Geometrical Constructions

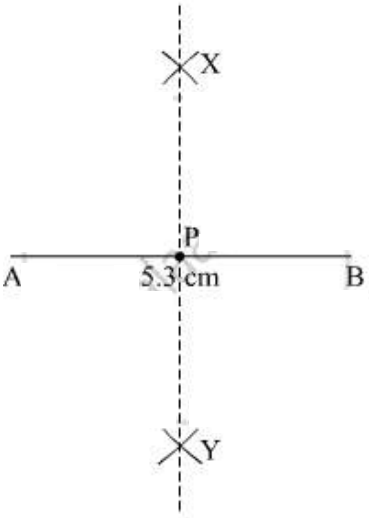
PRACTICE SET 1 [PAGE 2]

Practice Set 1 | Q 1.1 | Page 2

Draw the line segment of the length given below and draw their perpendicular bisectors.

5.3 cm

Solution:



Steps of construction:

1. Draw line segment AB = 5.3 cm.

2. With A as center and radius more than half of AB, mark two arcs, one above and other below the line AB.

3. With B as a centre and same radius, draw two arcs cutting the previous drawn arcs and name the point of intersection as X and Y.

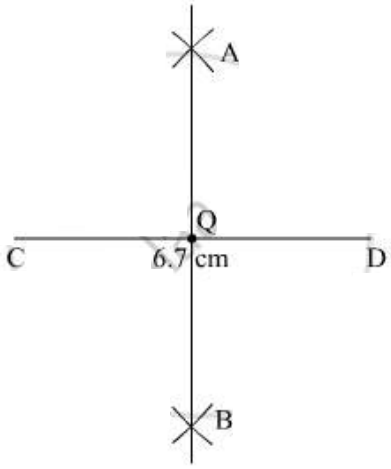
4. Join XY and name the point where this line cuts AB as point P. XY is the perpendicular bisector of AB.

Practice Set 1 | Q 1.2 | Page 2

Draw the line segment of the length given below and draw their perpendicular bisectors.

6.7 cm

Solution:



Steps of construction:

1. Draw line segment CD = 6.7 cm.

2. With C as center and radius more than half of CD, mark two arcs, one above and other below the line CD.

3. With D as a centre and same radius, draw two arcs cutting the previous drawn arcs and name the point of intersection as A and B.

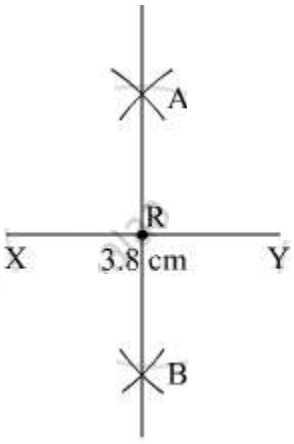
4. Join AB and name the point where this line cuts CD as point Q. AB is the perpendicular bisector of CD.

Practice Set 1 | Q 1.3 | Page 2

Draw the line segment of the length given below and draw their perpendicular bisectors.

3.8 cm

Solution:



Steps of construction:

1. Draw line segment XY = 3.8 cm.

2. With X as center and radius more than half of XY, mark two arcs, one above and other below the line XY.

3. With Y as a centre and same radius, draw two arcs cutting the previous drawn arcs and name the point of intersection as A and B.

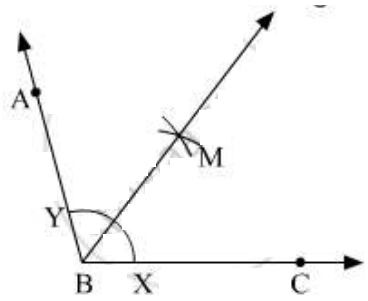
4. Join AB and name the point where this line cuts XY as point R. AB is the perpendicular bisector of XY.

Practice Set 1 | Q 2.1 | Page 2

Draw the angle of the measures given below and draw their bisectors.

105°

Solution:



Steps of Construction:

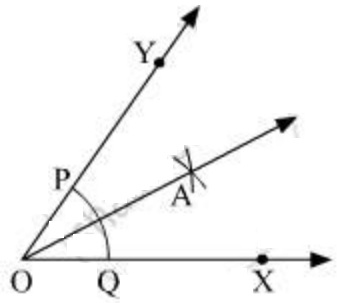
1. Draw a ray BC.
2. With B as a centre, use a protractor to make an angle of 105°. Thus, ∠ABC = 105°.
3. With X and Y as a centre, draw arcs intersecting each other at point M.
4. BM is the required angle bisector of ∠ABC.

Practice Set 1 | Q 2.2 | Page 2

Draw the angle of the measures given below and draw their bisectors.

55°

Solution:



Steps of Construction:

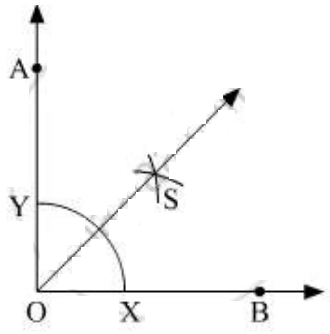
1. Draw a ray OX.
2. With O as a centre, use a protractor to make an angle of 55°. Thus, ∠YOX = 55°.
3. With P and Q as a centre, draw arcs intersecting each other at point A. OA is the required angle bisector of ∠YOX.

Practice Set 1 | Q 2.3 | Page 2

Draw the angle of the measures given below and draw their bisectors.

90°

Solution:



Steps of Construction:

1. Draw a ray OB.
2. With O as a centre, use a protractor to make an angle of 90°. Thus, ∠AOB = 90°.
3. With X and Y as a centre, draw arcs intersecting each other at point S.
4. OS is the required angle bisector of ∠ AOB.

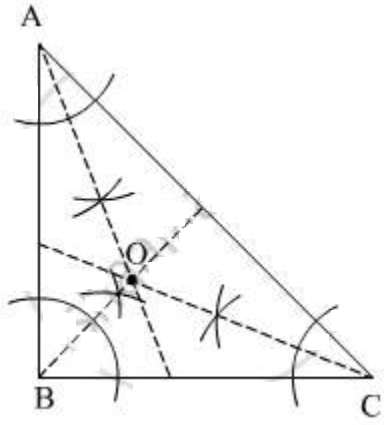
Practice Set 1 | Q 3.1 | Page 2

Draw an obtuse-angled triangle. Find the points of the concurrence of the angle bisectors of the triangle. Where do the points of concurrence lie?

Solution: Steps of construction:
1. Draw an obtuse-angled triangle XYZ.

2. Make the angle bisectors of angles X, Y, and Z.

The angle bisectors meet at point S. This point of concurrence of the angle bisectors lies inside the obtuse-angled triangle XYZ.



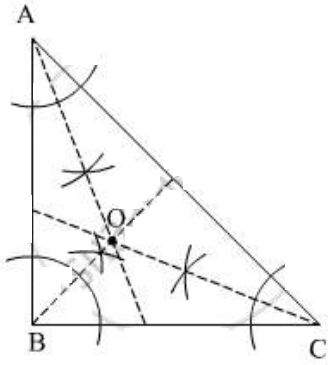
Practice Set 1 | Q 3.2 | Page 2

Draw a right-angled triangle. Find the points of the concurrence of the angle bisectors of the triangle. Where do the points of concurrence lie?

Solution: Steps of construction:

1. Draw a right-angled triangle ABC, right-angled at B.

2. Make the angle bisectors of the angles A, B, and C.
The angle bisectors meet at the point O. This point of concurrence of the angle bisectors lies inside the triangle ABC.



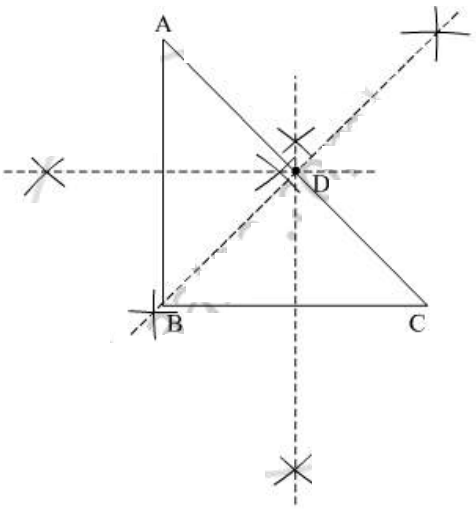
Practice Set 1 | Q 4 | Page 2

Draw a right-angled triangle. Draw the perpendicular bisectors of its sides. Where does the point of concurrence lie?

Solution: Steps of construction:

1. Draw the right angle triangle ABC.

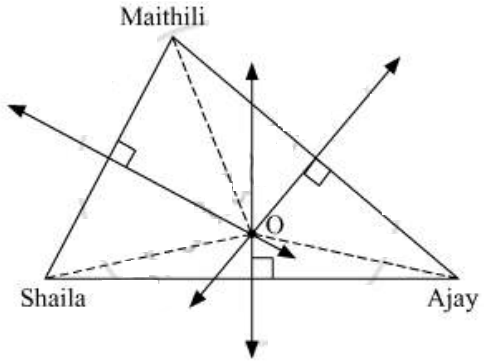
2. Draw the perpendicular bisectors of the sides AB, BC, and CA. The perpendicular bisectors meet at point D which lies on the hypotenuse AC.



Practice Set 1 | Q 5 | Page 2

Maithili, Shaila, and Ajay live in three different places in the city. A toy shop is equidistant from the three houses. Which geometrical construction should be used to represent this? Explain your answer.

Solution:



Maithili, Shaila and Ajay be the three vertices of a triangle.
A toy shop equidistant from these three points will be the point of concurrence of the perpendicular bisectors of the lines joining the three vertices of the triangle. Thus, the geometrical construction representing this will be the circumcircle.

PRACTICE SET 2 [PAGE 4]

Practice Set 2 | Q 1.1 | Page 4

Draw triangle with the measures given below.

In ΔABC , l(AB) = 5.5 cm, l(BC) = 4.2 cm, l(AC) = 3.5 cm

Solution: Steps of construction:

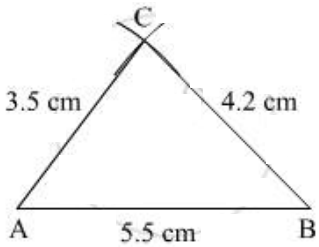
1. Draw a line AB = 5.5 cm

2. With A as a centre and 3.5 cm as the radius, draw an arc above the line AB.

3. With B as the center and 4.2 cm as the radius, draw an arc cutting the previous drawn arc at point C.

4. Join CA and CB.

Δ ABC is thus the required triangle.



Practice Set 2 | Q 1.2 | Page 4

Draw triangle with the measures given below.

In Δ STU, l(ST) = 7 cm, l(TU) = 4 cm, l(SU) = 5 cm

Solution: Steps of construction:

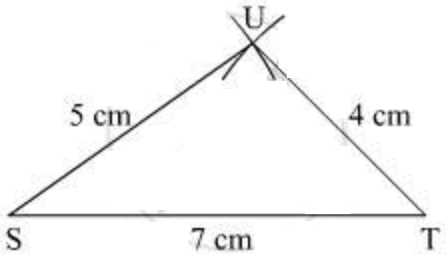
1. Draw a line ST = 7 cm

2. With S as centre and 5 cm as the radius, draw an arc above the line ST.

3. With T as the center and 4 cm as the radius, draw an arc cutting the previous drawn arc at point U.

4. Join US and UT.

ΔSTU is thus the required triangle.



Practice Set 2 | Q 1.3 | Page 4

Draw triangle with the measures given below.

In ∆ PQR, l(PQ) = 6 cm, l(QR) = 3.8 cm, l(PR) = 4.5 cm

Solution: Steps of construction:

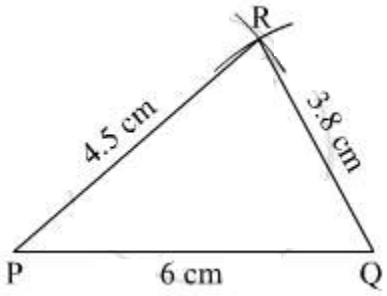
1. Draw a line PQ = 6 cm

2. With P as centre and 4.5 cm as the radius, draw an arc above the line PQ.

3. With Q as the center and 3.8 cm as the radius, draw an arc cutting the previous drawn arc at point R.

4. Join RP and RQ.

ΔPQR is thus the required triangle.



Practice Set 2 | Q 2 | Page 4

Draw an isosceles triangle with base 5 cm and the other sides 3.5 cm each.

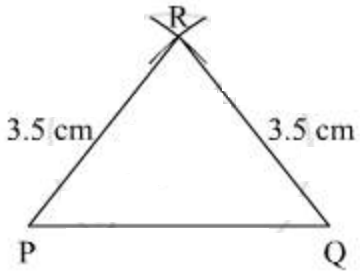
Solution: Steps of construction:

1. Draw a line PQ = 5 cm.

2. With P as a centre and 3.5 cm as radius, draw an arc above the line PQ.

3. With Q as a centre and 3.5 cm as radius, draw an arc cutting the previously drawn arc. Name the point of intersection as point R.

Join RP and RQ. △RPQ is the required isosceles triangle.



Practice Set 2 | Q 3 | Page 4

Draw an equilateral triangle with side 6.5 cm.

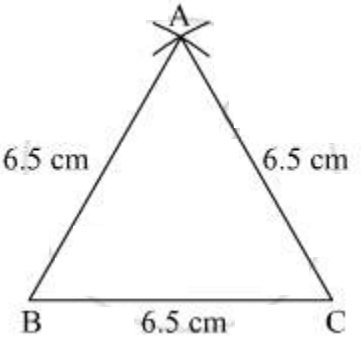
Solution: Steps of construction:

1. Draw a line BC = 6.5 cm.

2. With B as a centre and 6.5 cm as radius, draw an arc above the line BC.

3. With C as a centre and 6.5 cm as radius, draw an arc cutting the previous drawn arc. Name the point of intersection as point A.

Join AB and AC. △ABC is the required equilateral triangle.



Practice Set 2 | Q 4 | Page 4

Choose the lengths of the sides yourself and draw one equilateral, one isosceles and one scalene triangle.

Solution:

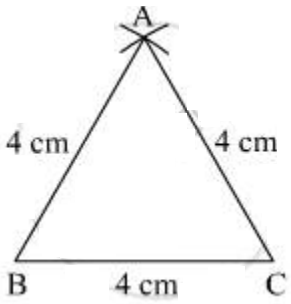
- Equilateral triangle

Steps of construction:

1. Draw a line BC = 4 cm.

2. With B as a centre and 4 cm as radius, draw an arc above the line BC.
3. With C as a centre and 4 cm as the radius, draw an arc cutting the previously drawn arc. Name the point of intersection as point A.

Join AB and AC. △△ABC is the required equilateral triangle.

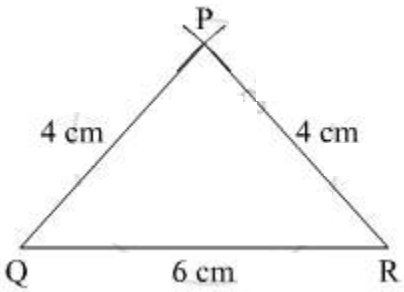


- Isosceles triangle

Steps of construction:

1. Draw a line QR = 6 cm.
2. With Q as a centre and 4 cm as radius, draw an arc above the line QR.
3. With R as a centre and 4 cm as the radius, draw an arc cutting the previously drawn arc. Name the point of intersection as point P.

Join PQ and RP. △RPQ is the required isosceles triangle.

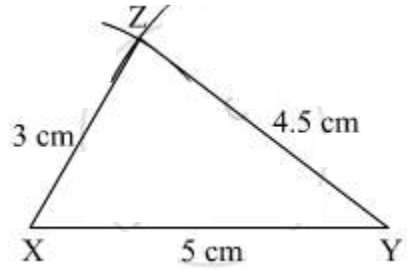


- Scalene triangle

Steps of construction:

1. Draw a line XY = 5 cm.
2. With X as centre and 3 cm as radius, draw an arc above the line XY.
3. With Y as a centre and 4.5 cm as radius, draw an arc cutting the previously drawn arc. Name the point of intersection as point Z.

Join ZX and ZY. △ZXY is the required isosceles triangle.



PRACTICE SET 3 [PAGE 5]

Practice Set 3 | Q 1 | Page 5

Draw triangle with the measures given below.

In ∆MAT, l(MA) = 5.2 cm, m∠A = 80°, l(AT) = 6 cm

Solution: Steps of construction:

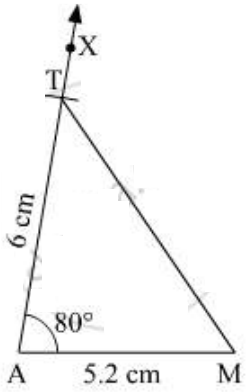
1. Draw a line AM = 5.2 cm.

2. With A as a centre, draw an angle of 80°80° using protractor. Name this angle as ∠∠XAM.

3. With A as a centre and 6 cm as radius, cut an arc on XA and name it as point T.

4. Join TM.

∆MAT is the required triangle.



Practice Set 3 | Q 2 | Page 5

Draw triangle with the measures given below.

In ∆ NTS, m ∠T = 40°, l(NT) = l(TS) = 5 cm

Solution: Steps of construction:

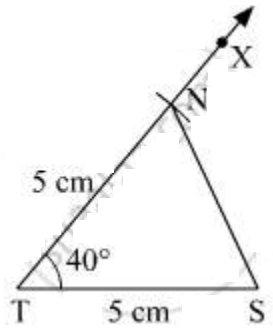
1. Draw a line TS = 5 cm.

2. With T as a centre, draw an angle of 40°° using protractor. Name this angle as ∠∠XTS.

3. With T as a centre and 5 cm as radius, cut an arc on XT and name it as point N.

4. Join NS.

ΔNTS is the required triangle.



Practice Set 3 | Q 3 | Page 5

Draw triangle with the measures given below.

In ΔFUN, l(FU) = 5 cm, l(UN) = 4.6 cm, m∠U = 110°

Solution: Steps of construction:

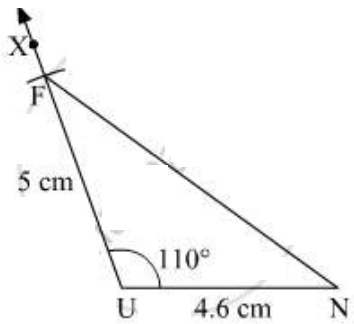
1. Draw a line UN = 4.6 cm

2. With U as centre, draw an angle of 110°° using the protractor. Name the angle thus formed as ∠∠XUN.

3. With U as centre and 5 cm radius, cut an arc on XU and name it as point F.

4. Join FN.

ΔFUN is the required triangle.



Practice Set 3 | Q 4 | Page 5

Draw triangle with the measures given below.

In ∆PRS, l(RS) = 5.5 cm, l(RP) = 4.2 cm, m ∠R = 90°

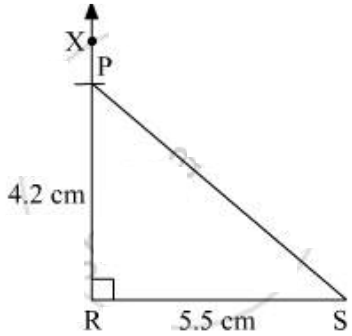
Solution: Steps of construction:

1. Draw a line RS = 5.5 cm.

2. With R as a centre, draw an angle of 90°° and name it as ∠XRS.

3. With R as a centre and 4.2 cm radius in compass, cut an arc on XR and name it P. Join PS.

∆PRS is the required triangle.



PRACTICE SET 4 [PAGE 6]

Practice Set 4 | Q 1 | Page 6

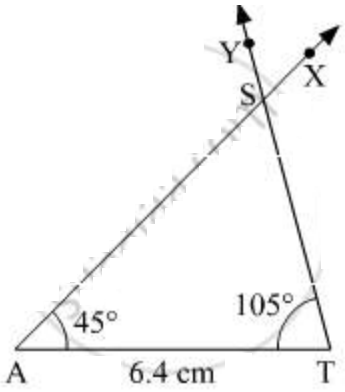
Construct a triangle of the measures given below.

In ∆SAT, l(AT) = 6.4 cm, m ∠A = 45°, m ∠T = 105°

Solution: Steps of construction:

1. Draw a line AT = 6.4 cm.
2. With A as a centre, draw ∠XAT = 45°°.
3. With T as a centre, draw ∠YTA = 105º.
4. Let YT and XA meet at point S.

∆SAT is the required triangle.



Practice Set 4 | Q 2 | Page 6

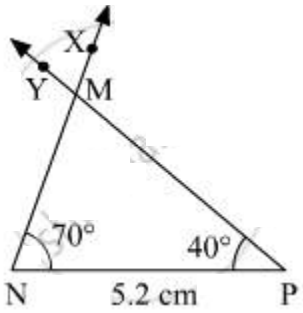
Construct a triangle of the measures given below.

In ∆MNP, l(NP) = 5.2 cm, m∠N = 70°, m ∠P = 40°

Solution: Steps of construction:

1. Draw a line NP = 5.2 cm.
2. With N as a centre, draw ∠XNP = 70°°.
3. With P as a centre, draw ∠YPN = 40º.
4. Let YP and XN meet at point M.

∆MNP is the required triangle.



Practice Set 4 | Q 3 | Page 6

Construct a triangle of the measures given below.

In ∆EFG, l(EG) = 6 cm, m∠F = 65°, m∠G = 45°

Solution: Using the angle sum property, we can find the third angle of the triangle FEG.

∠F + ∠E + ∠G = 180°

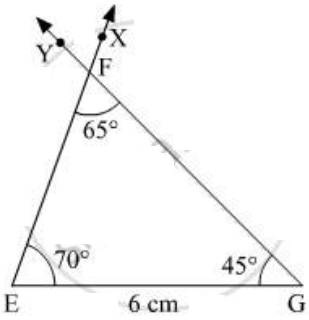
⇒ 65° + ∠E + 45° = 180°

⇒ ∠E = 70°

Steps of construction:

1. Draw a line EG = 6 cm.
2. With E as a centre, draw ∠XEG = 70°°.
3. With G as a centre, draw ∠YGE = 45º.
4. Let YG and XE meet at point F.

ΔFEG is the required triangle.



Practice Set 4 | Q 4 | Page 6

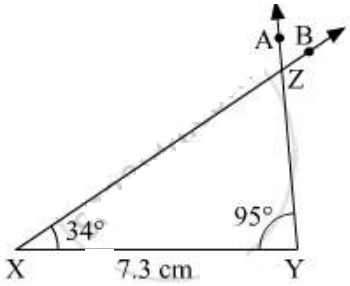
Construct a triangle of the measures given below.

In ΔXYZ, l(XY) = 7.3 cm, m∠X = 34°, m∠Y = 95°

Solution: Steps of construction:

1. Draw a line XY = 7.3 cm.
2. With X as a centre, draw ∠BXY = 34°°.
3. With Y as a centre, draw ∠AYX = 95º.
4. Let BX and AY meet at point Z.

ΔXYZ is the required triangle.



PRACTICE SET 5 [PAGE 6]

Practice Set 5 | Q 1 | Page 6

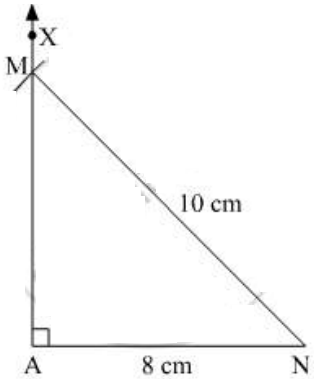
Construct a triangle of the measures given below.

In ∆MAN, m ∠MAN = 90°, l(AN) = 8 cm, l(MN) = 10 cm.

Solution: Steps of construction:

1. Draw a line AN = 8 cm.
2. With A as a centre, draw ∠XAN = 90º.
3. With N as the centre and 10 cm as radius, cut an arc on XA and name it as point M.
4. Join MN.

∆MAN is thus formed.



Practice Set 5 | Q 2 | Page 6

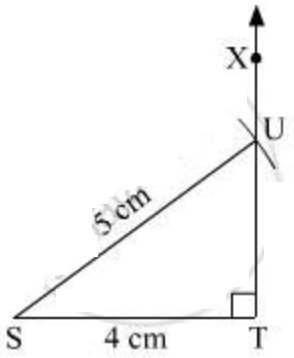
Construct a triangle of the measures given below.

In the right-angled ∆STU, hypotenuse SU = 5 cm and l(ST) = 4 cm.

Solution: Steps of construction:

1. Draw a line ST = 4 cm.
2. With T as a centre, draw ∠XTS = 90º.
3. With S as centre and 5 cm as radius, cut an arc on XT and name it as point U.
4. Join US.

∆UST is thus formed.



Practice Set 5 | Q 3 | Page 6

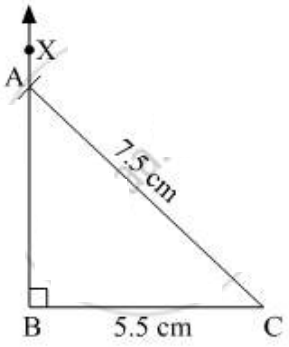
Construct a triangle of the measures given below.

In ΔABC, l(AC) = 7.5 cm, m ∠ABC = 90° , l(BC) = 5.5 cm.

Solution: Steps of construction:

1. Draw a line BC = 5.5 cm.
2. With B as a centre, draw ∠XBC = 90º.
3. With C as a centre and 7.5 cm as radius, cut an arc on XB and name it as point A.
4. Join AC.

ΔABC is thus formed.



Practice Set 5 | Q 4 | Page 6

Construct a triangle of the measures given below.

In ΔPQR, l(PQ) = 4.5 cm, l(PR) = 11.7 cm, m ∠PQR = 90°.

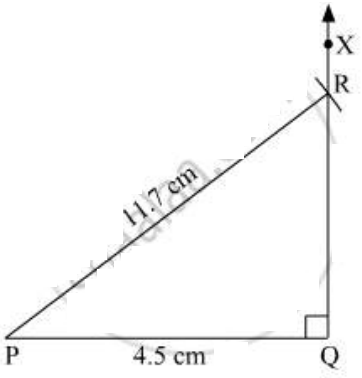
Solution: Steps of construction:

1. Draw a line PQ = 4.5 cm.
2. With Q as centre, draw ∠XQP = 90º.
3. With P as centre and 11.7 cm as radius, cut an arc on

XQ and name it as point R.

4. Join RP.

ΔPQR is thus formed.



Practice Set 5 | Q 5 | Page 6

Students should take examples of their own and practise the construction of triangles.

Solution: In ΔPQR, l(PR) = 8 cm, m ∠PQR = 90° , l(QR) = 6 cm.

Steps of construction:

1. Draw a line QR = 6 cm.

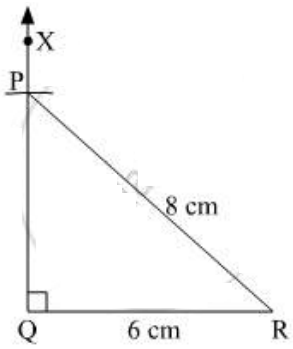
2. With Q as centre, draw ∠XQR = 90º.

3. With R as centre and 8 cm as radius, cut an arc on

XQ and name it as point P.

4. Join PR.

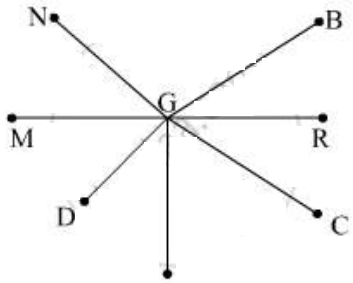
ΔPQR is thus formed.



PRACTICE SET 6 [PAGE 8]

Practice Set 6 | Q 1 | Page 8

Write the names of pairs of congruent line segments. (Use a divider to find them.)



Solution: (i) seg(MG) ≅ seg(GR)

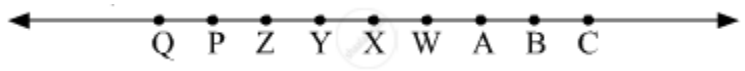
(ii) seg(MG) ≅ seg(NG)

(iii) seg(GC) ≅ seg(GB)

(iv) seg(GE) ≅ seg(GR)

Practice Set 6 | Q 2.1 | Page 8

On the line below, the distance between any two adjoining points shown on it is equal. Hence, fill in the blank.



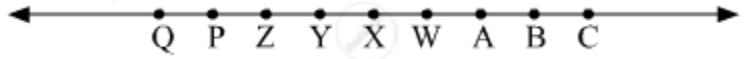
seg AB ≅ seg

Solution: Given that the distance between any two adjoining points shown on it is equal.

seg AB ≅ seg **WA**

Practice Set 6 | Q 2.2 | Page 8

On the line below, the distance between any two adjoining points shown on it is equal. Hence, fill in the blank.



seg AP ≅ seg _____

Solution: Given that the distance between any two adjoining points shown on it is equal.

seg AP ≅ seg **YC**

Practice Set 6 | Q 2.3 | Page 8

On the line below, the distance between any two adjoining points shown on it is equal. Hence, fill in the blank.

seg AC ≅ seg _____

Solution: Given that the distance between any two adjoining points shown on it is equal.

seg AC ≅ seg **PY**

Practice Set 6 | Q 2.4 | Page 8

On the line below, the distance between any two adjoining points shown on it is equal. Hence, fill in the blank.

seg _____ ≅ seg BY

Solution: Given that the distance between any two adjoining points shown on it is equal.

seg **PW** ≅ seg BY

Practice Set 6 | Q 2.5 | Page 8

On the line below, the distance between any two adjoining points shown on it is equal. Hence, fill in the blank.

seg _____ ≅ seg YQ

Solution: Given that the distance between any two adjoining points shown on it is equal.

seg **YA** ≅ seg BY

Practice Set 6 | Q 2.6 | Page 8

On the line below, the distance between any two adjoining points shown on it is equal. Hence, fill in the blank.

seg BW ≅ seg _____

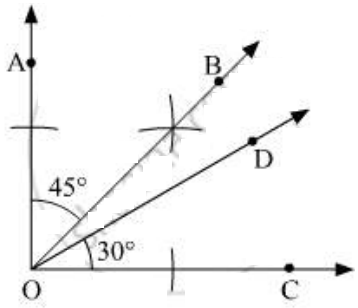
Solution: Given that the distance between any two adjoining points shown on it is equal.

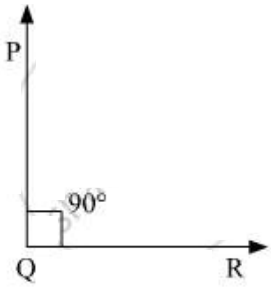
seg BW ≅ seg **ZQ**

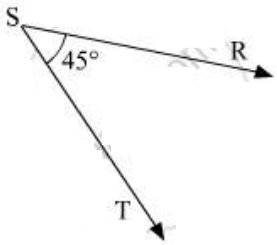
PRACTICE SET 7 [PAGE 10]

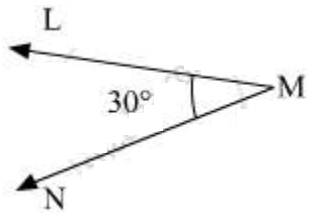
Practice Set 7 | Q 1 | Page 10

Some angles are given below. Using the symbol of congruence write the names of the pairs of congruent angles in these figures.









Solution: OB is the angle bisector of ∠AOC.

So, ∠AOB = ∠BOC = 45°

Thus, ∠AOB ≅ ∠BOC

Also, ∠AOB ≅ ∠SRT and ∠BOC ≅ ∠RST.

∠AOC = ∠PQR = 90°

∠ AOC ≅∠ PQR

$\angle DOC = \angle LMN = 30^o$

So, $\angle DOC \cong \angle LMN$