

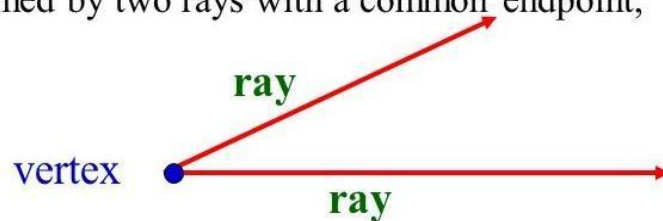
Lines and Angles

Recap Geometrical Terms

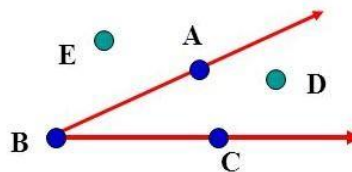
Point		An exact location on a plane is called a point.
Line		A straight path on a plane, extending in both directions with no endpoints, is called a line.
Line segment		A part of a line that has two endpoints and thus has a definite length is called a line segment.
Ray		A line segment extended indefinitely in one direction is called a ray.

Angle and Points

- An Angle is a figure formed by two rays with a common endpoint, called the **vertex**.

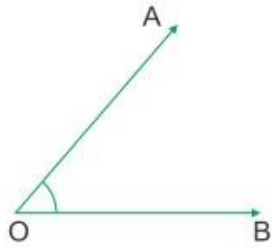
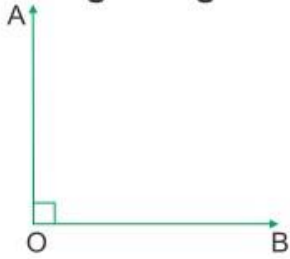
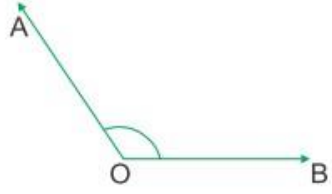
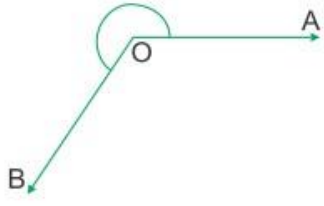


- Angles can have points in the interior, in the exterior or on the angle.

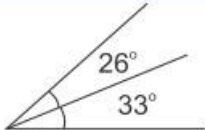
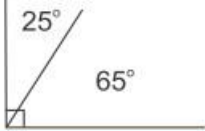
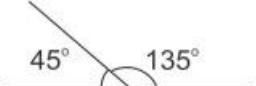
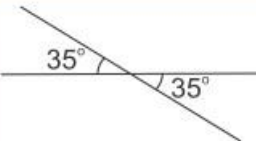


Points A, B and C are on the angle. D is in the interior and E is in the exterior. B is the vertex.

Types of Angles

Acute Angle  $0^\circ < \text{Measure} < 90^\circ$	Right Angle  $\text{Measure} = 90^\circ$	Obtuse Angle  $90^\circ < \text{Measure} < 180^\circ$
Straight Angle  $\text{Measure} = 180^\circ$	Reflex Angle  $180^\circ < \text{Measure} < 360^\circ$	Complete Angle  $\text{Measure} = 360^\circ$

Pair of Angles

	Adjacent Angles - a common vertex and arm - other arms lie on opposite sides of the common arm
	Complementary Angles - sum of measures of two angles is 90° - each angle is called a complement of the other
	Supplementary Angles - sum of measures of two angles is 180° - each angle is called a supplement of the other
	Vertically Opposite Angles angles formed by two intersecting lines having no common arm

Angles Made by Transversal

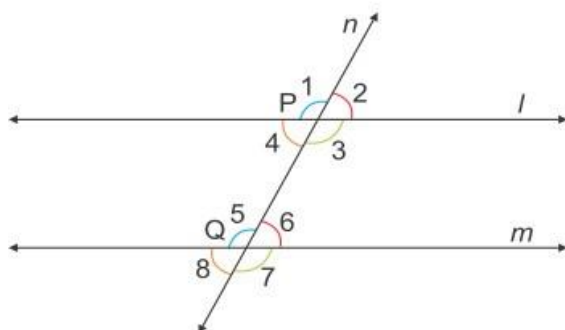
Transversal: A line intersecting two or more given lines in a plane at different points.

	Exterior Angles: Outside of the lines l and m. $\angle 1, \angle 2, \angle 7, \angle 8$ Interior Angles: Inside of the lines l and m. $\angle 3, \angle 4, \angle 5, \angle 6$
	Corresponding Angles: Pairs of angles that are at the same position at each intersection on the same side of the transversal. $\angle 1$ and $\angle 5, \angle 2$ and $\angle 6, \angle 3$ and $\angle 7, \angle 4$ and $\angle 8$
	Alternate Exterior Angles: Pairs of angles on opposite sides of the transversal but outside the two lines l and m. $\angle 1$ and $\angle 7, \angle 2$ and $\angle 8$ Alternate Interior Angles: Pairs of angles on opposite sides of the transversal but inside the two lines l and m. $\angle 4$ and $\angle 6, \angle 3$ and $\angle 5$

Conditions for Parallel Lines

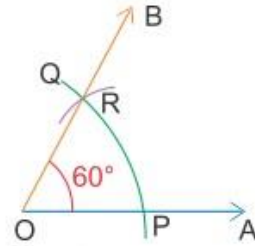
Lines l and m are parallel if any of the following is true:

- Pairs of **alternate angles** are equal.
 $\angle 3 = \angle 5, \angle 1 = \angle 7$
- Pairs of **corresponding angles** are equal.
 $\angle 2 = \angle 6, \angle 4 = \angle 8$
- The sum of the **interior (or exterior) angles** on the same side of the transversal is 180° .
 $\angle 3 + \angle 6 = 180^\circ$ or
 $\angle 1 + \angle 8 = 180^\circ$



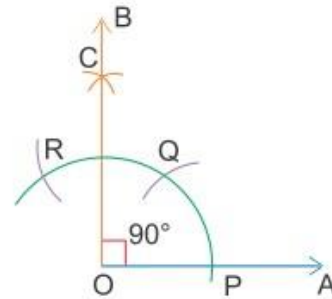
Constructions of Specific Angles

- Draw a ray OA
- Using a compass, with O as centre and any radius draw an arc PQ which cuts OA at P
- With P as centre and same radius draw an arc to cut the arc PQ at R
- Join OR and produce it to form the ray OB
- The $\angle AOB$ thus formed measures 60°



Note: To get angle of 30° , follow the above steps and then draw a angle bisector.

- Draw a ray OA
- With O as centre and any radius draw an arc which cuts OA at P
- With P as centre and same radius draw an arc to cut the arc in step (ii) at Q
- With Q as centre and same radius as in step (ii) draw an arc to cut the arc in step (ii) at R
- With Q as centre and same radius draw an arc
- With R as centre and same radius draw an arc, to cut the arc in Step (v) at C
- Join OC and produce it to B
- The $\angle AOB$ thus formed measures 90°



Note: To get angle of 45° , follow the above steps and then draw a angle bisector
To get angle 120° , follow steps (i) to (iv) above, and join OR and produce it to B.

Constructions

Drawing a Perpendicular Bisector

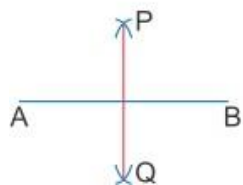
- Draw a line segment AB of given length by using a scale



- With A as centre and radius more than half of AB, draw arcs on each side of AB



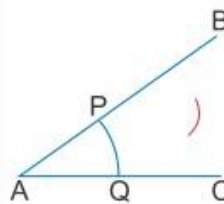
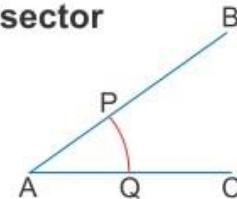
- With B as centre and same radius, repeat step (ii)



- Join line segment PQ, which is a perpendicular bisector to AB

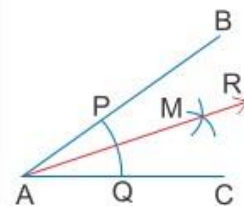
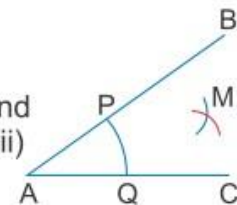
Drawing an Angle Bisector

- With A as centre and any radius, draw an arc cutting AB at P and AC at Q



- With P as centre and radius more than half of PQ, draw an arc

- With Q as centre and same radius repeat step (ii)



- Join AM and produce it to AR. The ray AR is bisector of $\angle BAC$