RS Aggarwal Solutions for Class 10 Maths Chapter 13 Exercise 13.1: RS Aggarwal Solutions for Class 10 Maths Chapter 13 Exercise 13.1 Constructions, is written by the Physics Wallah academic team. We have already prepared answers for every exercise in this chapter.

Here are the detailed answers to every question found in the RS Aggarwal Solutions for Class 10 Maths Chapter 13 Exercise 13.1 Constructions. You are now familiar with the chapter's formula. Physics Wallah has produced detailed notes, extra problems, and brief explanations of each maths formula for class 10 maths. On Physics Wallah, you can find RS Aggarwal Solutions for Class 10 Maths Chapter 13 Exercise 13.1 Constructions for every topic in PDF format.

RS Aggarwal Solutions for Class 10 Maths Chapter 13 Exercise 13.1 Overview

RS Aggarwal Solutions for Class 10 Maths Chapter 13 Exercise 13.1 focus on geometric constructions, an essential aspect of mathematics that involves creating various shapes and figures using basic tools such as a compass and straightedge. This exercise is meticulously structured to help students grasp the fundamentals of constructions through clear, step-by-step instructions.

Each construction problem in this chapter is carefully explained to ensure comprehension and proficiency. Students learn to perform constructions such as bisecting a line segment, constructing angles of specific measures, and drawing tangents to circles. These skills not only strengthen their understanding of geometric principles but also prepare them for more advanced mathematical concepts.

The solutions provided by RS Aggarwal guide students through the construction process, emphasizing precision and logical reasoning. They include practical tips and alternative methods where applicable, enriching the learning experience. Additionally, the exercises cover a diverse range of constructions, from basic to intermediate levels, catering to different learning needs and abilities.

What is Construction?

Construction in geometry refers to precisely sketching forms, angles, or lines. All that is needed for these constructions is a pencil, a straightedge (a ruler), and a compass. Because it is the “pure” form of geometric construction, numbers are not used in it.

Types of Geometric Constructions

The six fundamental building blocks are: copy an angle, duplicate a line segment, generate an angle bisector, generate a perpendicular line through a specified point, and generate parallel lines.

- An angle bisector is a line that precisely divides an angle in half, always passing through the vertex (or corner point). These cuts are crucial for resolving geometrical issues.
- By drawing lines precisely perpendicular to each side of the original shape, one can use a perpendicular bisector to generate a new quadrilateral from another.
- A line that originates outside of a circle and only ever reaches the plane, or flat surface, of the circle at one precise location is called a tangent. The contact point is the name given to this meeting place.
- Parallel lines are two lines that never cross and always remain the same distance apart on a single flat surface, or plane.
- Replicate an Angle: creating a new angle in a different place that is the same size (measure) as an existing angle.
- Cutting an angle in half is the process of dividing it into two identically sized pieces.

RS Aggarwal Solutions for Class 10 Maths Chapter 13 Exercise 13.1

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 13 Exercise 13.1 for the ease of the students –

Q. Construct a $\triangle ABC$ in which $AB = 5.8\ cm, \angle B = 60^o$ and $BC + CA = 8.4\ cm$. Justify your construction.

› of Construction:

›nstruct $AB = 5.8\,cm$

›struct $\angle ABX = 60^o$

› BX, cut the line segment BD which is equal to $BC + CA = 8.4$

the point AD

.›nstruct a perpendicular bisector of AD which meets BD at the point C

›rder to obtain the required triangle ABC join AC

›tification:

We know that C lies on AD which is the perpendicular bisector

So we get

CD

We know that $BD = 8.4\,cm$

an be written as

$CD = 8.4\,cm$

We know that $BD = 8.4\,cm$

It can be written as

$BC + CD = 8.4\,cm$

So we get

$BC + CA = 8.4\,cm$

Therefore, $\triangle ABC$ is the required triangle.

Q. Construct each of the following angles, using ruler and compasses:

105^o

Solution

Step of construction

Construct a line segment PQ

Considering P as centre and any radius, construct an arc which intersects PQ

at the point R

Considering R as centre and same radius, construct and arc which intersects

the previous arc at the point S

Considering S as centre and same radius, construct and arc which intersects

the arc in step 2 at the point T

Considering T and S as centre and radius more than half of TS, construct arcs

which intersects each other at point U

Join PU which intersects the arc in step 2 at point V

Join PU which intersects the arc in step 2 at point V

Considering T and V as centres and radius more than half of TV, construct arc

intersecting in each other the point W

Join PW which is makes 105^o with the ray PQ

Therefore, we know that $\angle WPQ = 105^o$.

Q. Draw an angle of 80^o with the help of a protractor and bisect it. Measure each part of the bisected angle.

Solution

Steps of construction:

Construct a ray OB

Using the protractor construct $\angle AOB$ of 80^o

Considering O as centre and convenient radius construct an arc cutting the

sides OA and OB at the points Q and P

Considering Q as centre and radius more than half of the angle PQ, construct

an arc

Considering P as the centre and radius more than half of the angle PQ,

construct another arc which intersects the previous arc at the point R

Join the points OR and produce it in order to from a ray OX

Therefore, OX is the bisects of the $\angle AOB$

So the measure of each parts of the bisected angle is $\angle AOX = \angle BOX = 40^o$

Q. Draw a line segment $AB = 5.6\ cm$ and draw its perpendicular bisector. Measure the length of each part.

Solution

Steps of construction:

Construct a line segment $AB = 5.6\ cm$

Considering A as centre and radius more than half of line segment AB, draw

two arcs on the each side of the line segment AB

Considering B as centre and radius more than half of line segment AB, draw

arcs which cuts the previous arcs at the point P and Q

Join the points PQ such that it intersects the line segment AB at the point M

Therefore, PQ is the perpendicular bisector of the line segment AB.

So the length of each part is $AM = BM = 2.8\ cm$

Q. Construct an angle of 90^o using ruler and compasses and bisect it.

Solution

step of Construction:

Construct a line segment OA

Considering O as centre and suitable radius construct an arc cutting the line

OA at the point B

Considering B as a centre and suitable radius as before constructing an arc to

cut the previous arc at the point C

Considering C as centre and same radius cut the arc at the point D

Considering C as a centre and the radius more than half of CD construct an

arc

Considering D as a centre and same radius construct another arc to cut the

previous arc at the point E

Join E so we get $\angle AOE = 90^o$

Considering B as centre and radius more than half of CBconstruct and arc

Considering C as the centre and same radius construct an arc with cuts the

previous arc at the point F

Join OF

Therefore, F is the bisector of the right $\angle AOE$.

Q. Construct a $\triangle ABC$ in which $BC = 6\ cm, \angle B = 30^o$ and $AB - AC = 3.5\ cm$. Justify your construction.

Solution

Step of Construction:

Construct $BC = 6\ cm$

Construct $\angle CBX = 30^o$

From BX, cut the line segment BD which is equal to $AB - AC = 3.5\ cm$

Join the point CD

Construct a perpendicular bisector of CD which meets BX at the point A

In order to obtain the required triangle ABC join CA

Justification:

We know that A lies on CD which is the perpendicular bisector

So we get

$AD = AC$

We know that $BD = 3.5\ cm$

It can be written as

$AB - AD = 3.5\ cm$

So we get

$AB - AC = 3.5\ cm$

Therefore, $\triangle ABC$ is the required triangle.

Q. Construct a $\triangle ABC$ in which $BC = 4.5\ cm, \angle B = 45^o$ and $AB + AC = 8\ cm$. Justify your construction.

Solution

Step of Construction:

Construct a line $BC = 4.5\ cm$

Construct $\angle CBX = 45^o$

From BX, cut the line segment BD which is equal to $AB + AC = 8$

Join the point CD

Construct a perpendicular bisector of CD which meets BD at the point A

In order to obtain the required triangle ABC join CA

Justification:

We know that A lies on CD which is the perpendicular bisector

So we get

$AC = AD$

Q. Construct an equilateral triangle, each of whose altitude measures $5.4\ cm$. Measure each of its sides.

Solution

Construct a line XY

Make a point P on the line XY

From the point P, construct PQ perpendicular to XY

From the point P make the point $PA = 5.4\ cm$, which cuts the line PQ at the point A

Draw $\angle PAB = 30^o$ and $\angle PAC = 30^o$ which meets the line XY at the points B and C

Therefore, ABC is the required equilateral triangle

Q. Construct each of the following angles, using ruler and compasses:

135^o

olution

Step of construction

onstruct a line segment AB and produce MA to C

Considering A as centre and any radius, construct and arc which intersecting

AC at the point D and AB at point E

Considering D and E as centre and same radius more than half DE, construct

Two arch intersecting each other at the point F

Join the points FA which intersects the arc in step 2 at point G

Considering G and D as centre and radius more than half of GD construct two

arcs intersecting each other at the point H

Join HA

herefore, we know that $\angle HAB = 135^o$

Q. Construct a $\triangle ABC$ in which $BC = 4.8\ cm, \angle B = 45^o$ and $\angle C = 75^o$. Measure $\angle A$.

of Construction:

Construct line segment $BC = 4.8\ cm$

Considering B as centre and any radius, construct an arc which intersects BC

at pint P

Considering P as centre same radius, construct an arc which intersects the

previous arc at the point Q

Considering Q as centre same radius, construct an arc which intersects the ar

in step 2 at the point R

Considering R and Q as centre and radius more than half of RQ, construct

tersecting each other at the point S

ntersects the arc in step 2 at the point G so $\angle SBC = 90^o$

Considering P as centre and radius more than half of PG, construct an arc

Considering G as centre and same radius, construct an arc which intersects the

previous arc at the point X

Join B and extend it so $\angle B = 45^o$

Draw $\angle TCB = 90^o$

Considering M and H as centres and radius more than half of MH, construct

arcs which intersect each other at point y

Join CY and extend it so $\angle C = 75^o$

BX and is the required at point after extending

So $\triangle ABC$ is the required triangle

Therefore, $\angle A = 60^o$

Q. Construct a $\triangle ABC$ in which $BC = 5\ cm, AB = 3.8\ cm$ and $AC = 2.6\ cm$. Bisect the largest angle of this triangle.

Solution

Step of Construction:

Construct line segment $AC = 2.5\ cm$

Considering A as centre and radius $3.8\ cm$ construct an arc

Considering C as centre and radius $5\ cm$ construct an arc which intersects the

previous arc at the point B

Join the point AB and BC

So we get $\triangle ABC$

From the figure we know that BC is the largest side of the triangle

$BC = 5\ cm$

We know that $\angle A$ is the largest angle

Considering A as centre and any radius, construct and arc which intersects AB

at point P and AC at point Q

We know that $\angle A$ is the largest angle

Considering A as centre and any radius, construct and arc which intersects AB

at point P and AC at point Q

Considering P as centre and radius more than half of PQ, construct an arc

Considering Q as centre and same radius, construct an arc intersecting the

previous arc at the point R

Join AR and extend it

Therefore, $\angle A$ is bisected by the ray AR.

Q. Construct a $\triangle ABC$ in which $\angle A = 45^\circ$, $\angle C = 60^\circ$ and the perpendicular from the vertex A to base BC is 4.5 cm.

Solution

Step of Construction:
Construct a line XY

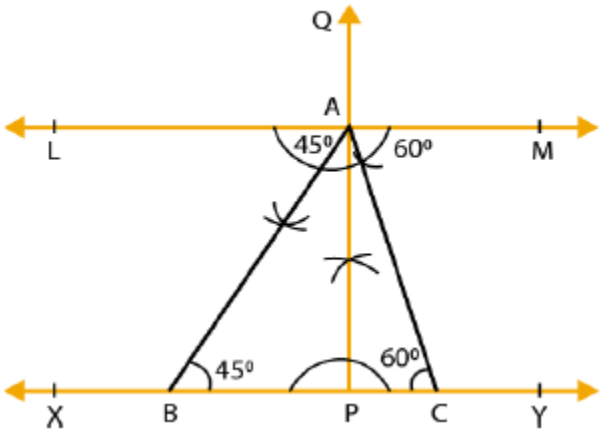
Considering a point P on the line XY and draw PQ perpendicular to the line XY

Along with PQ set off PA = 4.5 cm

From the point A, construct LM parallel to XY

Draw ∠LAB = 45° and ∠MAAC = 60° which meets the line XY at the points B and C

Therefore, △ABC is the required



Q. Construct a right triangle whose one side is 3.5 cm and the sum of the other side and the hypotenuse is 5.5 cm.

Solution

Step of Construction:

Construct BC = 3.5 cm

Construct $\angle CBX = 90^\circ$

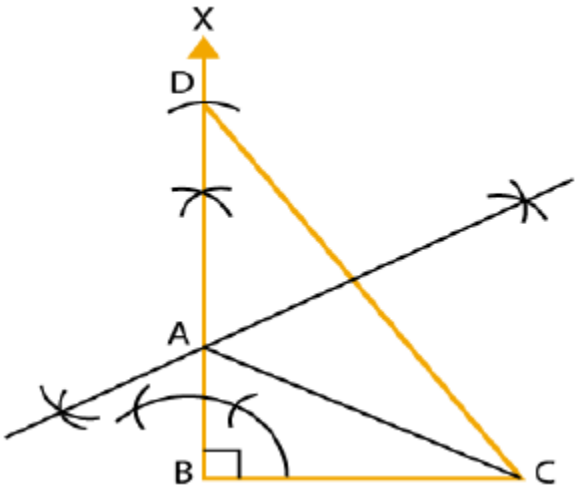
From BX cut off line segment BD = AB + AC = 5.5 cm

Join the points CD

Construct the perpendicular bisector of CD which meets the line BD at point A

Join AC

Therefore, $\triangle ABC$ is the required triangle.



Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 13 Exercise 13.1

RS Aggarwal Solutions for Class 10 Maths Chapter 13 Exercise 13.1 on constructions offer several benefits:

Structured Approach: The solutions provide a structured approach to understanding and mastering geometric constructions. They follow a step-by-step methodical process, making it easier for students to grasp the concepts.

Clarity and Explanation: Each construction is explained clearly with detailed steps. This helps students understand the rationale behind each step and how it contributes to the final geometric figure.

Practice and Mastery: By solving problems using RS Aggarwal Solutions, students get ample practice in geometric constructions. This practice is crucial for mastering the skills required for constructing various geometric shapes and figures.

Variety of Constructions: The exercises cover a wide range of constructions, including basic constructions like bisecting a line segment or drawing tangents, as well as more complex constructions involving circles and triangles. This variety ensures that students are well-prepared for any construction-related questions.

Supplementary Learning: Apart from the textbook exercises, RS Aggarwal Solutions often include additional tips, notes, or alternative methods for certain constructions. This supplementary information enhances understanding and offers alternative approaches to problem-solving.