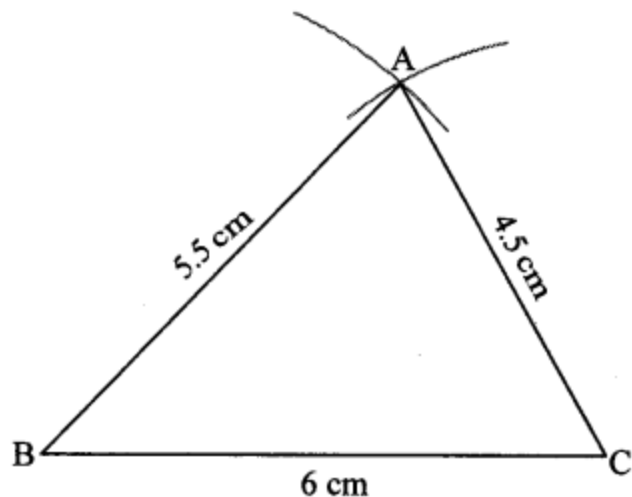
Analysis:

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

$$\begin{aligned} \Delta ABC &\sim \Delta LMN && \dots[\text{Given}] \\ \therefore \frac{AB}{LM} &= \frac{BC}{MN} = \frac{CA}{LN} && \dots(i)[\text{Corresponding sides of similar triangles}] \\ \text{But, } \frac{BC}{MN} &= \frac{5}{4} && \dots(ii)[\text{Given}] \\ \therefore \frac{AB}{LM} &= \frac{BC}{MN} = \frac{CA}{LN} = \frac{5}{4} && \dots[\text{From (i) and (ii)}] \\ \therefore \frac{5.5}{LM} &= \frac{6}{MN} = \frac{4.5}{LN} = \frac{5}{4} \\ \therefore \frac{5.5}{LM} &= \frac{5}{4} \\ \therefore LM &= \frac{5.5 \times 4}{5} = 4.4 \text{ cm} \\ \text{Also, } \frac{6}{MN} &= \frac{5}{4} \\ \therefore MN &= \frac{6 \times 4}{5} = 4.8 \text{ cm} \\ \text{and, } \frac{4.5}{LN} &= \frac{5}{4} \\ \therefore LN &= \frac{4.5 \times 4}{5} = 3.6 \text{ cm} \end{aligned}$$



Rough Figure



Question 2.

$\triangle PQR \sim \triangle LTR$. In $\triangle PQR$, $PQ = 4.2$ cm, $QR = 5.4$ cm, $PR = 4.8$ cm. Construct $\triangle PQR$ and $\triangle LTR$, such that $PQLT = 34$

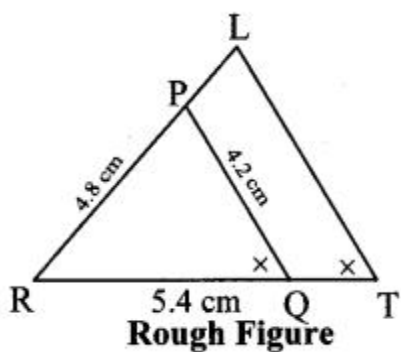
Solution:

Analysis:

As shown in the figure, Let $R - P - L$ and $R - Q - T$.

$\triangle PQR \sim \triangle LTR$... [Given]

$\therefore \angle PRQ \cong \angle LRT$... [Corresponding angles of similar triangles]



<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

$PQLT = QRTR = PRLR \dots (i)$ [Corresponding sides of similar triangles]

But, $PQLT = 34 \dots (ii)$ [Given]

$\therefore PQLT = QRTR = PRLR = 34 \dots$ [From (i) and (ii)]

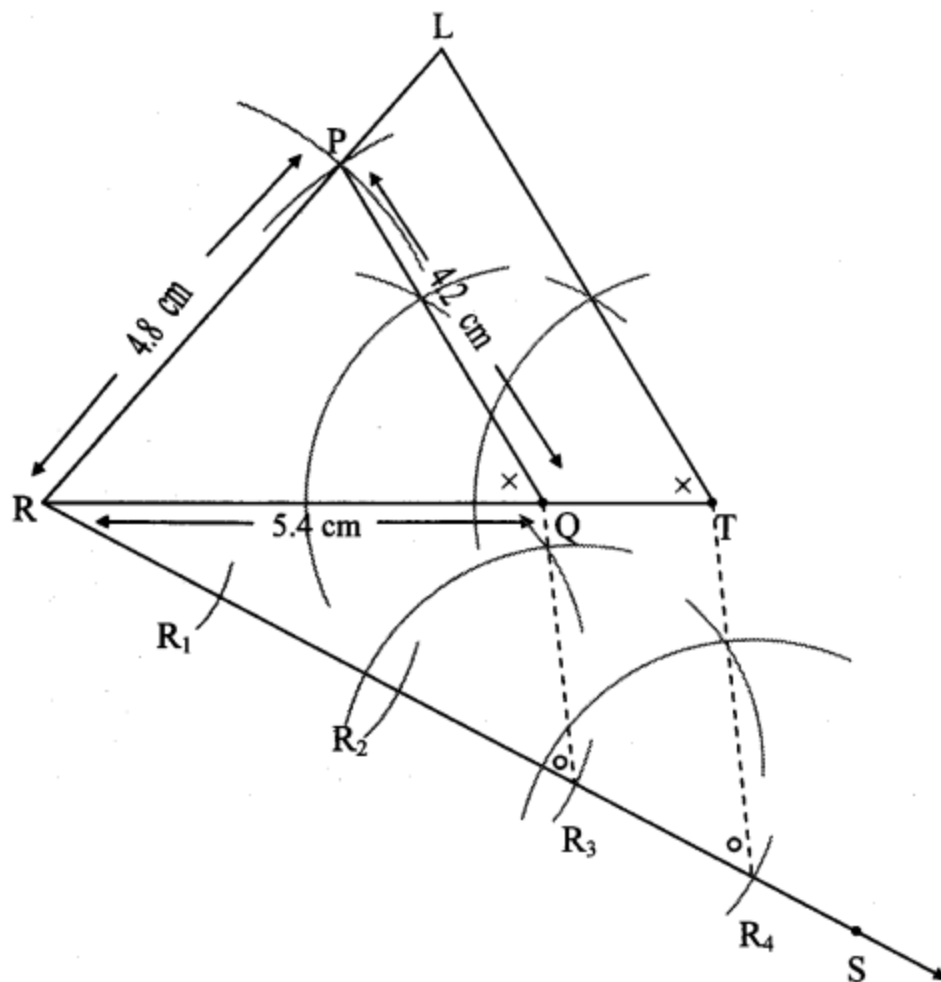
$\therefore$ sides of LTR are longer than corresponding sides of ΔPQR .

If seg QR is divided into 3 equal parts, then seg TR will be 4 times each part of seg QR .

So, if we construct ΔPQR , point T will be on side RQ , at a distance equal to 4 parts from R .

Now, point L is the point of intersection of ray RP and a line through T , parallel to PQ .

ΔLTR is the required triangle similar to ΔPQR .



Steps of construction:

- i. Draw $\triangle PQR$ of given measure. Draw ray RS making an acute angle with side RQ .
- ii. Taking convenient distance on the compass, mark 4 points R_1 , R_2 , R_3 , and R_4 , such that $RR_1 = R_1R_2 = R_2R_3 = R_3R_4$.
- iii. Join R_3Q . Draw line parallel to R_3Q through R_4 to intersect ray RQ at T .
- iv. Draw a line parallel to side PQ through T . Name the point of intersection of this line and ray RP as L .

$\triangle LTR$ is the required triangle similar to $\triangle PQR$.

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

Question 3.

$\triangle RST \sim \triangle XYZ$. In $\triangle RST$, $RS = 4.5$ cm, $\angle RST = 40^\circ$, $ST = 5.7$ cm. Construct $\triangle RST$ and $\triangle XYZ$, such that $RSXY = 35$.

Solution:

Analysis:

$\triangle RST \sim \triangle XYZ$... [Given]

$\therefore \angle RST \cong \angle XYZ = 40^\circ$... [Corresponding angles of similar triangles]

Also, $\frac{RS}{XY} = \frac{ST}{YZ} = \frac{RT}{XZ}$... (i) [Corresponding sides of similar triangles]

But, $\frac{RS}{XY} = \frac{3}{5}$... (ii) [Given]

$\therefore \frac{RS}{XY} = \frac{ST}{YZ} = \frac{3}{5}$... [From (i) and (ii)]

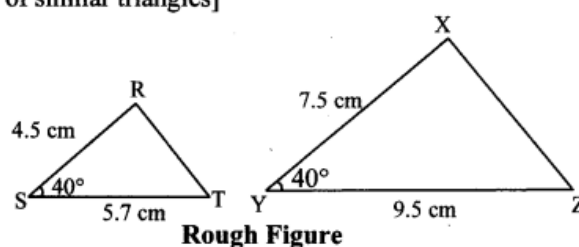
$$\therefore \frac{4.5}{XY} = \frac{5.7}{YZ} = \frac{3}{5}$$

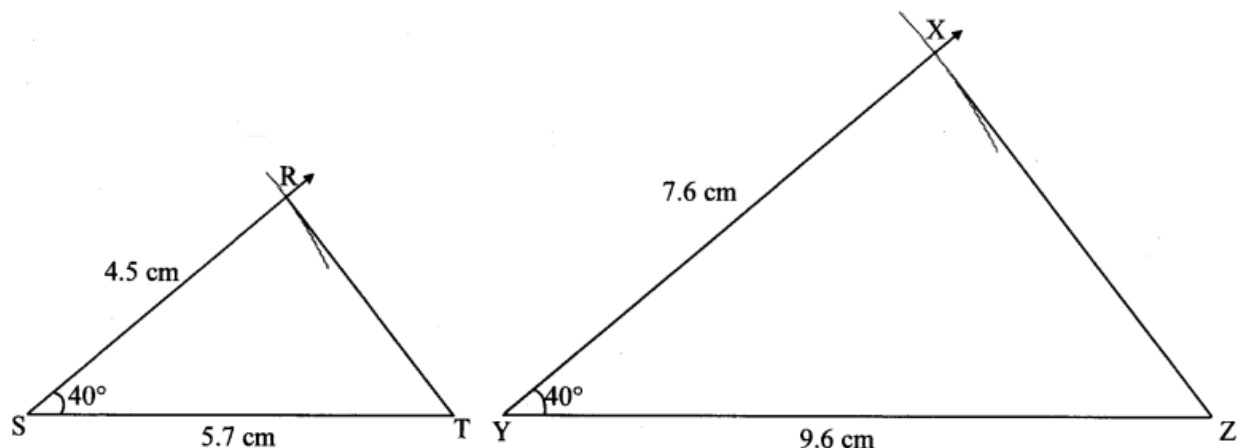
$$\therefore \frac{4.5}{XY} = \frac{3}{5}$$

$$\therefore XY = \frac{4.5 \times 5}{3} = 7.5 \text{ cm}$$

$$\text{Also, } \frac{5.7}{YZ} = \frac{3}{5}$$

$$\therefore YZ = \frac{5.7 \times 5}{3} = 9.5 \text{ cm}$$





Question 4.

$\triangle AMT \sim \triangle ANE$. In $\triangle AMT$, $AM = 6.3$ cm, $\angle TAM = 50^\circ$, $AT = 5.6$ cm. $AMAH = 75^\circ$ Construct $\triangle AHE$.

Solution:

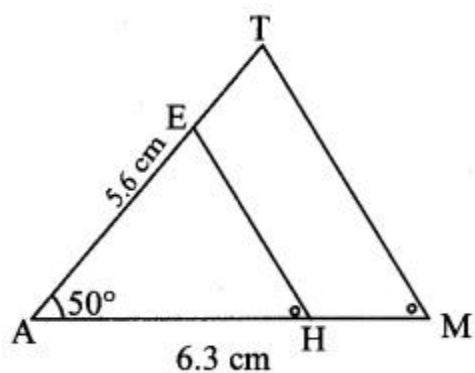
Analysis:

As shown in the figure,

Let $A - H - M$ and $A - E - T$.

$\triangle AMT \sim \triangle AHE$... [Given]

$\therefore \angle TAM \cong \angle EAH$... [Corresponding angles of similar triangles]



<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

$AMAH = MTHE = ATAE \dots (i)$ [Corresponding sides of similar triangles]

But, $AMAH = 75 \dots (ii)$ [Given]

$\therefore AMAH = MTHE = ATAH = 75 \dots$ [From (i) and (ii)]

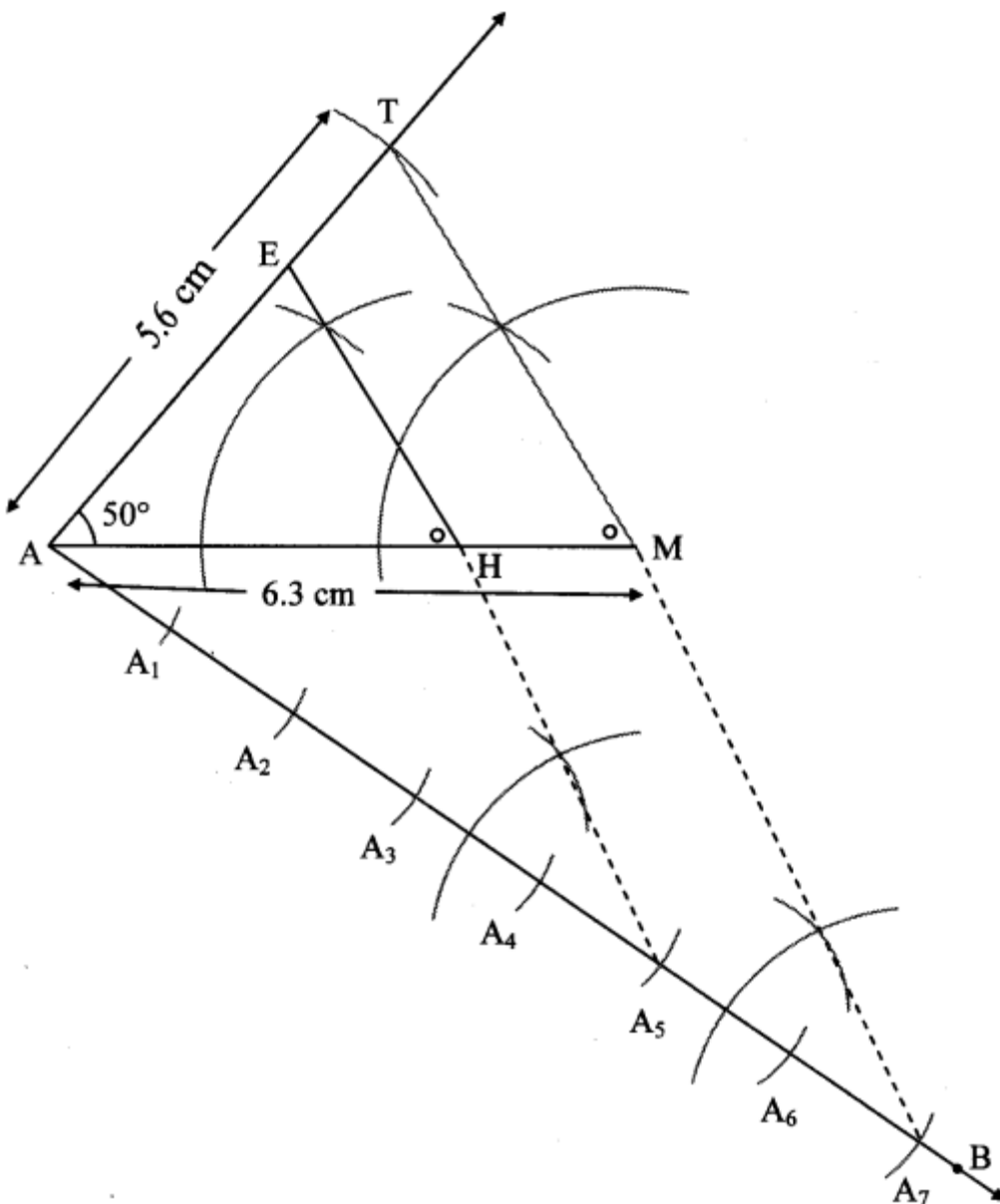
$\therefore$ Sides of $\triangle AMT$ are longer than corresponding sides of $\triangle AHE$.

$\therefore$ The length of side AH will be equal to 5 parts out of 7 equal parts of side AM .

So, if we construct $\triangle AMT$, point H will be on side AM , at a distance equal to 5 parts from A .

Now, point E is the point of intersection of ray AT and a line through H , parallel to MT .

$\triangle AHE$ is the required triangle similar to $\triangle AMT$.



Steps of construction:

- Draw $\triangle AMT$ of given measure. Draw ray AB making an acute angle with side AM .
- Taking convenient distance on the compass, mark 7 points $A_1, A_2, A_3, A_4, A_5, A_6$ and A_7 , such that

$$AA_1 = A_1A_2 = A_2A_3 = A_3A_4 = A_4A_5 = A_5A_6 = A_6A_7.$$

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

iii. Join A_7M . Draw line parallel to A_7M through A_5 to intersect seg AM at H .

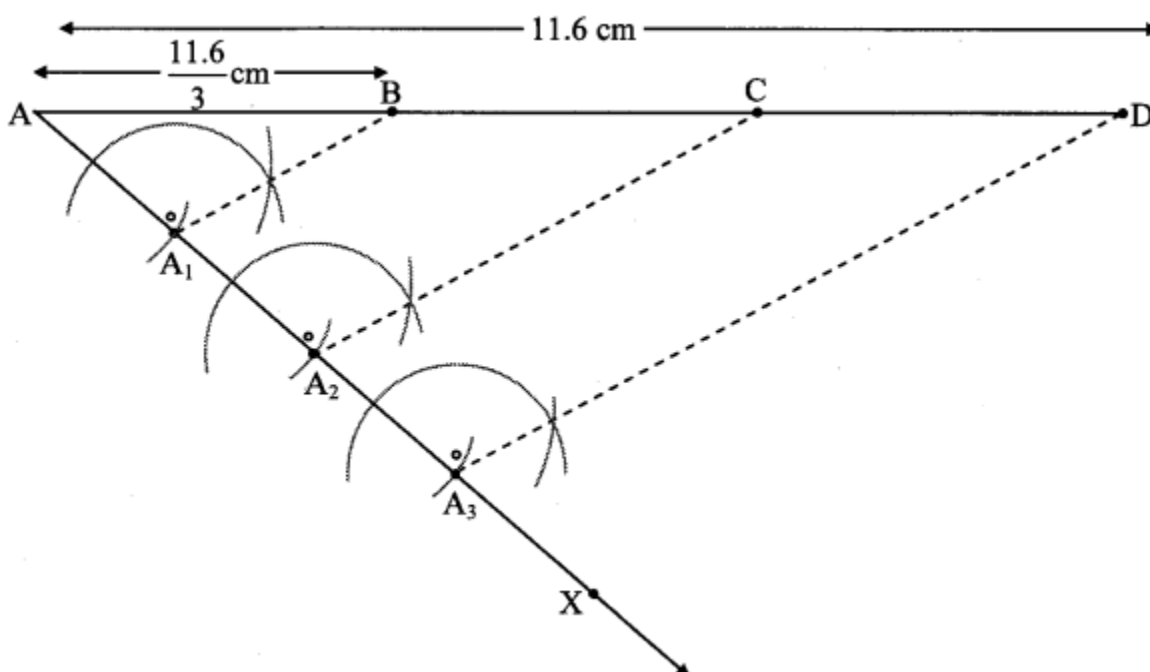
iv. Draw a line parallel to side TM through H . Name the point of intersection of this line and seg AT as E .

$\triangle AHE$ is the required triangle similar to $\triangle AMT$.

Question 1.

If length of side AB is 11.62 cm, then by dividing the line segment of length 11.6 cm in three equal parts, draw segment AB . (Textbook pg. no. 93)

Solution:



Steps of construction:

i. Draw seg AD of 11.6 cm.

ii. Draw ray AX such that $\angle DAX$ is an acute angle.

iii. Locate points A_1 , A_2 and A_3 on ray AX such that $AA_1 = A_1A_2 = A_2A_3$

iv. Join A_3D .

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

v. Through A_1, A_2 draw lines parallel to A_3D intersecting AD at B and C , wherein

$AB = 11.63$ cm

Question 2.

Construct any $\triangle ABC$. Construct $\triangle A'BC'$ such that $AB : A'B = 5:3$ and $\triangle ABC \sim \triangle A'BC'$. (Textbook pg. no. 93)

Analysis:

As shown in the figure,

Let $B - A' - A$ and $B - C' - C$

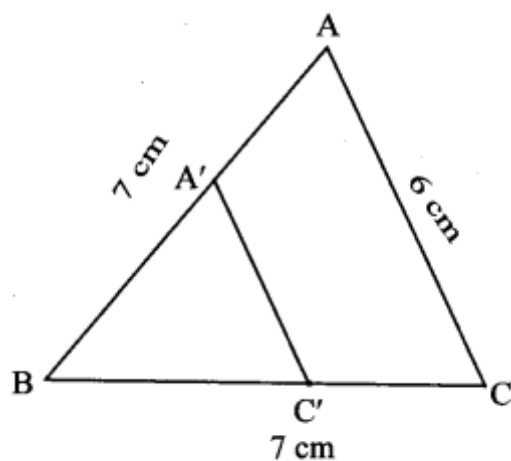
$\triangle ABC \sim \triangle A'BC'$... [Given]

$\therefore \angle ABC \cong \angle A'BC'$... [Corresponding angles of similar triangles]

$$\frac{AB}{A'B} = \frac{BC}{BC'} = \frac{AC}{A'C'} \quad \dots (i) \text{ [Corresponding sides of similar triangles]}$$

$$\text{But, } \frac{AB}{A'B} = \frac{5}{3} \quad \dots (ii) \text{ [Given]}$$

$$\frac{AB}{A'B} = \frac{BC}{BC'} = \frac{AC}{A'C'} = \frac{5}{3} \quad \dots \text{ [From (i) and (ii)]}$$



Rough figure

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

∴ Sides of $\triangle ABC$ are longer than corresponding sides of $\triangle A'BC'$. Rough figure

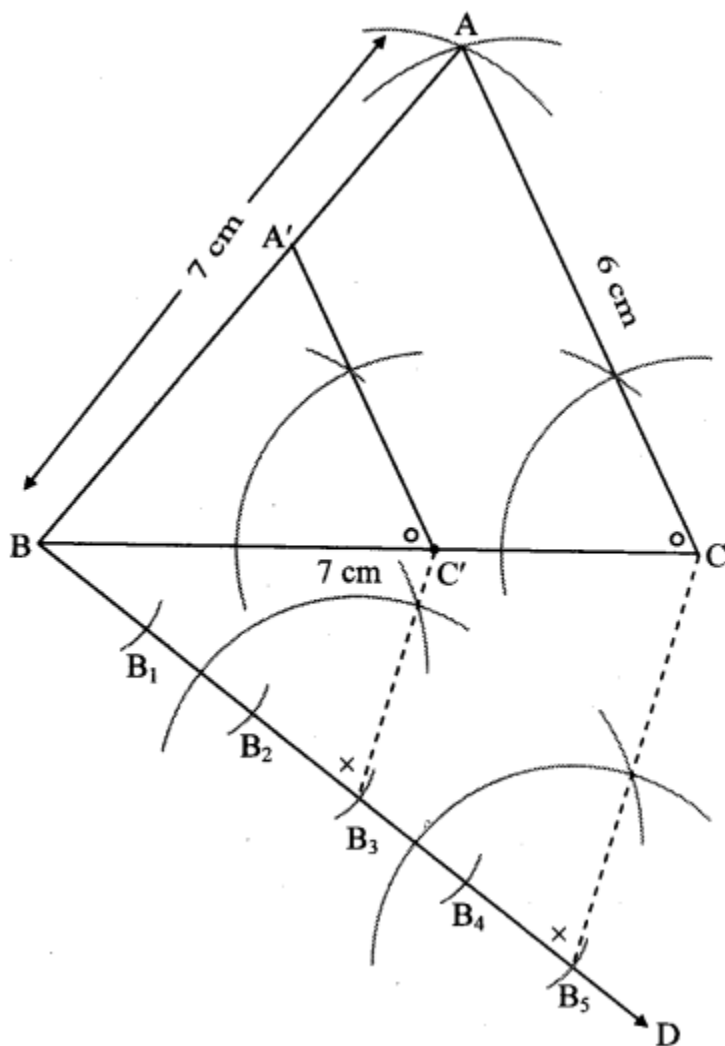
∴ the length of side BC' will be equal to 3 parts out of 5 equal parts of side BC .

So if we construct $\triangle ABC$, point C' will be on side BC , at a distance equal to 3 parts from B .

Now A' is the point of intersection of AB and a line through C' , parallel to CA .

Solution:

Let $\triangle ABC$ be any triangle constructed such that $AB = 7$ cm, $BC = 7$ cm and $AC = 6$ cm.

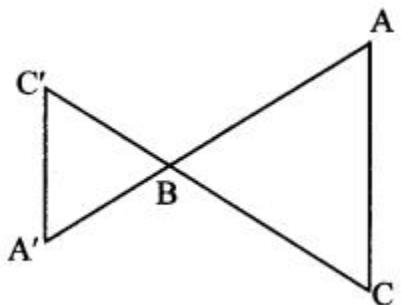


<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

Question 3.

Construct any $\triangle ABC$. Construct $\triangle A'BC'$ such that $AB:A'B = 5:3$ and $\triangle ABC \sim \triangle A'BC'$.

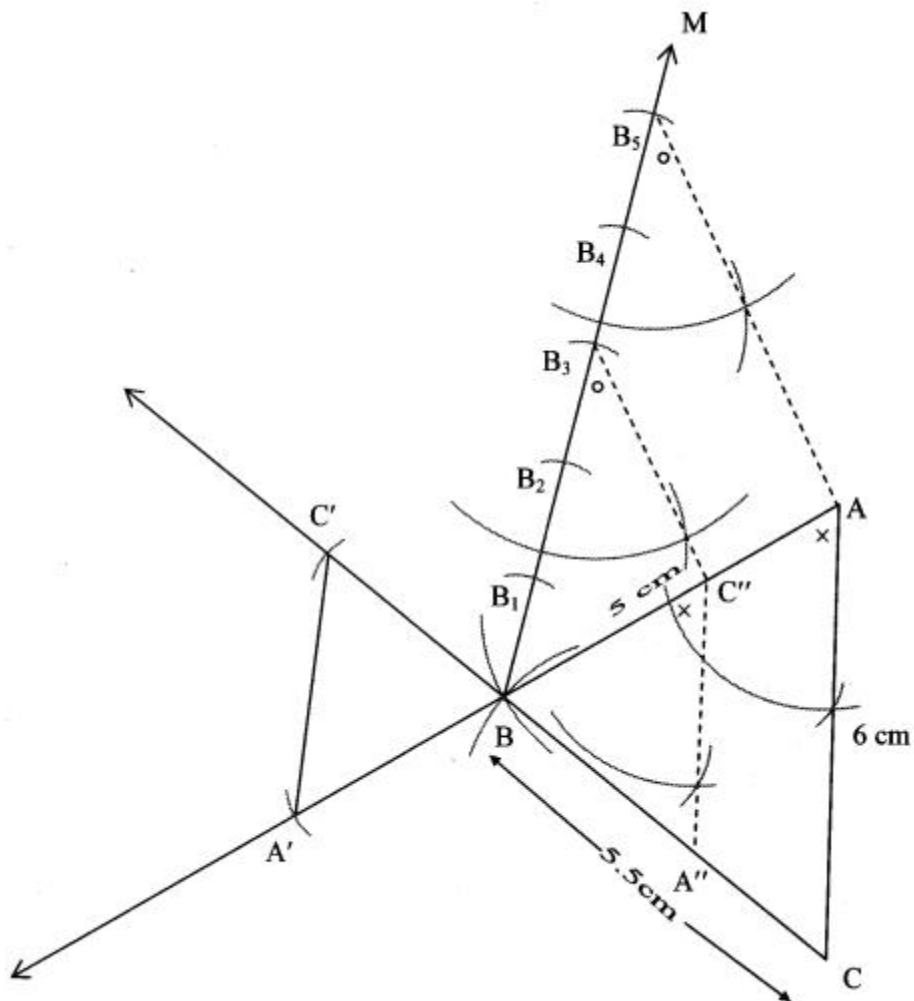
$\triangle A'BC'$ can also be constructed as shown in the adjoining figure. What changes do we have to make in steps of construction in that case? (Textbook pg. no. 94)

**Solution:**

Let $\triangle ABC$ be any triangle constructed such that $AB = 5\text{cm}$,

$BC = 5.5\text{ cm}$ and $AC = 6\text{ cm}$.

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>



i. Steps of construction:

Construct $\triangle ABC$, extend rays AB and CB.

Draw line BM making an acute angle with side AB.

Mark 5 points B_1, B_2, B_3, B_4, B_5 starting from B at equal distance.

Join B_3C (ie 3rd part)

Draw a line parallel to AB_5 through B_3 to intersect line AB at C''

Draw a line parallel to AC through C'' to intersect line BC at A''

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

ii. Extra construction:

With radius BC'' cut an arc on extended ray CB at C' [$C' - B - C$]

With radius BA'' cut an arc on extended ray AB at A' [$A' - B - A$]

$\triangle A'BC'$ is the required triangle.

Practice Set 4.2

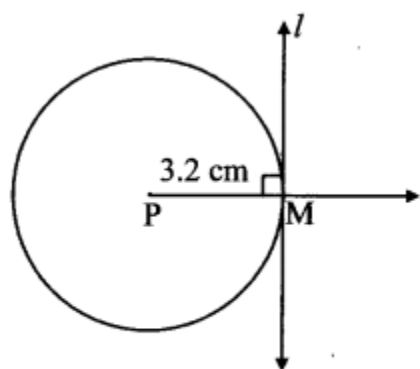
Question 1.

Construct a tangent to a circle with centre P and radius 3.2 cm at any point M on it.

Solution:

Analysis:

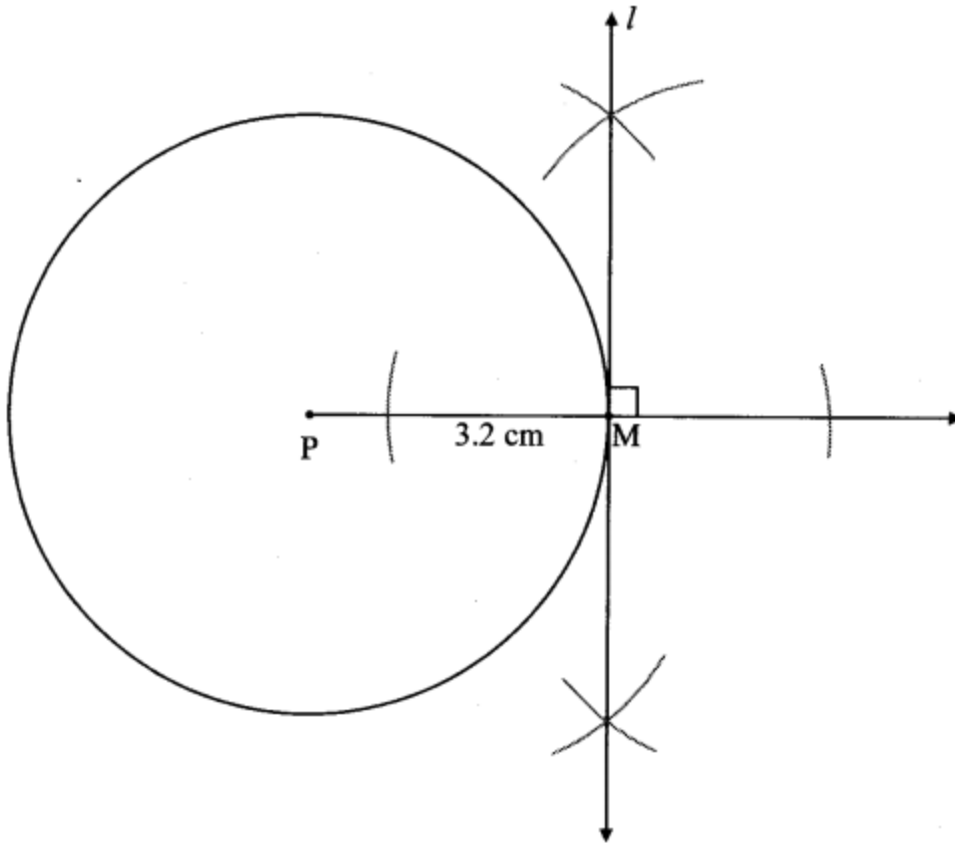
seg $PM \perp$ line l [Tangent is perpendicular to radius]



Rough Figure

The perpendicular to seg PM at point M will give the required tangent at M .

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>



Question 2.

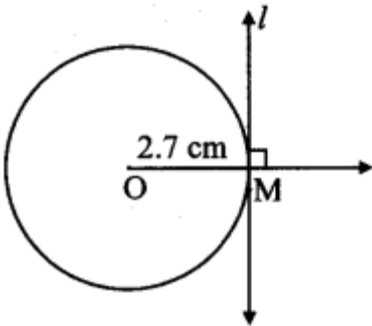
Draw a circle of radius 2.7 cm. Draw a tangent to the circle at any point on it.

Solution:

Analysis:

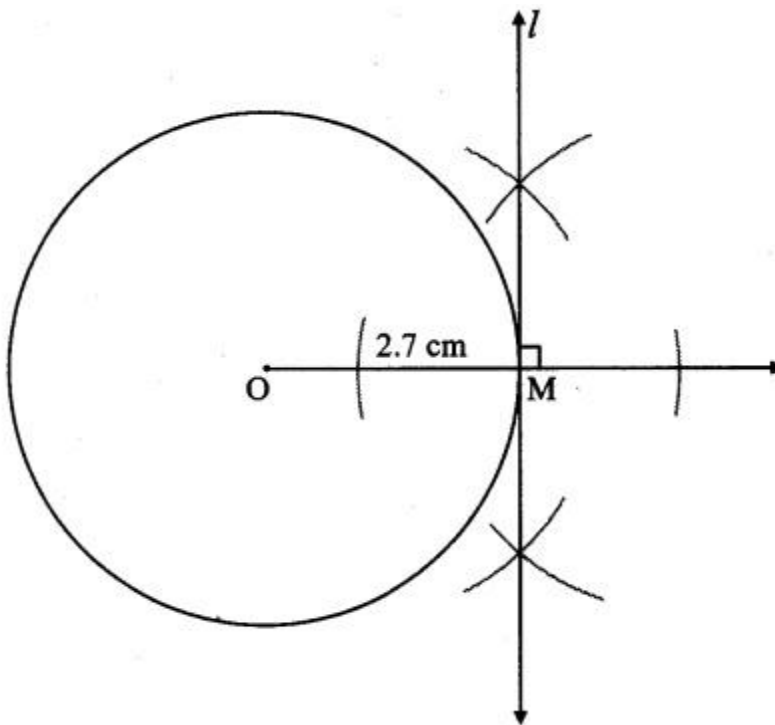
seg $OM \perp$ line l ... [Tangent is perpendicular to radius]

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>



Rough Figure

The perpendicular to seg OM at point M will give the required tangent at M.



Question 3.

Draw a circle of radius 3.6 cm. Draw a tangent to the circle at any point on it without using the centre.

Solution:

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

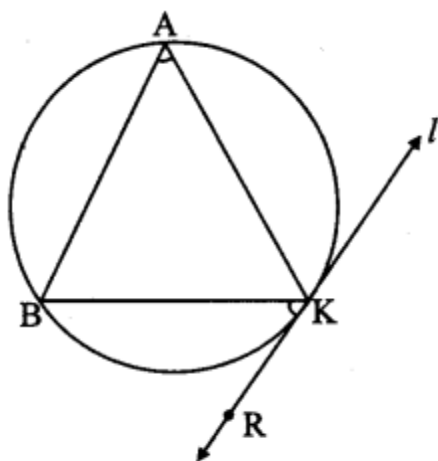
Analysis:

As shown in the figure, line l is a tangent to the circle at point K .

seg BK is a chord of the circle and $\angle BAK$ is an inscribed angle.

By tangent secant angle theorem,

$$\angle BAK = \angle BKR$$

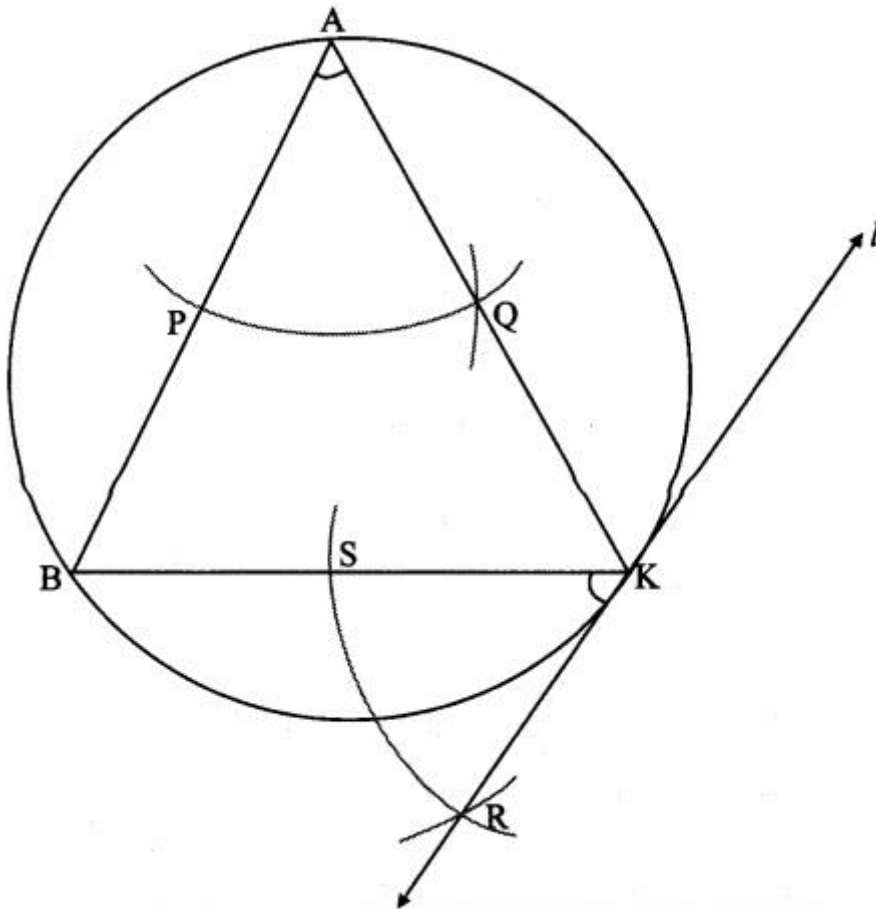


Rough figure

By converse of tangent secant angle theorem,

If we draw $\angle BKR$ such that $\angle BKR = \angle BAK$, then ray KR

i.e. (line l) is a tangent at point K .



Question 4.

Draw a circle of radius 3.3 cm. Draw a chord PQ of length 6.6 cm. Draw tangents to the circle at points P and Q. Write your observation about the tangents.

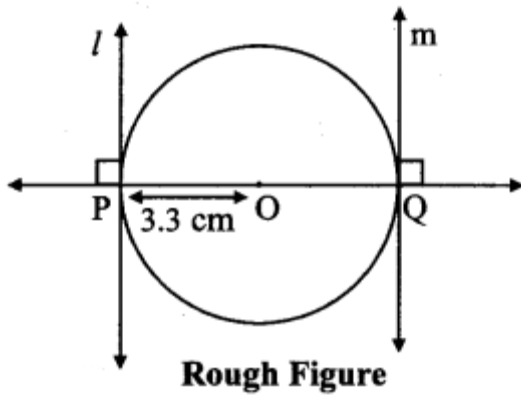
Solution:

Analysis:

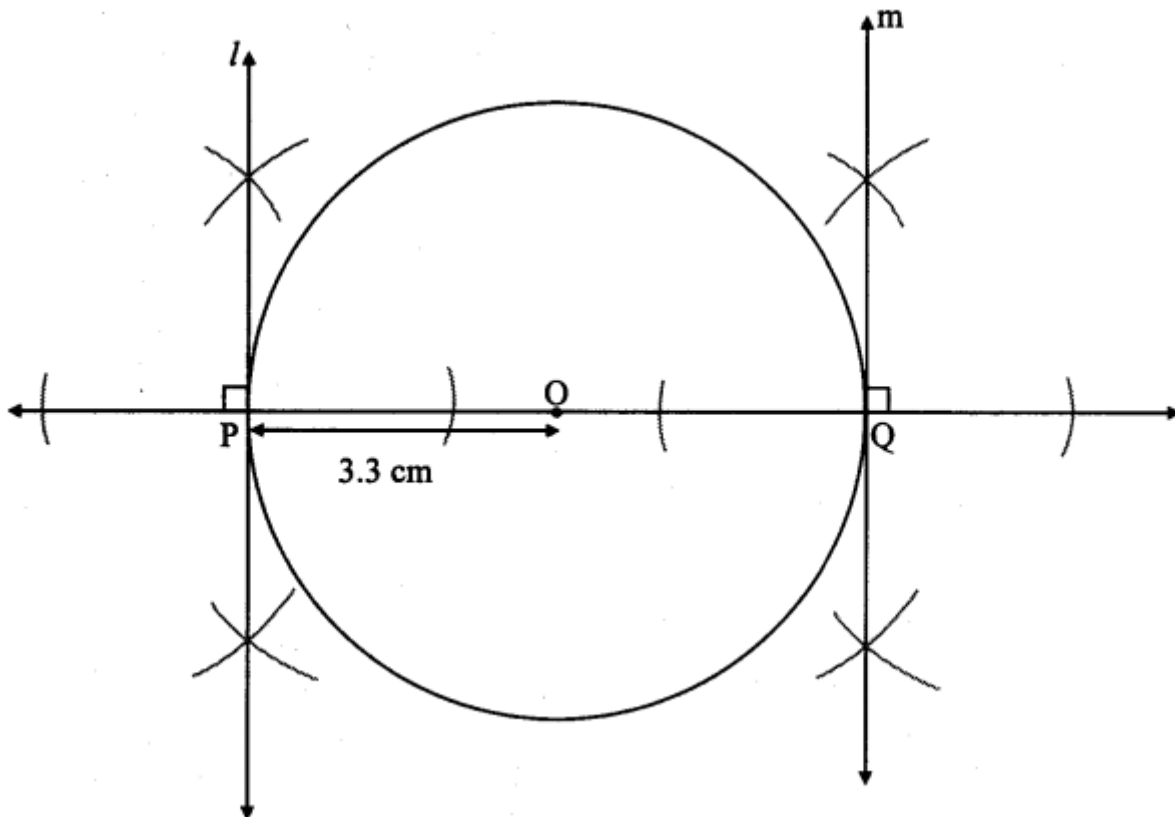
seg OP $\perp$ line l ...[Tangent is perpendicular to radius]

seg OQ $\perp$ line m

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>



The perpendicular to seg OP and seg OQ at points P and Q respectively will give the required tangents at P and Q.



Radius = 3.3 cm

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

$\therefore$ Diameter = $2 \times 3.3 = 6.6$ cm

$\therefore$ Chord PQ is the diameter of the circle.

$\therefore$ The tangents through points P and Q (endpoints of diameter) are parallel to each other.

Question 5.

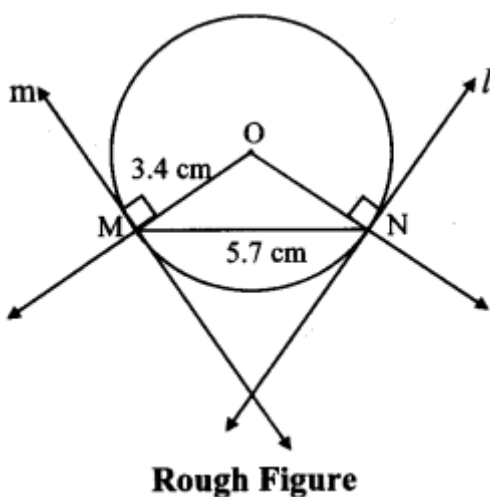
Draw a circle with radius 3.4 cm. Draw a chord MN of length 5.7 cm in it. Construct tangents at points M and N to the circle.

Solution:

Analysis:

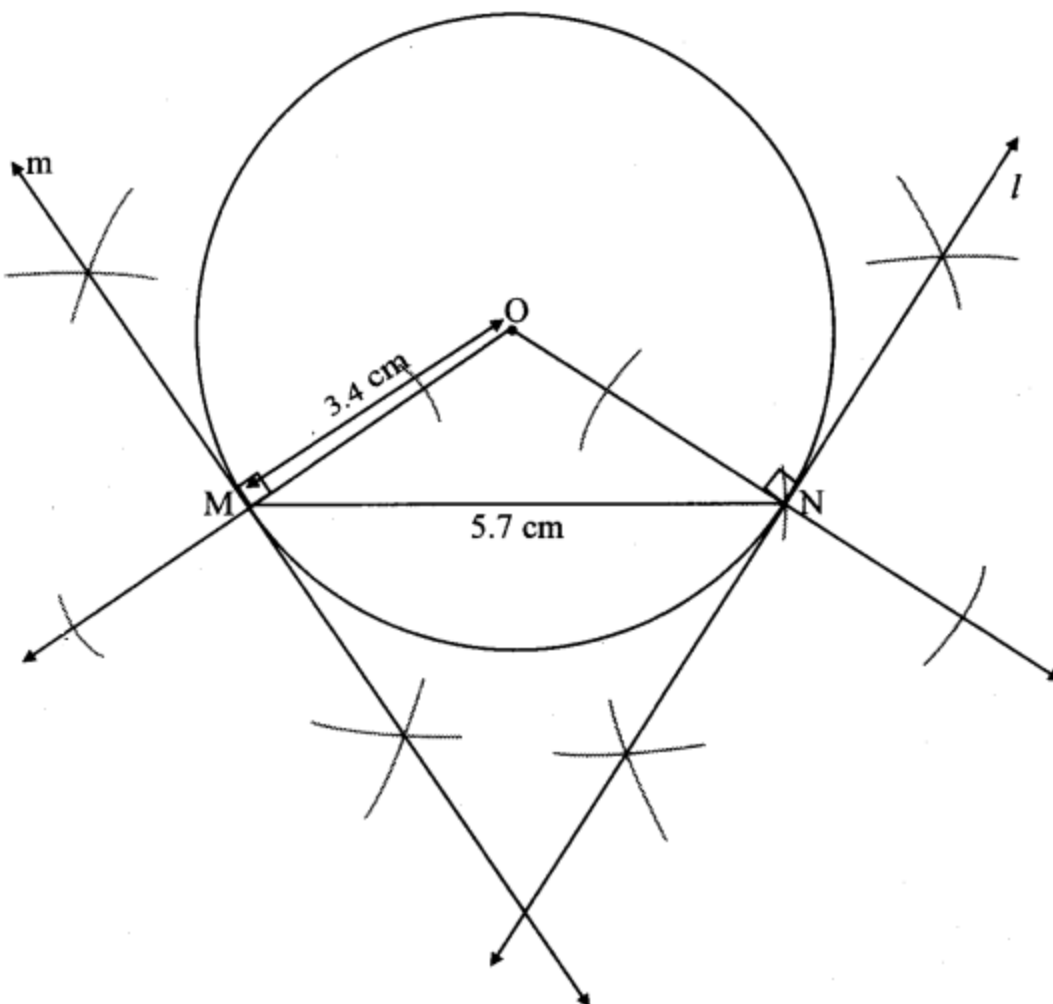
seg ON $\perp$ line l

seg OM $\perp$ line m[Tangent is perpendicular to radius]



The perpendicular to seg ON and seg OM at points N and M respectively will give the required tangents at N and M.

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>



Question 6.

Draw a circle with centre P and radius 3.4 cm. Take point Q at a distance 5.5 cm from the centre. Construct tangents to the circle from point Q.

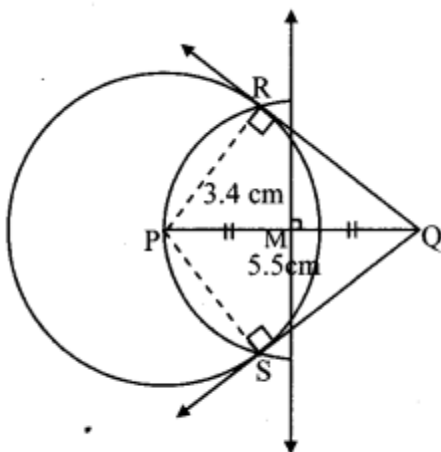
Solution:

Analysis:

As shown in the figure, let Q be a point in the exterior of circle at a distance of 5.5 cm.

Let QR and QS be the tangents to the circle at points R and S respectively.

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>



Rough figure

$\therefore$ seg $PR \perp$ tangent QR ...[Tangent is perpendicular to radius]

$\therefore \angle PRQ = 90^\circ$

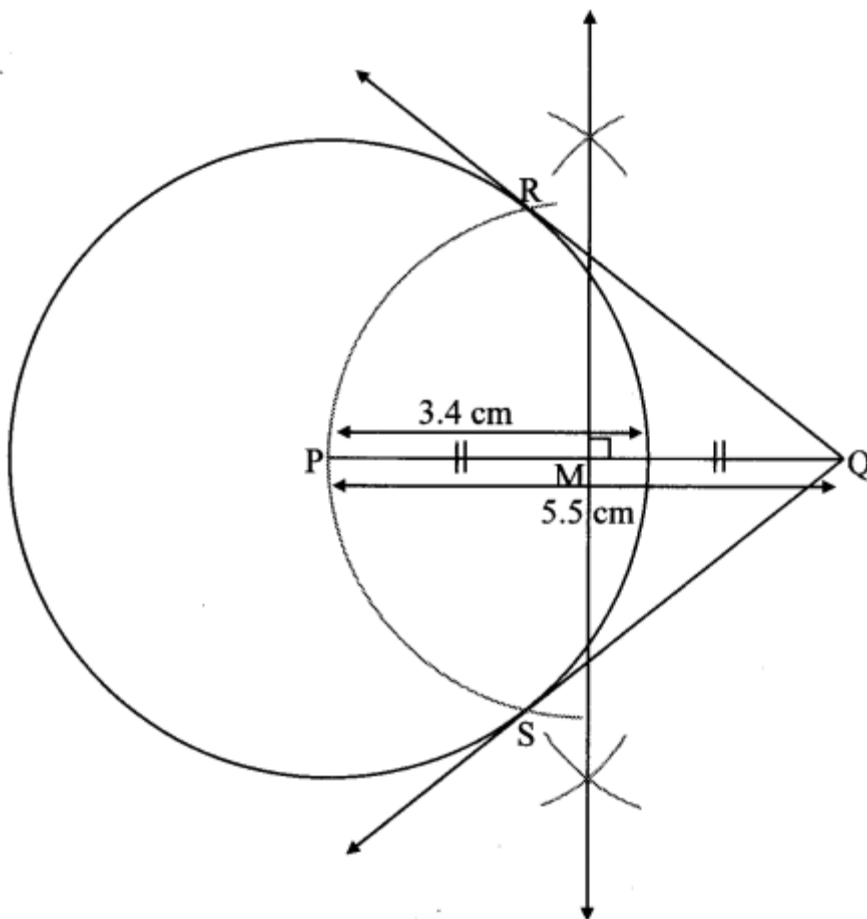
$\therefore$ point R is on the circle having PQ as diameter. ...[Angle inscribed in a semicircle is a right angle]

Similarly, point S also lies on the circle having PQ as diameter.

$\therefore$ Points R and S lie on the circle with PQ as diameter.

On drawing a circle with PQ as diameter, the points where it intersects the circle with centre P , will be the positions of points R and S respectively.

Ray QR and QS are the required tangents to the circle from point Q .



Question 7.

Draw a circle with radius 4.1 cm. Construct tangents to the circle from a point at a distance 7.3 cm from the centre.

Solution:

Analysis:

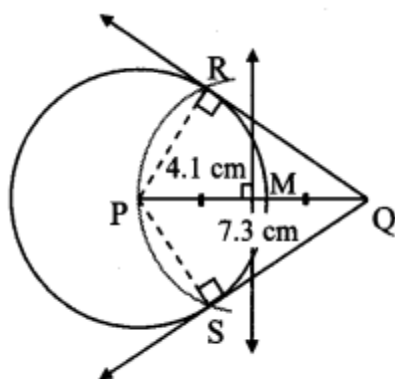
As shown in the figure, let Q be a point in the exterior of circle at a distance of 5.5 cm.

Let QR and QS be the tangents to the circle at points R and S respectively.

$\therefore$ seg PR $\perp$ tangent QR ...[Tangent is perpendicular to radius]

$\therefore \angle PRQ = 90^\circ$

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>



Rough Figure

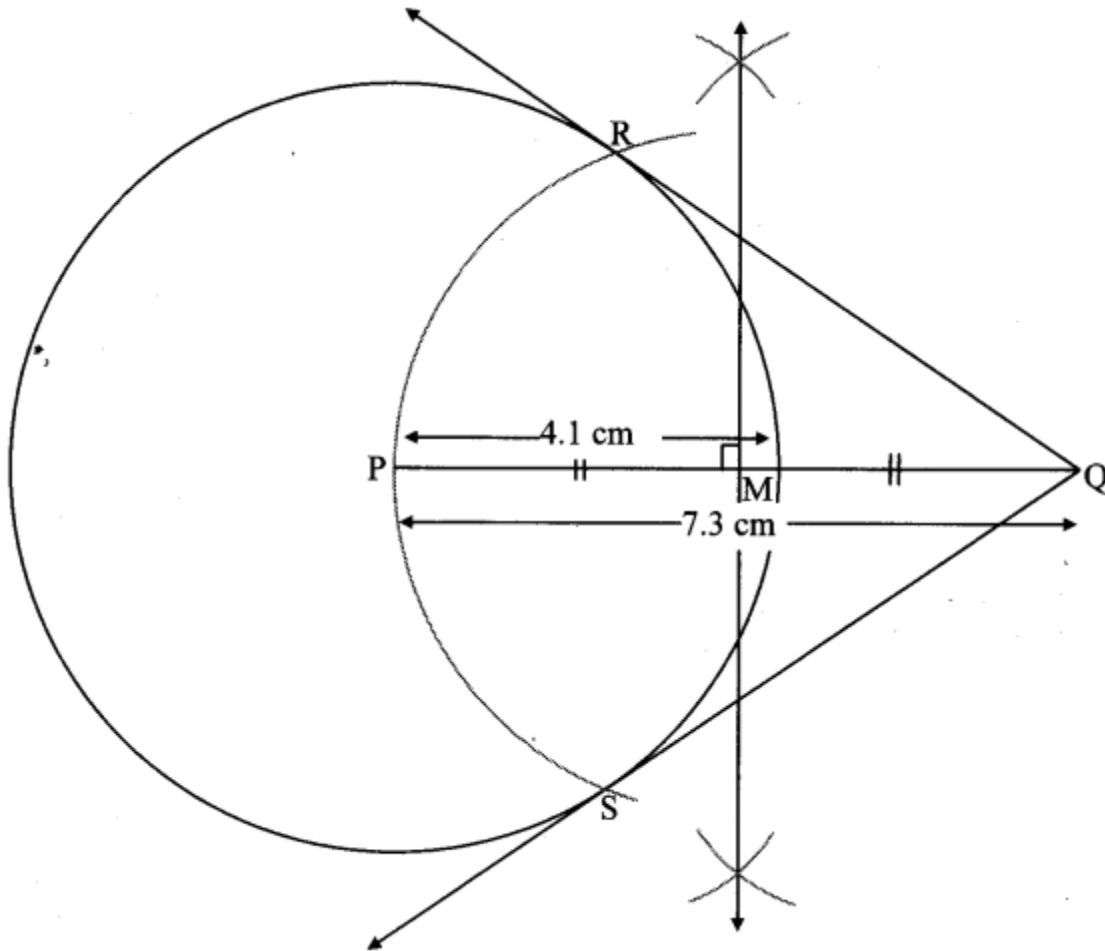
$\therefore$ point R is on the circle having PQ as diameter. ...[Angle inscribed in a semicircle is a right angle]

Similarly, point S also lies on the circle having PQ as diameter.

$\therefore$ Points R and S lie on the circle with PQ as diameter.

On drawing a circle with PQ as diameter, the points where it intersects the circle with centre P, will be the positions of points R and S respectively.

Ray QR and QS are the required tangents to the circle from point Q.



Maharashtra Board Solutions

Class 10 Maths (Part 2)

- Chapter 1- Similarity
- Chapter 2- Pythagoras Theorem
- Chapter 3- Circle
- Chapter 4- Geometric Constructions
- Chapter 5- Co-ordinate Geometry
- Chapter 6- Trigonometry
- Chapter 7- Mensuration

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

About About Maharashtra State Board (MSBSHSE)

The Maharashtra State Board of Secondary and Higher Secondary Education or MSBSHSE (Marathi: महाराष्ट्र राज्य माध्यमिक आणि उच्च माध्यमिक शिक्षण मंडळ), is an **autonomous and statutory body established in 1965**. The board was amended in the year 1977 under the provisions of the Maharashtra Act No. 41 of 1965.

The Maharashtra State Board of Secondary & Higher Secondary Education (MSBSHSE), Pune is an independent body of the Maharashtra Government. There are more than 1.4 million students that appear in the examination every year. The Maha State Board conducts the board examination twice a year. This board conducts the examination for SSC and HSC.

The Maharashtra government established the Maharashtra State Bureau of Textbook Production and Curriculum Research, also commonly referred to as Ebalbharati, in 1967 to take up the responsibility of providing quality textbooks to students from all classes studying under the Maharashtra State Board. MSBHSE prepares and updates the curriculum to provide holistic development for students. It is designed to tackle the difficulty in understanding the concepts with simple language with simple illustrations. Every year around 10 lakh students are enrolled in schools that are affiliated with the Maharashtra State Board.

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

FAQs

Where do I get the Maharashtra State Board Books PDF For free download?

You can download the Maharashtra State Board Books from the eBalbharti official website, i.e. cart.ebalbharati.in or from this article.

Add image

How to Download Maharashtra State Board Books?

Students can get the Maharashtra Books for primary, secondary, and senior secondary classes from here. You can view or download the Maharashtra State Board Books from this page or from the official website for free of cost. Students can follow the detailed steps below to visit the official website and download the e-books for all subjects or a specific subject in different mediums.

Step 1: Visit the official website ebalbharati.in

Step 2: On the top of the screen, select "Download PDF textbooks"

Step 3: From the "Classes" section, select your class.

Step 4: From "Medium", select the medium suitable to you.

Step 5: All Maharashtra board books for class 11th will now be displayed on the right side.

Step 6: Click on the "Download" option to download the PDF book.

Who developed the Maharashtra State board books?

As of now, the MSCERT and Balbharti are responsible for the syllabus and textbooks of Classes 1 to 8, while Classes 9 and 10 are under the Maharashtra State Board of Secondary and Higher Secondary Education (MSBSHSE).

How many state boards are there in Maharashtra?

The Maharashtra State Board of Secondary & Higher Secondary Education, conducts the HSC and SSC Examinations in the state of Maharashtra through its nine Divisional Boards located at Pune, Mumbai, Aurangabad, Nasik, Kolhapur, Amravati, Latur, Nagpur and Ratnagiri.

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>

About IndCareer

IndCareer.com is a leading developer of online career guidance resources for the Indian marketplace. Established in 2007, IndCareer.com is currently used by over thousands of institutions across India, including schools, employment agencies, libraries, colleges and universities.

IndCareer.com is designed to assist you in making the right career decision - a decision that meets your unique interests and personality.

For any clarifications or questions you can write to **info@indcareer.com**

Postal Address

IndCareer.com
52, Shilpa Nagar,
Somalwada
Nagpur - 440015
Maharashtra, India

WhatsApp: +91 9561 204 888

Website: <https://www.indcareer.com>

<https://www.indcareer.com/schools/maharashtra-board-solutions-for-class-10-maths-part-2-chapter-4-geometric-constructions/>