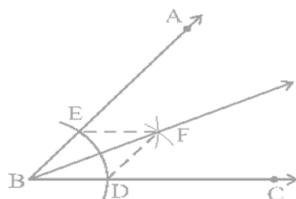


A. Introduction

B. Basic Constructions

Construction-A : To construct the bisector of a given angle.

Given an angle ABC.

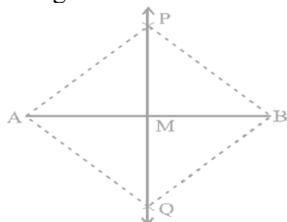


Steps for construction:

- Taking B as centre and any radius, draw an arc to intersect the rays BA and BC, say at E and D respectively.
- Next, taking D and E as centres and with the radius more than half of DE, draw arcs to intersect each other, say at F.
- Draw the ray BF. This ray BF is the required bisector of the angle ABC.

Construction-B : To construct the perpendicular bisector of a given line segment.

Given a line segment AB.



Steps for construction:

- Taking A and B as centres and radius more than half of AB, draw arcs on both sides of the line segment AB (to intersect each other).
- Let these arcs intersect each other at P and Q. Join PQ.
- Let PQ intersect AB at the point M. Then line PMQ is the required perpendicular bisector of AB.

Construction-C : To construct an angle of 60° at the initial point of a given ray.

Given a ray AB.

Steps for construction:

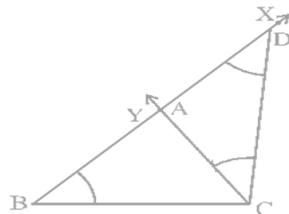
- Taking A as centre and some radius, draw an arc of a circle, which intersects AB, say at a point D.
- Taking D as centre and with the same radius as before, draw an arc intersecting the previously drawn arc, say at a point E.
- Draw the ray AC passing through E. Then $\angle CAB$ is the required angle of 60° .

C. Some Constructions of Triangles

-- A triangle is unique if : (i) two sides and the included angle is given, (ii) three sides are given, (iii) two angles and the included side is given and, (iv) in a right triangle, hypotenuse and one side is given.

Construction-D : To construct a triangle, given its base, a base angle and sum of other two sides.

Given the base BC, a base angle, say $\angle B$ and the sum $AB + AC$ of the other two sides of a triangle ABC.



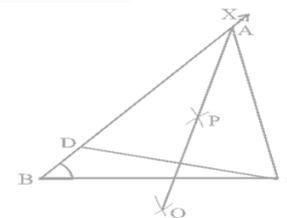
Steps for construction:

- Draw the base BC and at the point B make an angle, say $\angle B$ equal to the given angle.
- Cut a line segment BD equal to $AB + AC$ from ray BX.
- Join DC and make an angle $\angle DCY$ equal to $\angle BDC$.
- Let CY intersect BX at A. Then, ABC is the required triangle.

Construction-E : To construct a triangle given its base, a base angle and the difference of the other two sides.

Given the base BC, a base angle, say $\angle B$ and the difference of other two sides $AB - AC$ or $AC - AB$.

Steps for construction:



Case-(I) : Let $AB > AC$ that is $AB - AC$ is given.

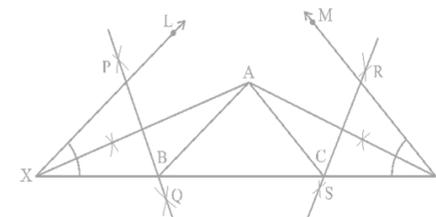
- Draw the base BC and at point B make an angle say $\angle B$ equal to the given angle.
- Cut the line segment BD equal to $AB - AC$ from ray BX.
- Join DC and draw perpendicular bisector, say PQ of DC.
- Let it intersect BX at a point A. Join AC. Then ABC is the required triangle.

Case (II) : To do taking $AB < AC$ that is $AC - AB$ as given.

Construction-F : To construct a triangle, given its perimeter and its two base angles.

Given the base angles, say $\angle B$ and $\angle C$ and $BC + CA + AB$.

Steps for construction:



- Draw a line segment, say XY equal to $BC + CA + AB$.
- Make angles $\angle LX Y$ equal to $\angle B$ and $\angle MY X$ equal to $\angle C$.
- Bisect $\angle LX Y$ and $\angle MY X$. Let these bisectors intersect at a point A.
- Draw perpendicular bisectors PQ of AX and RS of AY.
- Let PQ intersect XY at B and RS intersect XY at C. Join AB and AC. Then ABC is the required triangle.