

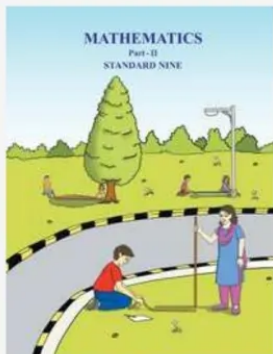
Maharashtra Board Solutions Class 9-Maths

(Part 2): Chapter 4.3- Constructions of Triangles

BOOK SOLUTIONS
CLASS 9
MATHS (PART 2)

CHAPTER 4.3
Constructions of Triangles

Maharashtra Board Solutions→



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Maharashtra Board Solutions Class 9-Maths

(Part 2): Chapter 4.3- Constructions of Triangles

Class 9: Maths Chapter 4.3 solutions. Complete Class 9 Maths Chapter 4.3 Notes.

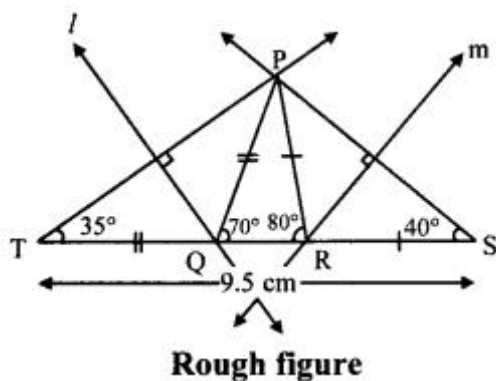
Maharashtra Board Solutions Class 9-Maths (Part 2): Chapter 4.3- Constructions of Triangles

Maharashtra Board 9th Maths Chapter 4.3, Class 9 Maths Chapter 4.3 solutions

Question 1.

Construct ΔPQR , in which $\angle Q = 70^\circ$, $\angle R = 80^\circ$ and $PQ + QR + PR = 9.5$ cm.

Solution:



i. As shown in the figure, take point T and S on line QR, such that

$QT = PQ$ and $RS = PR$ (i)

$QT + QR + RS = TS$ [T-Q-R, Q-R-S]

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$$\therefore PQ + QR + PR = TS \dots(ii) \text{ [From (i)]}$$

Also,

$$PQ + QR + PR = 9.5 \text{ cm} \dots(iii) \text{ [Given]}$$

$$\therefore TS = 9.5 \text{ cm}$$

ii. In ΔPQT

$$PQ = QT \text{ [From (i)]}$$

$$\therefore \angle QPT = \angle QTP = x^\circ \dots(iv) \text{ [Isosceles triangle theorem]}$$

In ΔPQT , $\angle PQR$ is the exterior angle.

$$\therefore \angle QPT + \angle QTP = \angle PQR \text{ [Remote interior angles theorem]}$$

$$\therefore x + x = 70^\circ \text{ [From (iv)]}$$

$$\therefore 2x = 70^\circ \quad x = 35^\circ$$

$$\therefore \angle PTQ = 35^\circ$$

$$\therefore \angle T = 35^\circ$$

Similarly, $\angle S = 40^\circ$

iii. Now, in ΔPTS

$\angle T = 35^\circ$, $\angle S = 40^\circ$ and $TS = 9.5 \text{ cm}$ Hence, ΔPTS can be drawn.

iv. Since, $PQ = TQ$,

$\therefore$ Point Q lies on perpendicular bisector of seg PT.

Also, $RP = RS$

$\therefore$ Point R lies on perpendicular bisector of seg PS.

Points Q and R can be located by drawing the perpendicular bisector of PT and PS respectively.

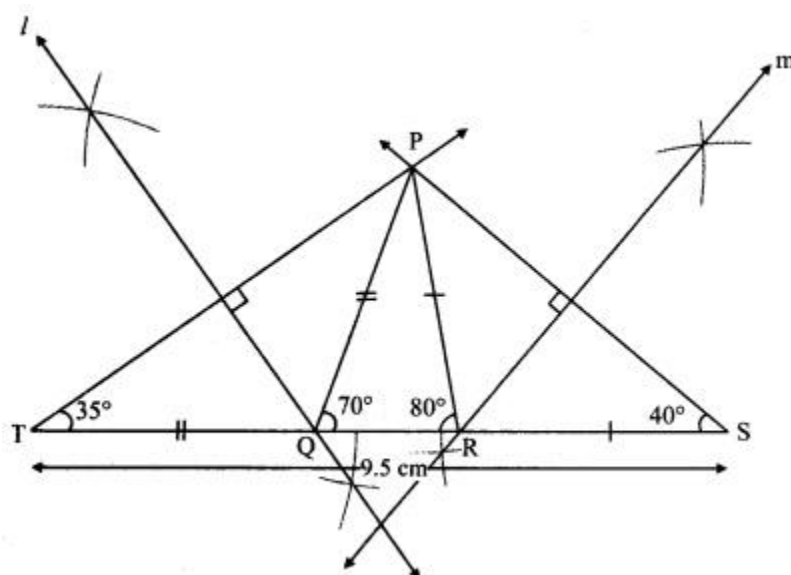
$\therefore \Delta PQR$ can be drawn.

Steps of construction:

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- i. Draw seg TS of length 9.5 cm.
- ii. From point T draw ray making angle of 35° .
- iii. From point S draw ray making angle of 40° .
- iv. Name the point of intersection of two rays as P.
- v. Draw the perpendicular bisector of seg PT and seg PS intersecting seg TS in Q and R respectively.
- vi. Join PQ and PR.

Hence, ΔPQR is the required triangle.

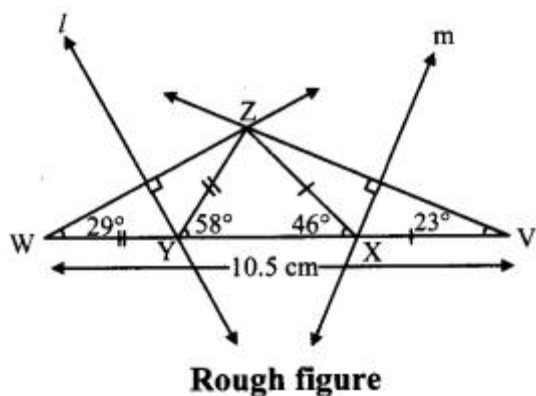


Question 2.

Construct ΔXYZ , in which $\angle Y = 58^\circ$, $\angle X = 46^\circ$ and perimeter of triangle is 10.5 cm.

Solution:

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i. As shown in the figure, take point W and V on line YX, such that

$$YW = ZY \text{ and } XV = ZX \dots\dots(i)$$

$$YW + YX + XV = WV \text{ [W-Y-X, Y-X-V]}$$

$$\angle Y + YX + \angle X = WV \dots\dots(ii) \text{ [From (i)]}$$

Also,

$$\angle Y + YX + \angle X = 10.5 \text{ cm} \dots\dots(iii) \text{ [Given]}$$

$$\therefore WV = 10.5 \text{ cm [From (ii) and (iii)]}$$

ii. In $\triangle ZWY$

$$\angle Y = \angle W \text{ [From (i)]}$$

$$\therefore \angle YZW = \angle YWZ = x^\circ \dots\dots(iv) \text{ [Isosceles triangle theorem]}$$

In $\triangle ZYW$, $\angle ZYX$ is the exterior angle.

$$\therefore \angle YZW + \angle YWZ = \angle ZYX \text{ [Remote interior angles theorem]}$$

$$\therefore x + x = 58^\circ \text{ [From (iv)]}$$

$$\therefore 2x = 58^\circ$$

$$\therefore x = 29^\circ$$

$$\therefore \angle ZWY = 29^\circ$$

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$$\therefore \angle W = 29^\circ$$

$$\therefore \text{Similarly, } \angle V = 23^\circ$$

iii. Now, in ΔZWV

$$\angle W = 29^\circ, \angle V = 23^\circ \text{ and}$$

$$WV = 10.5 \text{ cm}$$

Hence, ΔZWV can be drawn.

iv. Since, $ZY = YW$

$\therefore$ Point Y lies on perpendicular bisector of seg ZW.

$$\text{Also, } ZX = XV$$

$\therefore$ Point X lies on perpendicular bisector of seg ZV.

$\therefore$ Points Y and X can be located by drawing the perpendicular bisector of ZW and ZV respectively.

$\therefore \Delta XYZ$ can be drawn.

Steps of construction:

i. Draw seg WV of length 10.5 cm.

ii. From point W draw ray making angle of 29° .

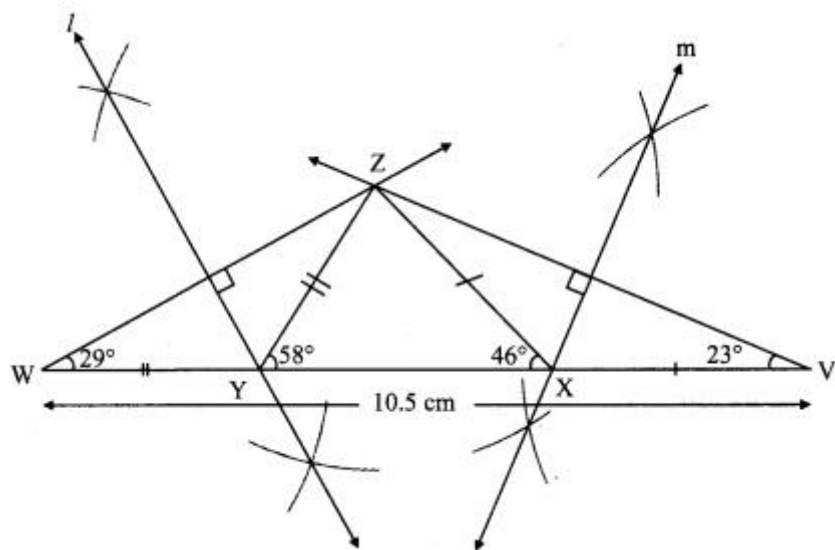
iii. From point V draw ray making angle of 23° .

iv. Name the point of intersection of two rays as Z.

v. Draw the perpendicular bisector of seg WZ and seg VZ intersecting seg WV in Y and X respectively.

vi. Join XY and XX.

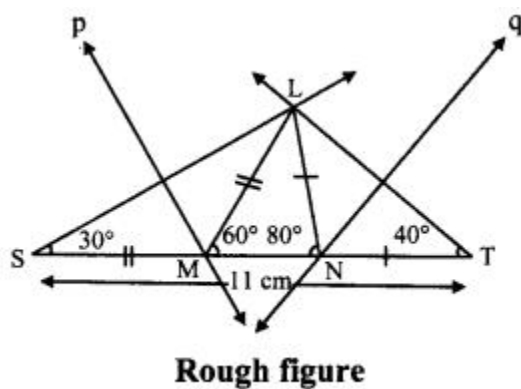
Hence, ΔXYZ is the required triangle



Question 3.

Construct $\triangle LMN$, in which $\angle M = 60^\circ$, $\angle N = 80^\circ$ and $LM + MN + NL = 11$ cm.

Solution:



i. As shown in the figure, take point S and T on line MN, such that

$MS = LM$ and $NT = LN$ (i)

$MS + MN + NT = ST$ [S-M-N, M-N-T]

$\therefore LM + MN + LN = ST$ (ii)

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Also,

$$LM + MN + LN = 11 \text{ cm} \dots(\text{iii})$$

$$\therefore ST = 11 \text{ cm} [\text{From (ii) and (iii)}]$$

ii. In $\triangle LSM$

$$LM = MS$$

$$\therefore \angle MLS = \angle MSL = x^\circ \dots(\text{iv}) [\text{isosceles triangle theorem}]$$

In $\triangle LMS$, $\angle LMN$ is the exterior angle.

$$\therefore \angle MLS + \angle MSL = \angle LMN [\text{Remote interior angles theorem}]$$

$$\therefore x + x = 60^\circ [\text{From (iv)}]$$

$$\therefore 2x = 60^\circ$$

$$\therefore x = 30^\circ$$

$$\therefore \angle LSM = 30^\circ$$

$$\therefore \angle S = 30^\circ$$

Similarly, $\angle T = 40^\circ$

iii. Now, in $\triangle LST$

$$\angle S = 30^\circ, \angle T = 40^\circ \text{ and } ST = 11 \text{ cm}$$

Hence, $\triangle LST$ can be drawn.

iv. Since, $LM = MS$

$\therefore$ Point M lies on perpendicular bisector of seg LS.

Also $LN = NT$

$\therefore$ Point N lies on perpendicular bisector of seg LT.

$\therefore$ Points M and N can be located by drawing the perpendicular bisector of LS and LT respectively.

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$\therefore \triangle LMN$ can be drawn.

Steps of construction:

- i. Draw seg ST of length 11 cm.
- ii. From point S draw ray making angle of 30° .
- iii. From point T draw ray making angle of 40° .
- iv. Name the point of intersection of two rays as L.
- v. Draw the perpendicular bisector of seg LS and seg LT intersecting seg ST in M and N respectively.
- vi. Join LM and LN.

Hence, $\triangle LMN$ is the required triangle.





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- Chapter 1.2- Basic Concepts in Geometry
- Chapter 1.3- Basic Concepts in Geometry
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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.

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FAQs

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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.

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