NCERT Solutions for Class 9 Maths Chapter 11: Here we have provided the NCERT Solutions for Class 9 Maths Chapter 11 on Constructions to help students in mastering this important topic. This chapter focuses on various geometric constructions, including the construction of angles, triangles, and the bisectors of angles and lines. T

By working through these solutions, students can enhance their skills in geometric drawing, develop precision in constructing shapes, and improve their problem-solving abilities. These solutions are designed to support students in achieving a thorough understanding of geometric constructions, which is crucial for performing well in exams and for applying geometric concepts in practical situations.

NCERT Solutions for Class 9 Maths Chapter 11 Constructions Overview

NCERT Solutions for Class 9 Maths Chapter 11 on Constructions have been prepared by subject experts from Physics Wallah.

The solutions are designed to simplify complex concepts and provide step-by-step guidance, ensuring a comprehensive understanding of each construction technique. With these expert-prepared solutions, students can confidently tackle construction problems, improve their geometric drawing skills, and enhance their overall performance in mathematics.

NCERT Solutions for Class 9 Maths Chapter 11 Constructions PDF

The PDF link for the NCERT Solutions for Class 9 Maths Chapter 11 Constructions is available below. This PDF includes detailed solutions to all the problems in the chapter, covering various geometric constructions such as angles, triangles, and bisectors.

By accessing this PDF, students can benefit from clear, step-by-step explanations and visual aids that will help them master the construction techniques essential for their exams.

[NCERT Solutions for Class 9 Maths Chapter 11 Constructions PDF]

NCERT Solutions for Class 9 Maths Chapter 11 Constructions

Below we have provided NCERT Solutions for Class 9 Maths Chapter 11 Constructions:

NCERT Solutions for Class 9 Maths Exercise 11.1 Exercise 11.1 Page: 191

1. Construct an angle of 90° at the initial point of a given ray and justify the construction.

Solution:

Construction Procedure:

To construct an angle 90°, follow the given steps:

1. Draw a ray OA.

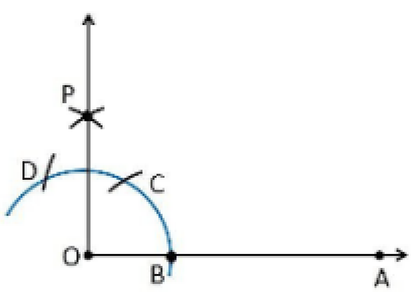
2. Take O as a centre with any radius, and draw an arc DCB that cuts OA at B.

3. With B as a centre with the same radius, mark a point C on the arc DCB.

4. With C as a centre and the same radius, mark a point D on the arc DCB.

5. Take C and D as the centres, and draw two arcs which intersect each other with the same radius at P.

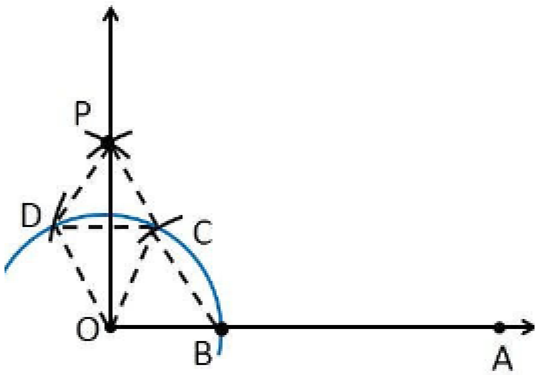
6. Finally, the ray OP is joined, which makes an angle of 90° with OA.



Justification

To prove $\angle POA = 90°$

In order to prove this, draw a dotted line from the point O to C and O to D, and the angles formed are:



From the construction, it is observed that

OB = BC = OC

Therefore, OBC is an equilateral triangle

So that, ∠BOC = 60°.

Similarly,

OD = DC = OC

Therefore, DOC is an equilateral triangle

So that, ∠DOC = 60°.

From SSS triangle congruence rule,

△OBC ≅ OCD

So, ∠BOC = ∠DOC [By C.P.C.T]

Therefore, ∠COP = ½ ∠DOC = ½ (60°).

∠COP = 30°

To find the ∠POA = 90°:

∠POA = ∠BOC+∠COP

∠POA = 60°+30°

∠POA = 90°

Hence, justified.

2. Construct an angle of 45° at the initial point of a given ray and justify the construction.

Solution:

Construction Procedure:

1. Draw a ray OA.

2. Take O as a centre with any radius, draw an arc DCB that cuts OA at B.

3. With B as a centre with the same radius, mark a point C on the arc DCB.

4. With C as a centre and the same radius, mark a point D on the arc DCB.

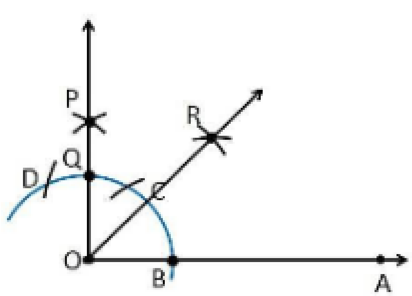
5. Take C and D as the centres, and draw two arcs which intersect each other with the same radius at P.

6. Finally, the ray OP is joined, which makes an angle of 90° with OA.

7. Take B and Q as the centres, and draw the perpendicular bisector which intersects at the point R

8. Draw a line that joins the points O and R

9. So, the angle formed ∠ROA = 45°



Justification

From the construction,

∠POA = 90°

The perpendicular bisector from points B and Q divides the ∠POA into two halves. So it becomes

∠ROA = ½ ∠POA

∠ROA = (½)×90° = 45°

Hence, justified

3. Construct the angles of the following measurements:

(i) 30° (ii) $22\frac{1}{2}^{\circ}$ (iii) 15°

Solution:

(i) 30°

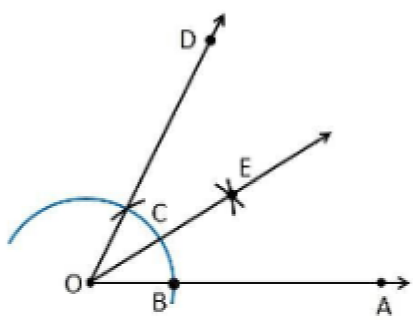
Construction Procedure:

1. Draw a ray OA

2. Take O as a centre with any radius, and draw an arc BC which cuts OA at B.

3. With B and C as centres, draw two arcs which intersect each other at point E, and the perpendicular bisector is drawn.

4. Thus, ∠EOA is the required angle making 30° with OA.



(ii) $22\frac{1}{2}^{\circ}$

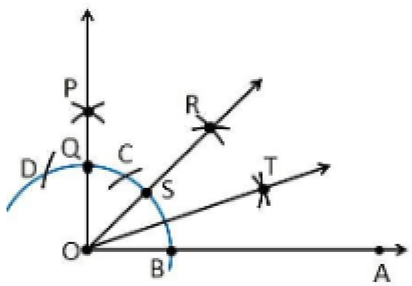
Construction Procedure:

1. Draw an angle ∠POA = 90°.

2. Take O as a centre with any radius, and draw an arc BC which cuts OA at B and OP at Q

3. Now, draw the bisector from points B and Q, where it intersects at the point R such that it makes an angle ∠ROA = 45°.

4. Again, ∠ROA is bisected such that ∠TOA is formed, which makes an angle of 22.5° with OA



(iii) 15°

Construction Procedure:

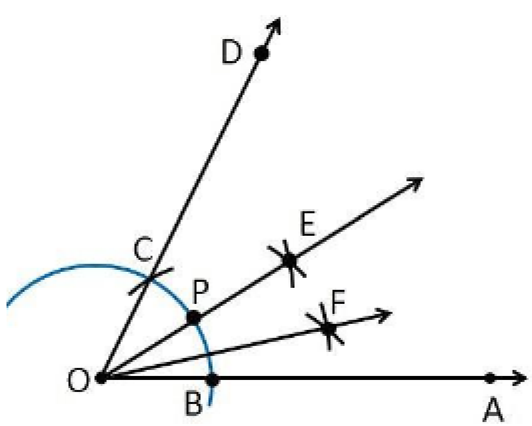
1. An angle ∠DOA = 60° is drawn.

2. Take O as the centre with any radius, and draw an arc BC which cuts OA at B and OD at C

3. Now, draw the bisector from points B and C, where it intersects at point E such that it makes an angle ∠EOA = 30°.

4. Again, ∠EOA is bisected such that ∠FOA is formed, which makes an angle of 15° with OA.

5. Thus, ∠FOA is the required angle making 15° with OA.



4. Construct the following angles and verify by measuring them with a protractor:

(i) 75° (ii) 105° (iii) 135°

Solution:

(i) 75°

Construction Procedure:

1. A ray OA is drawn.

2. With O as the centre, draw an arc of any radius and intersect at point B on the ray OA.

3. With B as the centre, draw an arc C, and with C as the centre, draw an arc D.

4. With D and C as the centres, draw an arc that intersects at point P.

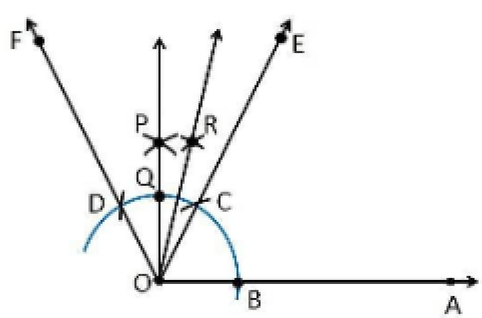
5. Join points O and P.

6. The point that the arc intersects the ray OP is taken as Q.

7. With Q and C as the centres, draw an arc that intersects at point R.

8. Join points O and R.

9. Thus, ∠AOE is the required angle making 75° with OA.



(ii) 105°

Construction Procedure:

1. A ray OA is drawn.

2. With O as the centre, draw an arc of any radius and intersect at point B on the ray OA.

3. With B as the centre, draw an arc C, and with C as the centre, draw an arc D.

4. With D and C as the centres, draw an arc that intersects at point P.

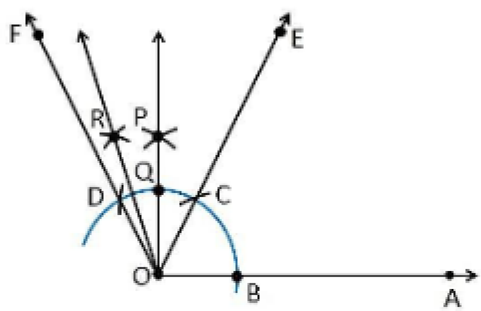
5. Join the points O and P

6. The point that the arc intersects the ray OP is taken as Q.

7. With Q and D as the centres, draw an arc that intersects at point R.

8. Join points O and R.

9. Thus, ∠AOR is the required angle making 105° with OA.



(iii) 135°

Construction Procedure:

1. Draw a line AOA'

2. Draw an arc of any radius that cuts the line AOA' at points B and B'

3. With B as the centre, draw an arc of the same radius at point C.

4. With C as the centre, draw an arc of the same radius at point D.

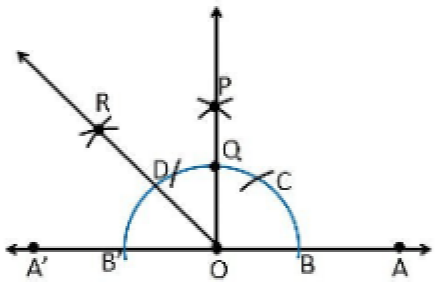
5. With D and C as the centres, draw an arc that intersects at point P.

6. Join OP.

7. The point that the arc intersects the ray OP is taken as Q, and it forms an angle of 90°.

8. With B' and Q as the centre, draw an arc that intersects at point R.

9. Thus, ∠AOR is the required angle making 135° with OA.



5. Construct an equilateral triangle, given its side and justify the construction.

Solution:

Construction Procedure:

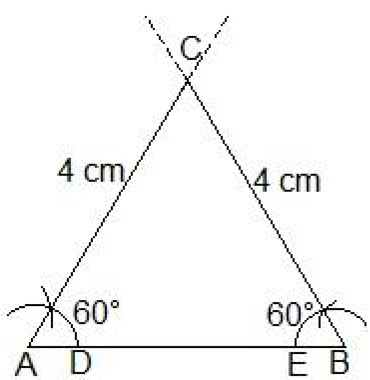
1. Let us draw a line segment AB = 4 cm.

2. With A and B as centres, draw two arcs on the line segment AB and note the point as D and E.

3. With D and E as centres, draw the arcs that cut the previous arc respectively that forms an angle of 60° each.

4. Now, draw the lines from A and B that are extended to meet each other at point C.

5. Therefore, ABC is the required triangle.



Justification:

From the construction, it is observed that,

AB = 4 cm, ∠A = 60° and ∠B = 60°

We know that the sum of the interior angles of a triangle is equal to 180°

$\angle A+\angle B+\angle C = 180°$

Substitute the values

$\Rightarrow 60°+60°+\angle C = 180°$

$\Rightarrow 120°+\angle C = 180°$

$\Rightarrow \angle C = 60°$

While measuring the sides, we get,

BC = CA = 4 cm (Sides opposite to equal angles are equal)

AB = BC = CA = 4 cm

$\angle A = \angle B = \angle C = 60°$

Hence, justified.

NCERT Solutions for Class 9 Maths Chapter 11 Exercise 11.2 Page: 195

1. Construct a triangle ABC in which BC = 7cm, $\angle B = 75°$ and AB+AC = 13 cm.

Solution:

Construction Procedure:

The steps to draw the triangle of the given measurement are as follows:

1. Draw a line segment of base BC = 7 cm.

2. Measure and draw $\angle B = 75°$ and draw the ray BX.

3. Take a compass and measure AB+AC = 13 cm.

4. With B as the centre, draw an arc at the point D.

5. Join DC.

6. Now draw the perpendicular bisector of the line DC, and the intersection point is taken as A.

7. Now join AC.

8. Therefore, ABC is the required triangle.

2. Construct a triangle ABC in which BC = 8cm, $\angle B = 45°$ and AB–AC = 3.5 cm.

Construction Procedure:

The steps to draw the triangle of the given measurement are as follows:

1. Draw a line segment of base BC = 8 cm

2. Measure and draw ∠B = 45° and draw the ray BX

3. Take a compass and measure AB-AC = 3.5 cm.

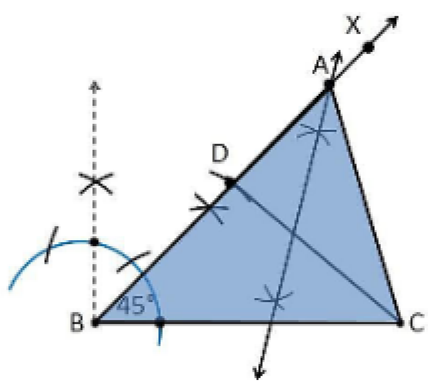
4. With B as the centre, draw an arc at point D on the ray BX.

5. Join DC.

6. Now draw the perpendicular bisector of the line CD, and the intersection point is taken as A.

7. Now join AC.

8. Therefore, ABC is the required triangle.



3. Construct a triangle PQR in which QR = 6cm, ∠Q = 60° and PR–PQ = 2cm.

Construction Procedure:

The steps to draw the triangle of the given measurement are as follows:

1. Draw a line segment of base QR = 6 cm

2. Measure and draw ∠Q = 60° and let the ray be QX.

3. Take a compass and measure PR–PQ = 2cm.

4. Since PR–PQ is negative, QD will be below the line QR.

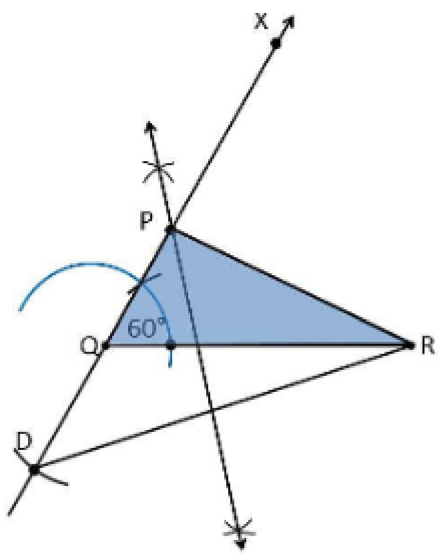
5. With Q as the centre, draw an arc at point D on the ray QX.

6. Join DR.

7. Now draw the perpendicular bisector of the line DR and the intersection point is taken as P.

8. Now join PR.

9. Therefore, PQR is the required triangle.



4. Construct a triangle XYZ in which ∠Y = 30°, ∠Z = 90° and XY+YZ+ZX = 11 cm.

Construction Procedure:

The steps to draw the triangle of the given measurement are as follows:

1. Draw a line segment AB which is equal to XY+YZ+ZX = 11 cm**.**

2. Make an angle ∠LAB = 30° from the point A.

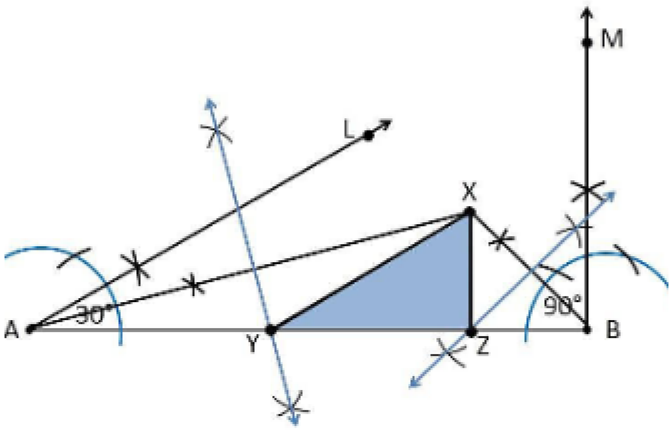
3. Make an angle ∠MBA = 90° from the point B.

4. Bisect ∠LAB and ∠MBA at point X.

5. Now, take the perpendicular bisectors of the lines XA and XB, and the intersection points are Y and Z, respectively.

6. Join XY and XZ.

7. Therefore, XYZ is the required triangle



5. Construct a right triangle whose base is 12cm and sum of its hypotenuse and other side is 18 cm.

Construction Procedure:

The steps to draw the triangle of the given measurement are as follows:

1. Draw a line segment of base BC = 12 cm

2. Measure and draw ∠B = 90° and draw the ray BX.

3. Take a compass and measure AB+AC = 18 cm.

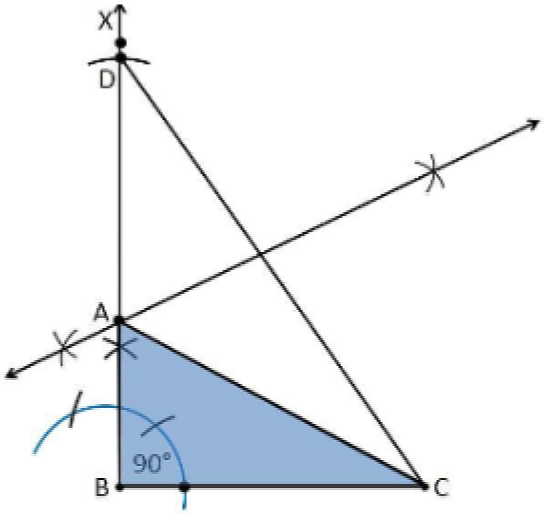
4. With B as the centre, draw an arc at point D on the ray BX.

5. Join DC.

6. Now draw the perpendicular bisector of the line CD, and the intersection point is taken as A.

7. Now join AC.

8. Therefore, ABC is the required triangle.



Benefits of NCERT Solutions for Class 9 Maths Chapter 11

- **Clear Understanding of Geometric Constructions**: The solutions provide step-by-step guidance on constructing various geometric shapes including angles, triangles and their bisectors. This clarity helps students grasp the methods and principles involved in geometric constructions.
- **Improved Problem-Solving Skills**: By working through the detailed solutions students enhance their problem-solving abilities learning how to apply geometric principles to solve complex problems.
- **Visual Learning**: The solutions include diagrams and visual aids that make it easier for students to understand and remember the construction processes. This visual approach supports better retention of concepts.
- **Practice with Precision**: The solutions allow students to practice constructing accurate geometric figures, which is crucial for exams and practical applications.
- **Preparation for Exams**: With comprehensive solutions to all the problems in the chapter, students can effectively prepare for exams, ensuring they are well-versed in the techniques required for geometric constructions.
- **Error Correction**: The solutions help identify and correct common mistakes, providing students with the opportunity to learn from errors and improve their accuracy in geometric constructions.