

LINES AND ANGLES



POINT, LINE, AND ANGLE

Point: A point represents the exact location of an object. It is the basic unit of geometry. It is represented by a dot. It is named using capital English alphabets. E.g.:

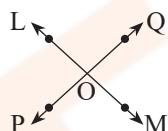
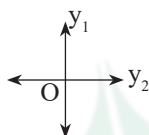
• A

⇒ This Is a Point A

Line: A line is a collection of points going on endlessly in both directions along a straight path. The symbol of a line is:



If two lines meet each other at a point they are called intersecting lines. Two intersecting lines have a common point.



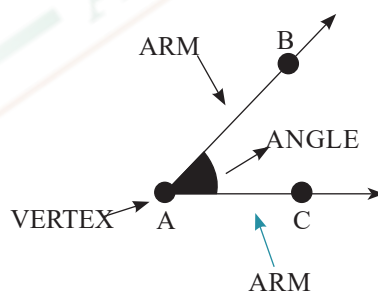
Intersecting lines



Parallel Lines

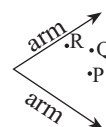
If two or more lines do not meet each other no matter how far they are extended, they are called parallel lines. For example: opposite edges of a book, table, ruler, etc. are good examples of parallel lines.

Angle: An angle is formed when two rays meet at a common point called the vertex. Each of these rays is called a side of the angle. An angle is represented by the symbol $\angle$.



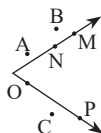
In the above figure, $\overrightarrow{QR}$ and $\overrightarrow{QP}$ in the figure meet at vertex Q to form an angle PQR. We write it as $\angle PQR$ or $\angle RQP$ or $\angle Q$. An angle can also be formed by the intersection of a line segment.

- Interior of an angle: The space generated within the arms of an angle when they are extended to infinity is called the interior of the angle. In the figure, the points P, Q and R are shown to be in the interior of the angle.



The points P, Q and R all lie in the interior of the angle formed by the two arms.

- **Exterior of the angle:** The space outside the arms of an angle, which continues to infinity, is called the exterior of the angle. Points A, B and C lie in the exterior of the angle shown in the figure.

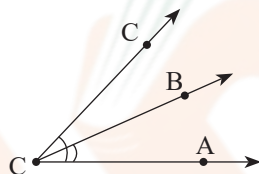


Here the points M, N, O and P are points located on the angle i.e. on the arms, hence they are part of the angle.

TYPES OF ANGLES

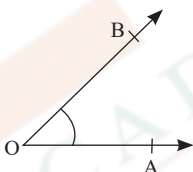
Adjacent Angles: Two angles which have a common side, a common vertex and lie on either side of the common side are called adjacent angles.

In the figure, $\angle AOB$ and $\angle BOC$ are adjacent angles because they have a common side, a common vertex O and both the angles AOB and BOC lie on either side of the common side $\overrightarrow{OB}$. The two angles are different angles and no part of $\angle AOB$ is a part of $\angle BOC$.



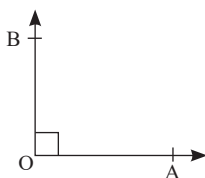
Adjacent Angles

Acute angle: An angle which is greater than zero and smaller than a right angle is called an acute angle. i.e., $90^\circ > \text{acute angle} > 0^\circ$



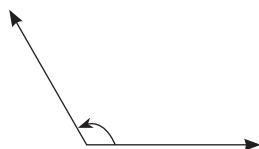
Acute angle

Right angle: An angle whose measure is equal to 90° is called a right angle. In the following figure represents a right angle.



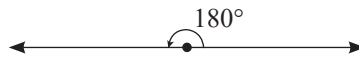
Right angle

Obtuse angle: An angle which is greater than a right angle but smaller than a straight angle is called an obtuse angle. i.e., $90^\circ < \text{obtuse angle} < \text{straight angle}$



Obtuse angle

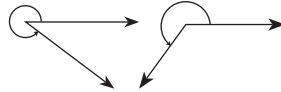
Straight angle: The angle whose measure is 180° is called a straight angle.



Straight angle

Obtuse angle: An angle which is greater than a straight angle but smaller than a complete angle (360°) is called an obtuse angle.

i.e., $180^\circ < \text{obtuse angle} < 360^\circ$



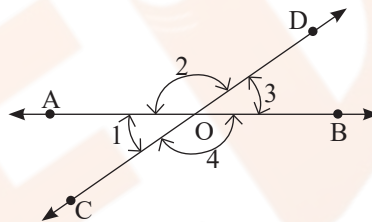
Obtuse angle

Complete angle: If a ray coincides with its initial position after completing one rotation around its starting point, then the angle thus formed is called a complete angle.



Complete angle

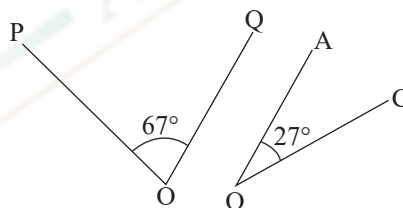
Vertically Opposite Angles: The two angles formed by two intersecting lines having no common side are called vertically opposite angles.



Vertically Opposite Angles

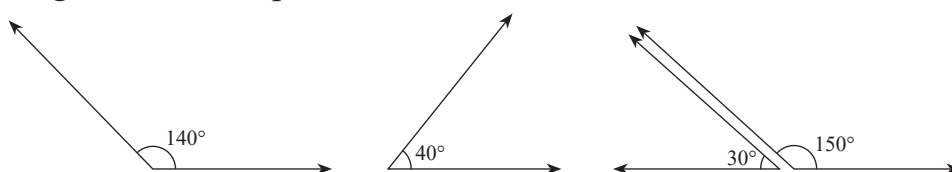
In the above figure, $\angle 1$ and $\angle 3$ are vertically opposite angles.

Complementary angles: If the sum of two angles is 90° then such angles are called complementary angles. For example: 40° and 50° , 30° and 60° , etc.



Complementary angles

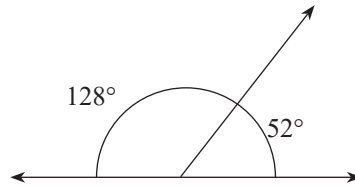
Supplementary angles: If the sum of two angles is equal to 180° then such angles are called supplementary angles. For example – 40° and 140° and 30° and 150° .



Supplementary angles

In the above figure, the sum of the two angles is equal to 180° , so these two angles are called supplementary to each other.

Linear pair angles: If the sum of two adjacent angles is 180° , then such a pair of corners is called a linear pair angle.



Linear pair angles

In the above attached picture, the sum of the two angles is 180° and both are adjacent angles, so we can call them linear pair angles.

