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CLASS – 9

MATHEMATICS

Chapter – 6

Lines and Angles

Part – 1

Lines and Angles

Vikas Saini

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OVERVIEW

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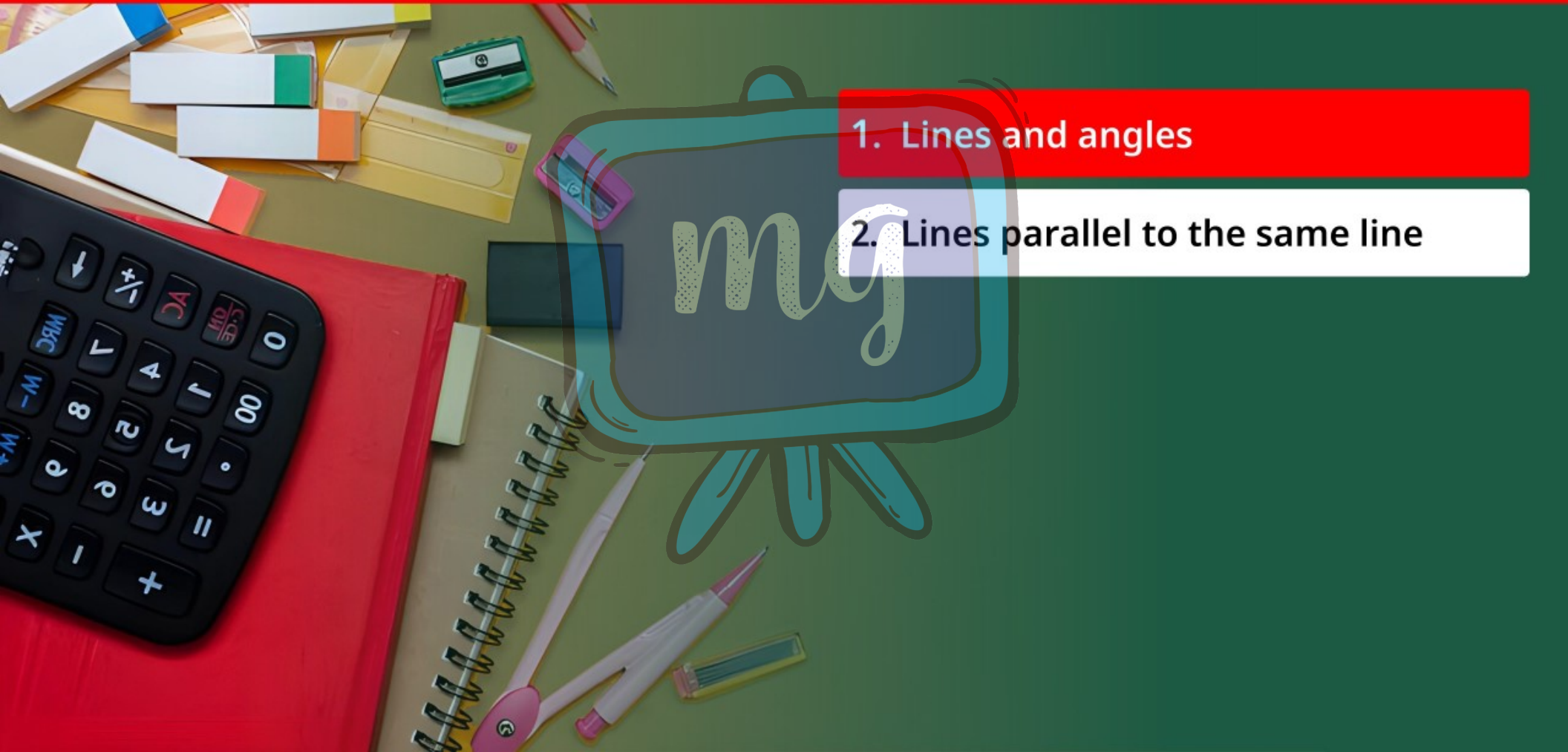

1. Lines and angles
2. Lines parallel to the same line

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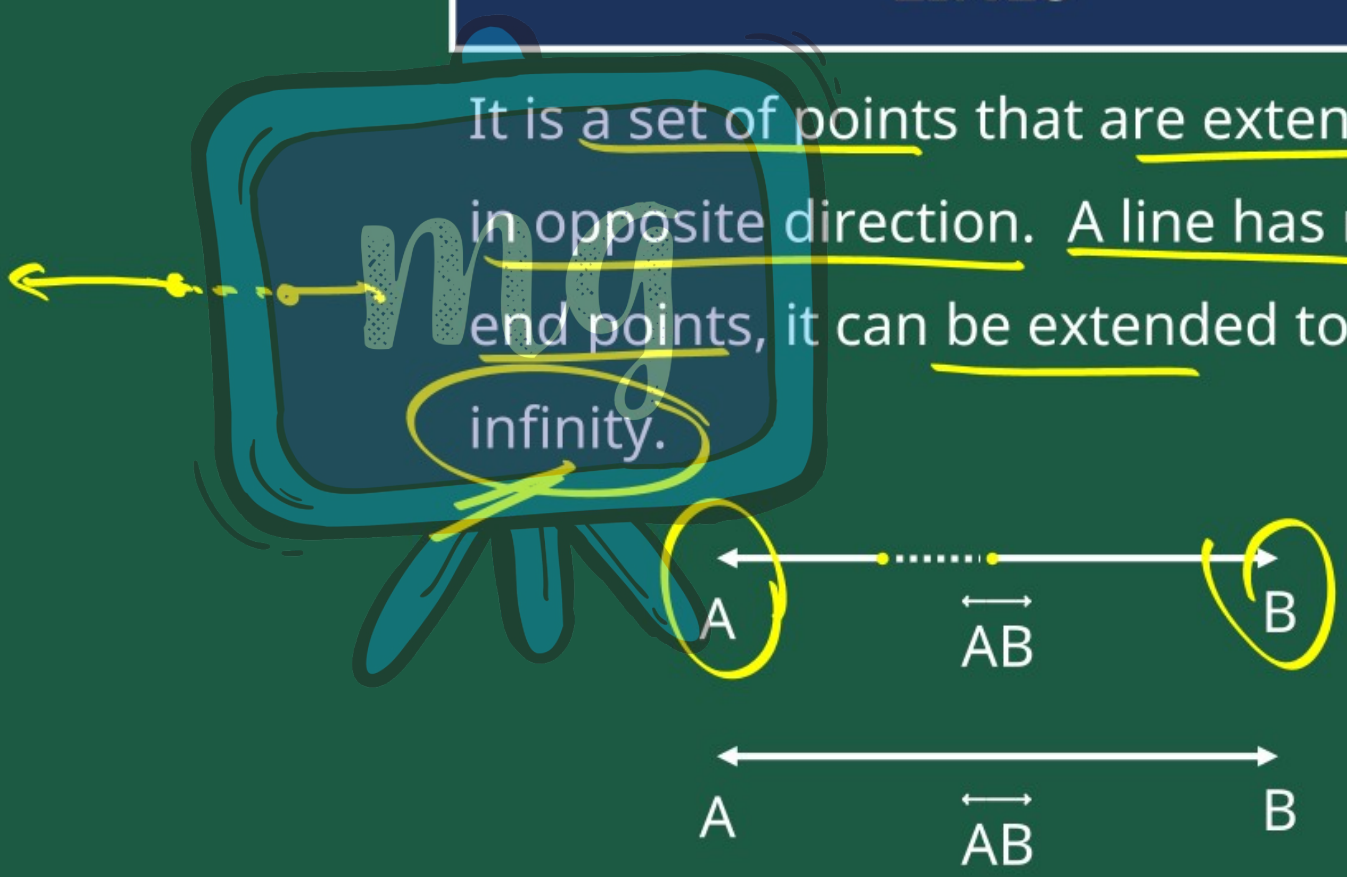
LINES

It is a set of points that are extended in opposite direction. A line has no end points, it can be extended to infinity.



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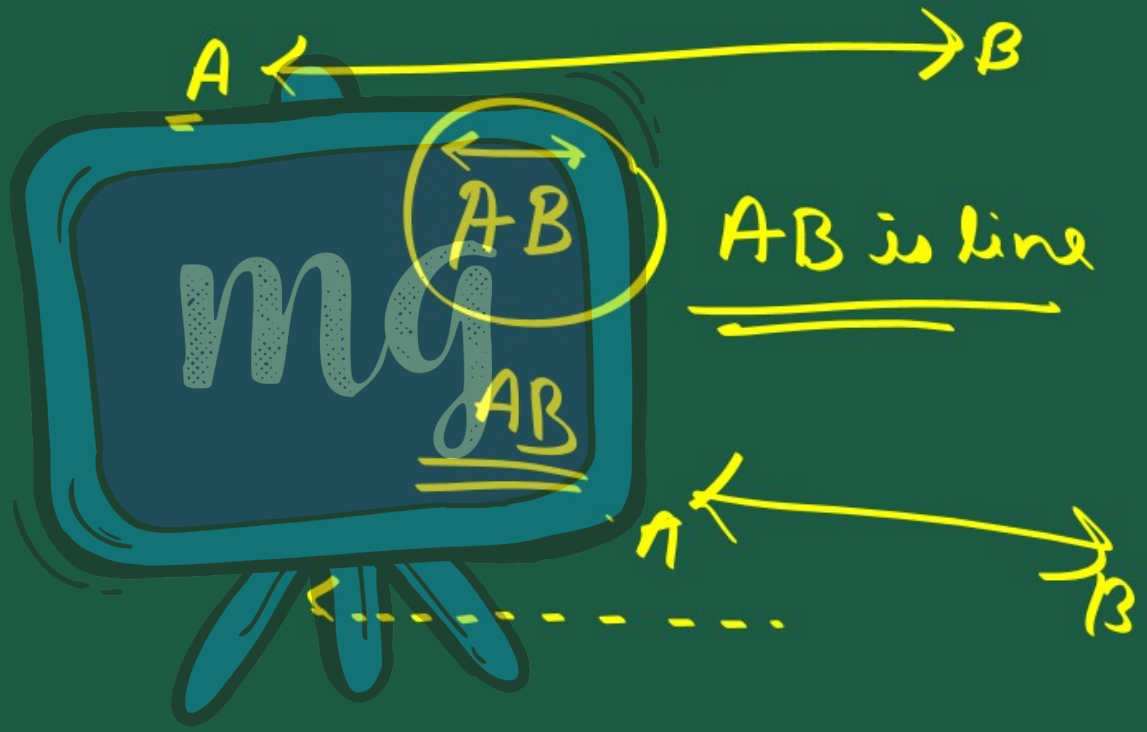

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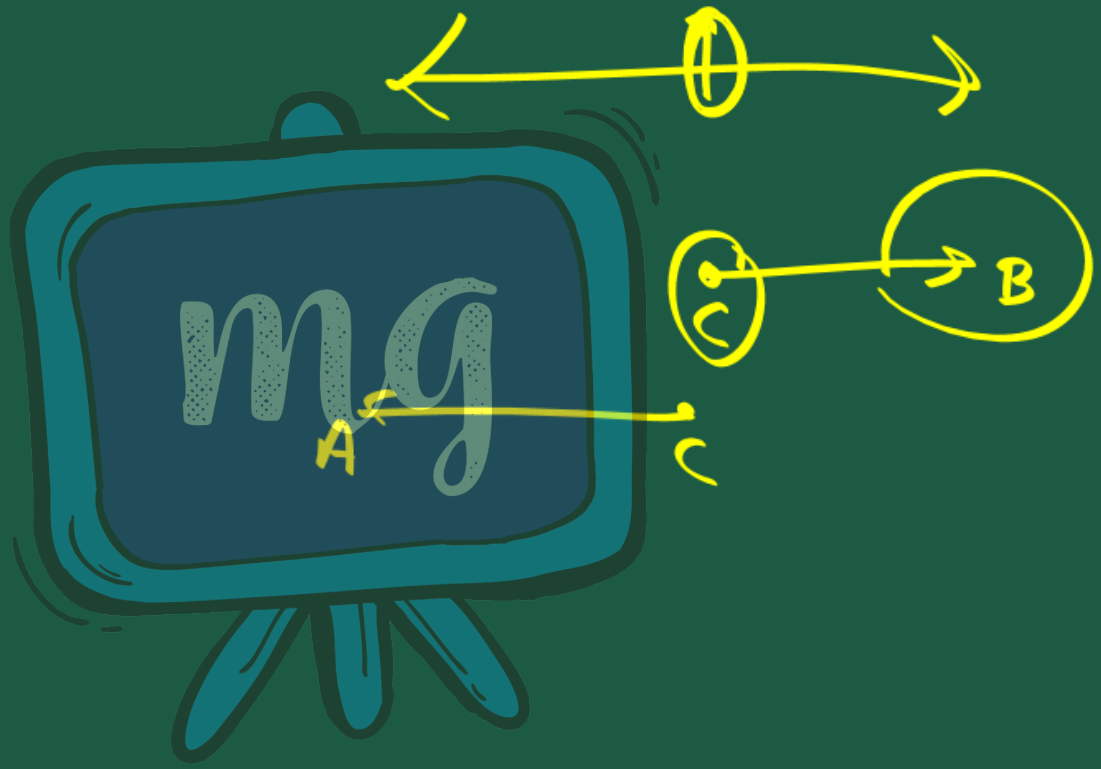

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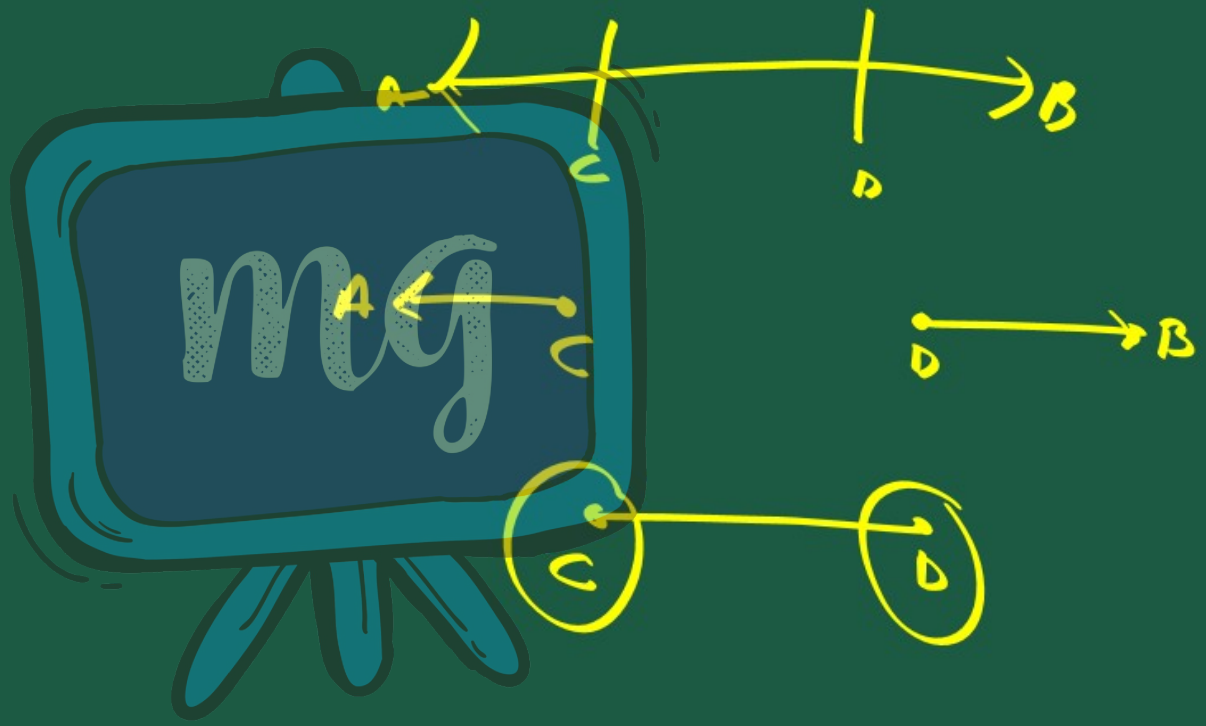

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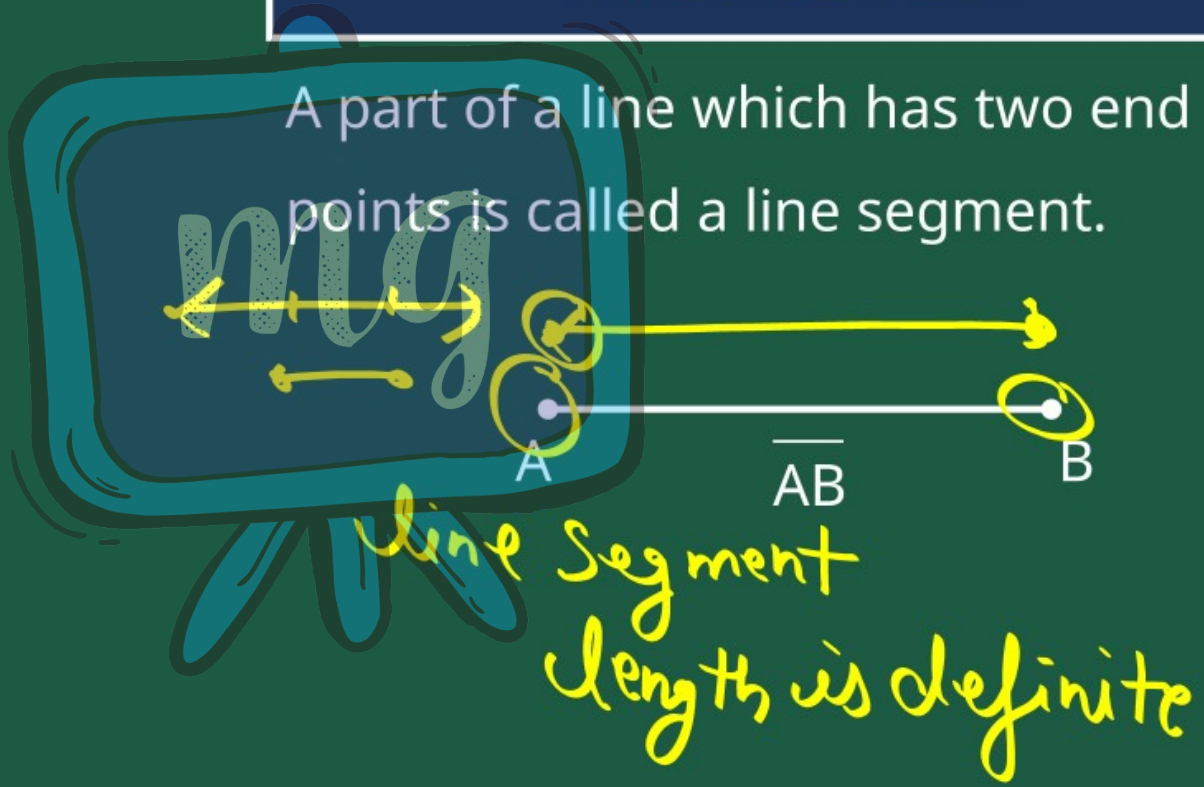
LINE SEGMENT

A part of a line which has two end points is called a line segment.



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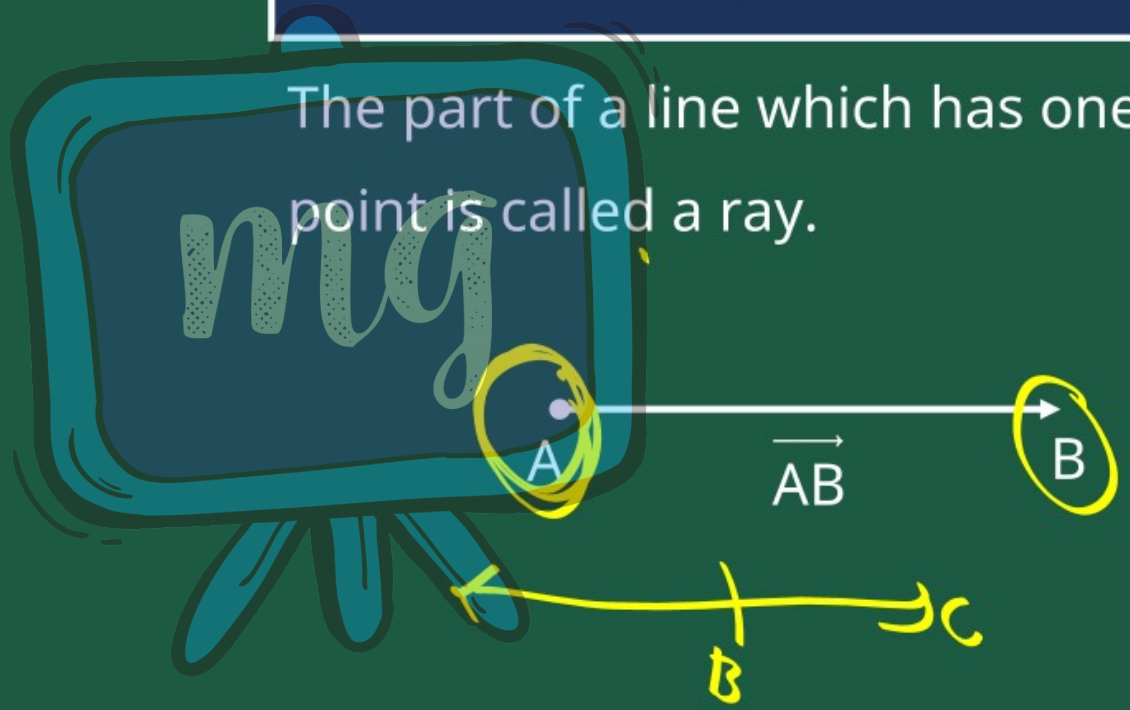
RAY

The part of a line which has one end point is called a ray.



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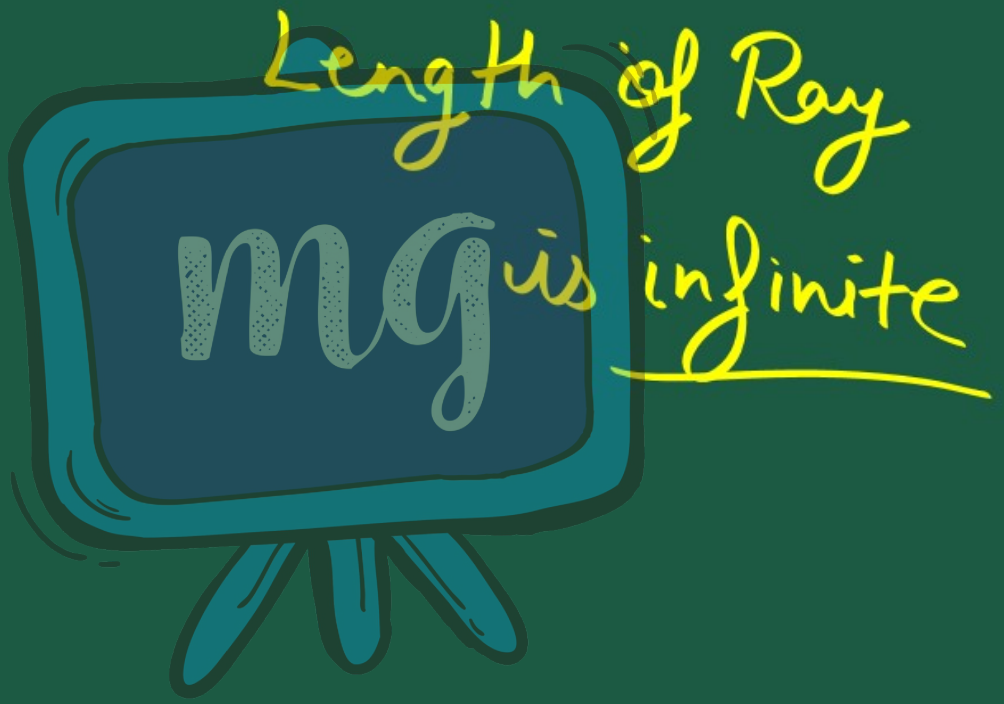

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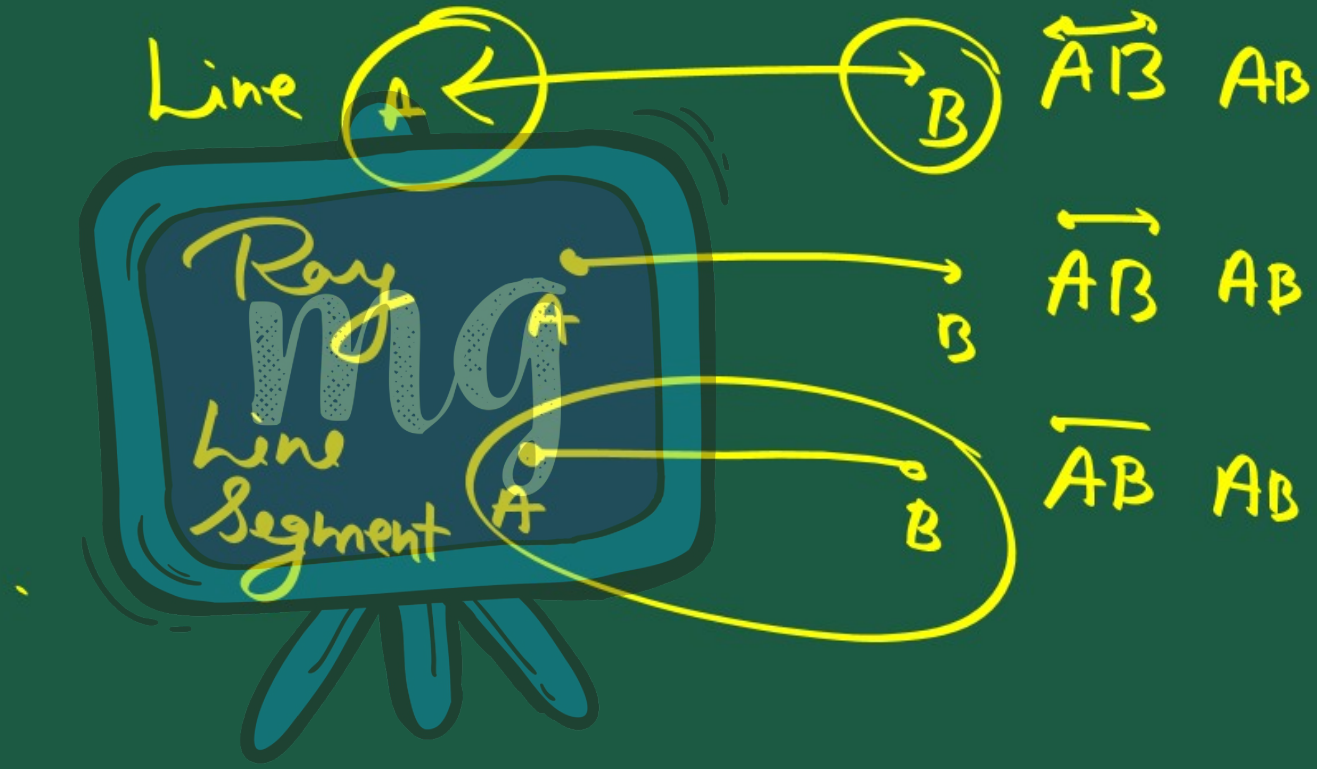

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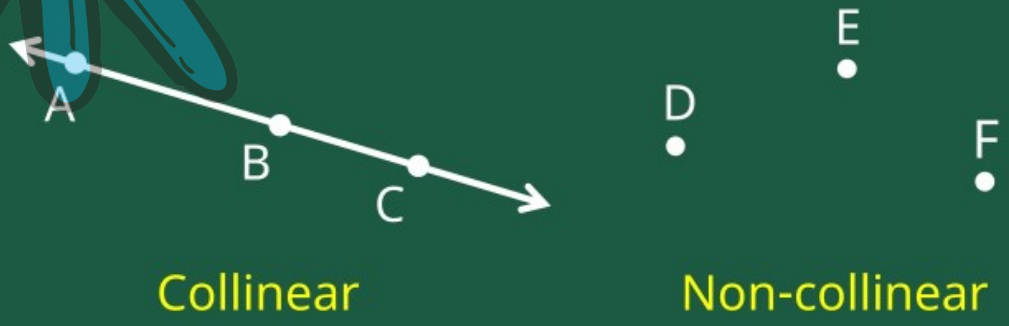
COLLINEAR AND NON-COLLINEAR POINTS

If three or more points lie on the same line then they are called collinear points, otherwise they are called non-collinear points.



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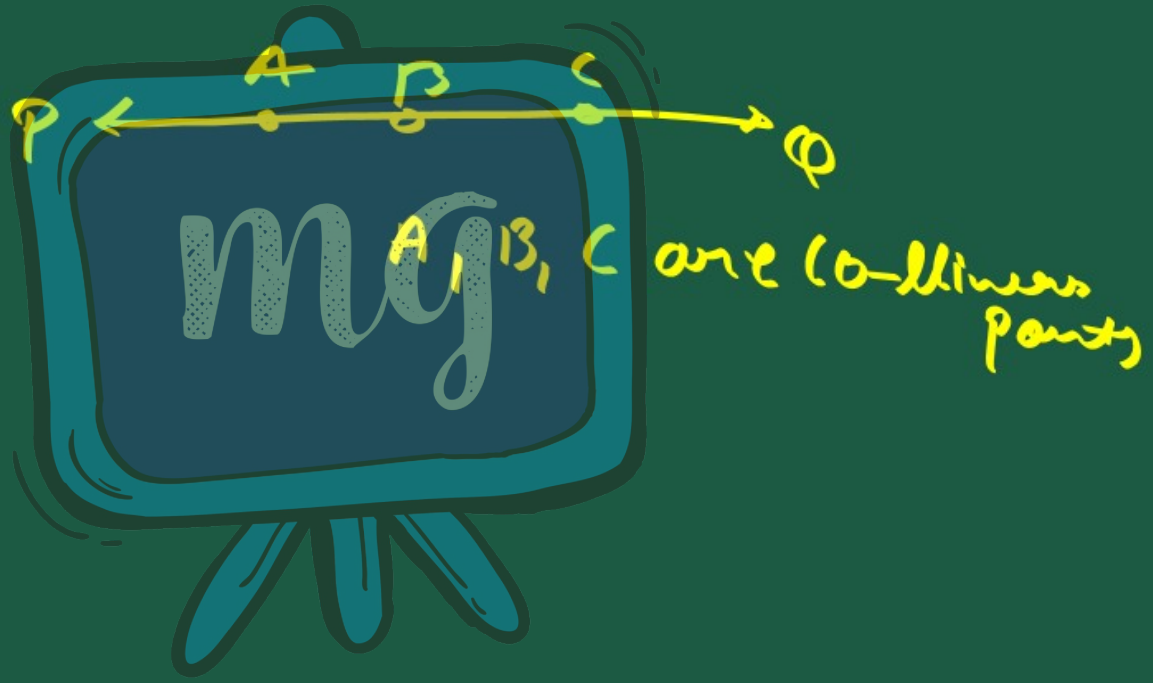

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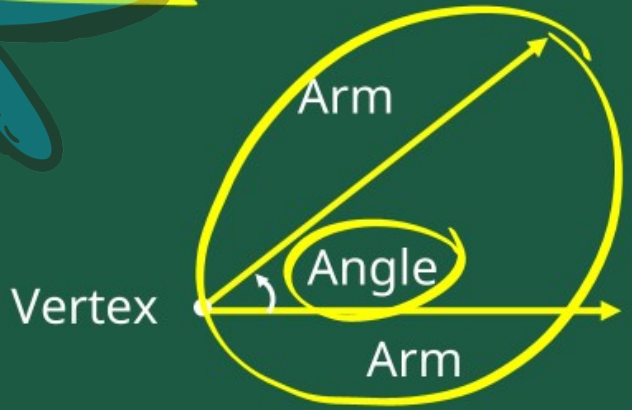
ANGLE

An angle is formed when two rays start from the same end point. The two rays are the sides of the angle and the end point is the vertex of the angle.



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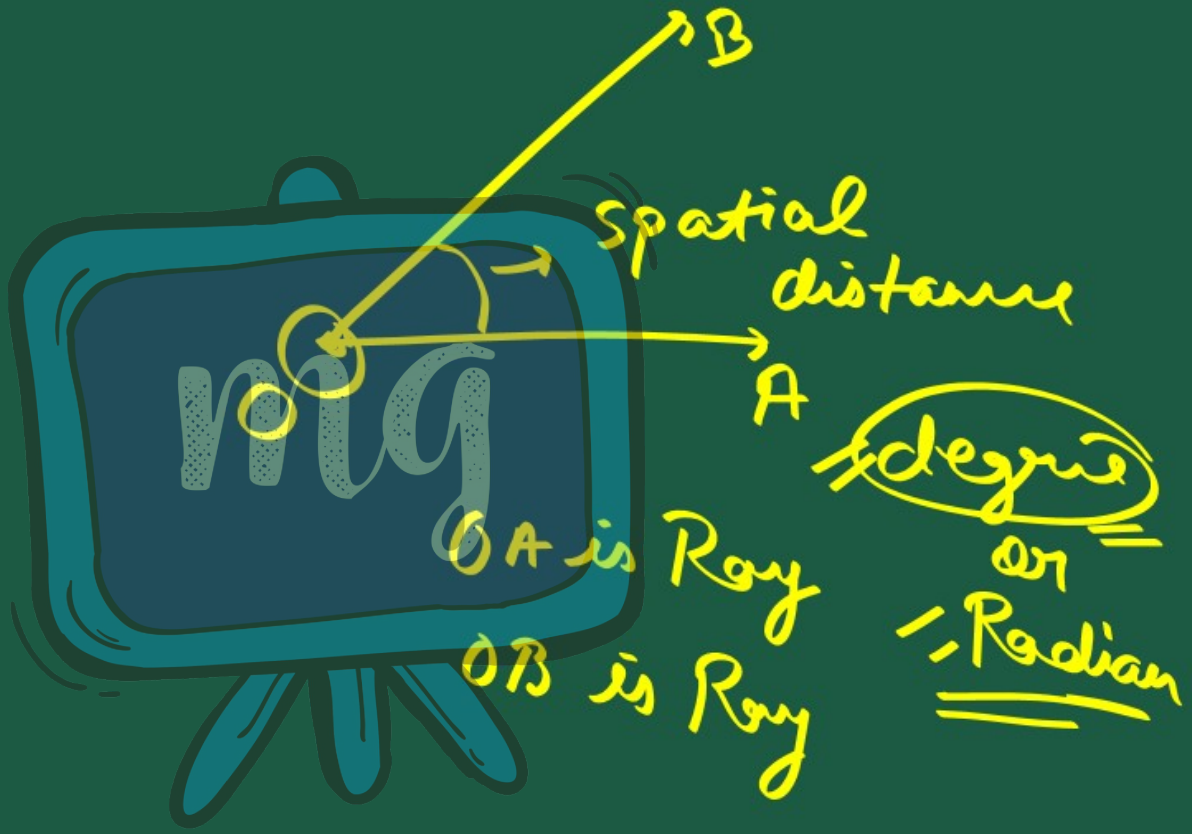

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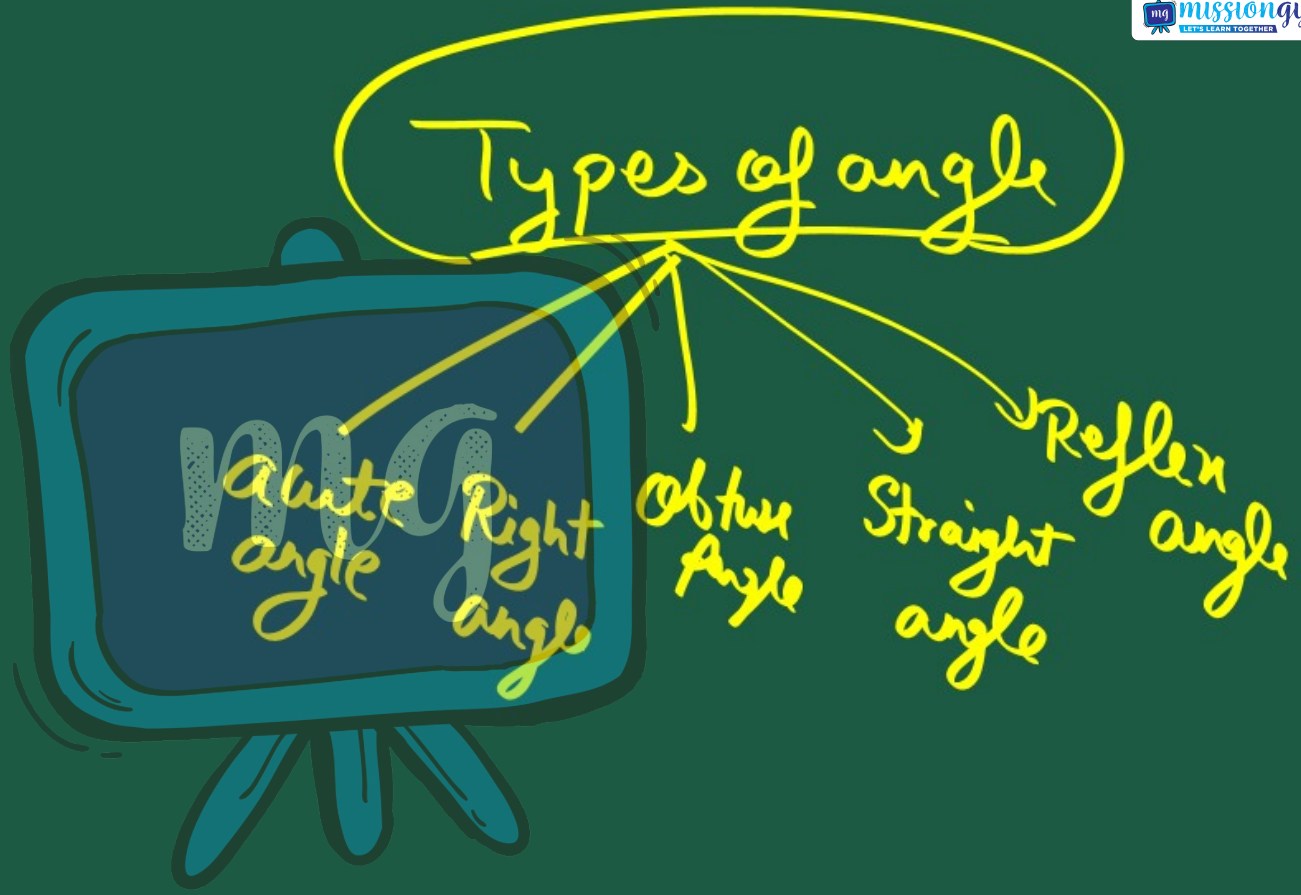

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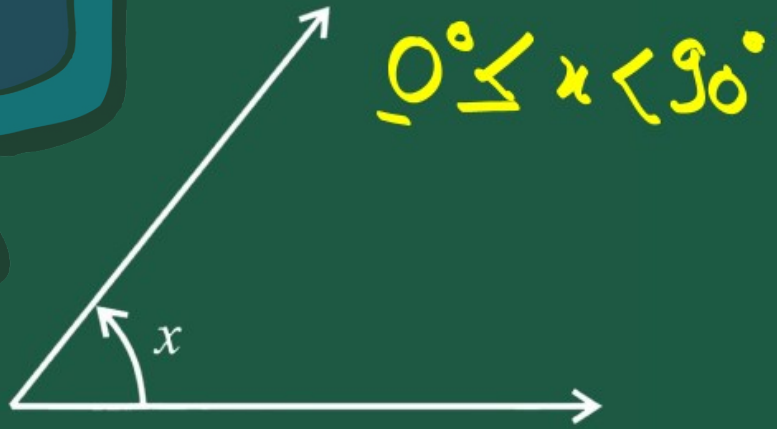
TYPES OF ANGLES

1. Acute Angle : The measure of an acute angle lies between 0° and 90°



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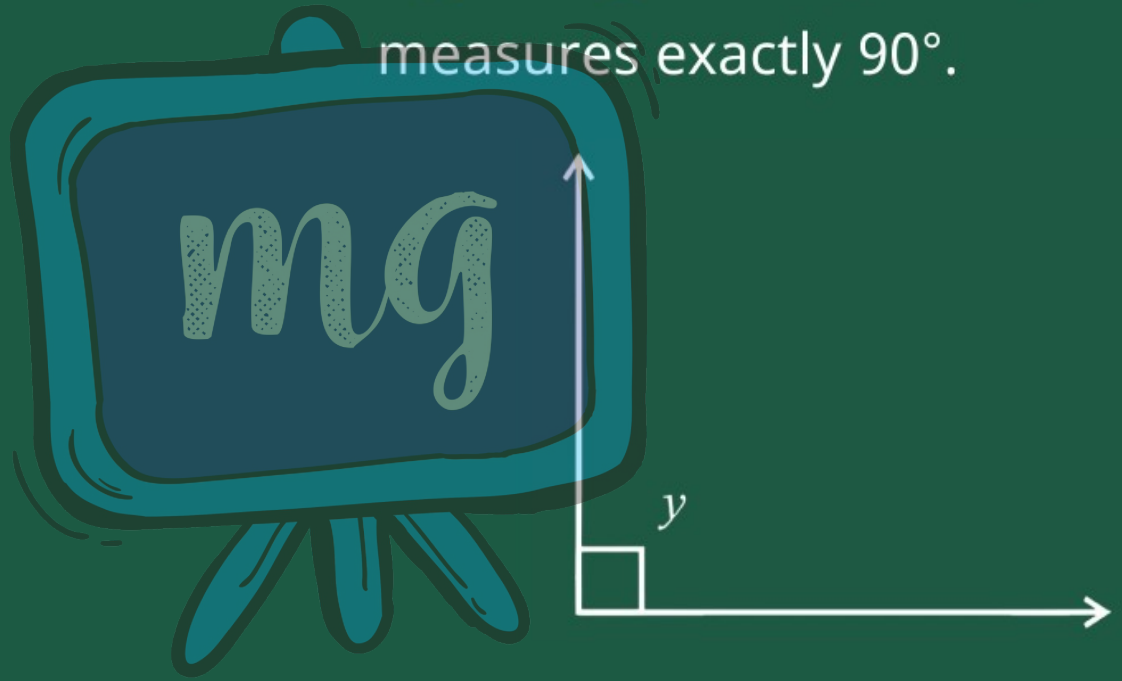
2. Right Angle : A right angle measures exactly 90°.



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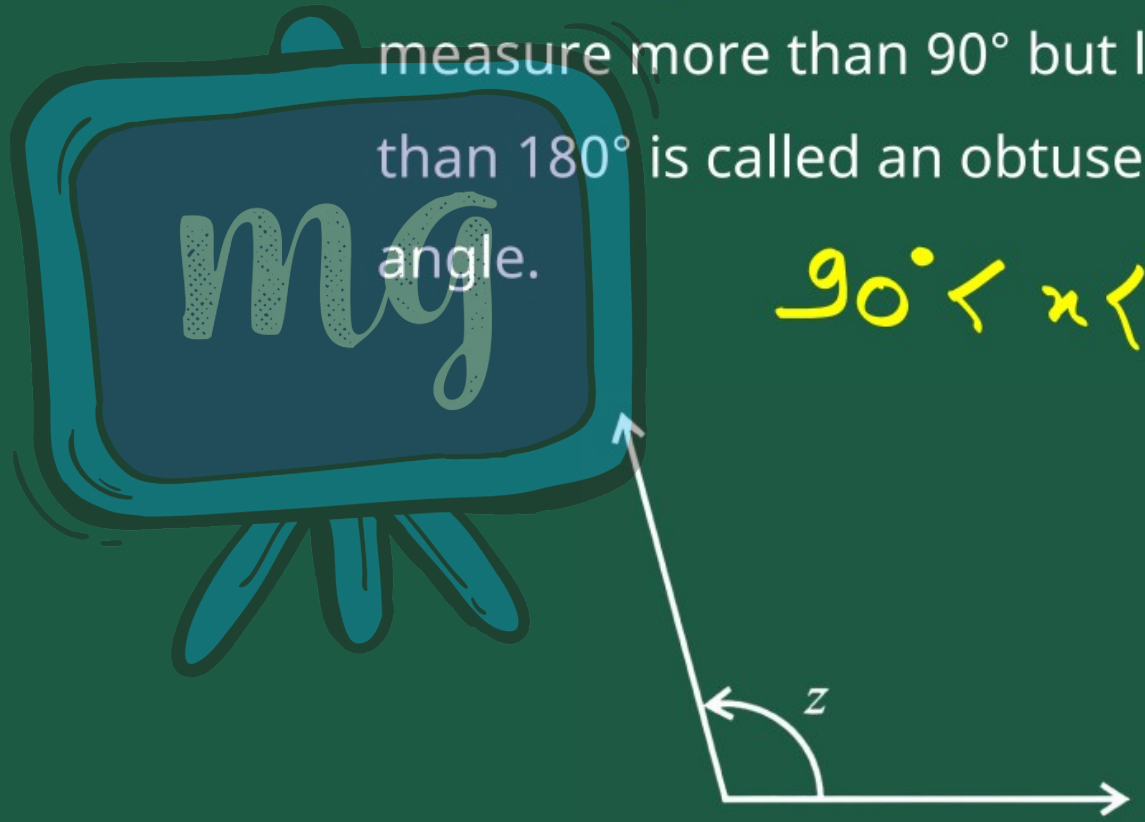
3. **Obtuse angle :** An angle with measure more than 90° but less than 180° is called an obtuse angle.



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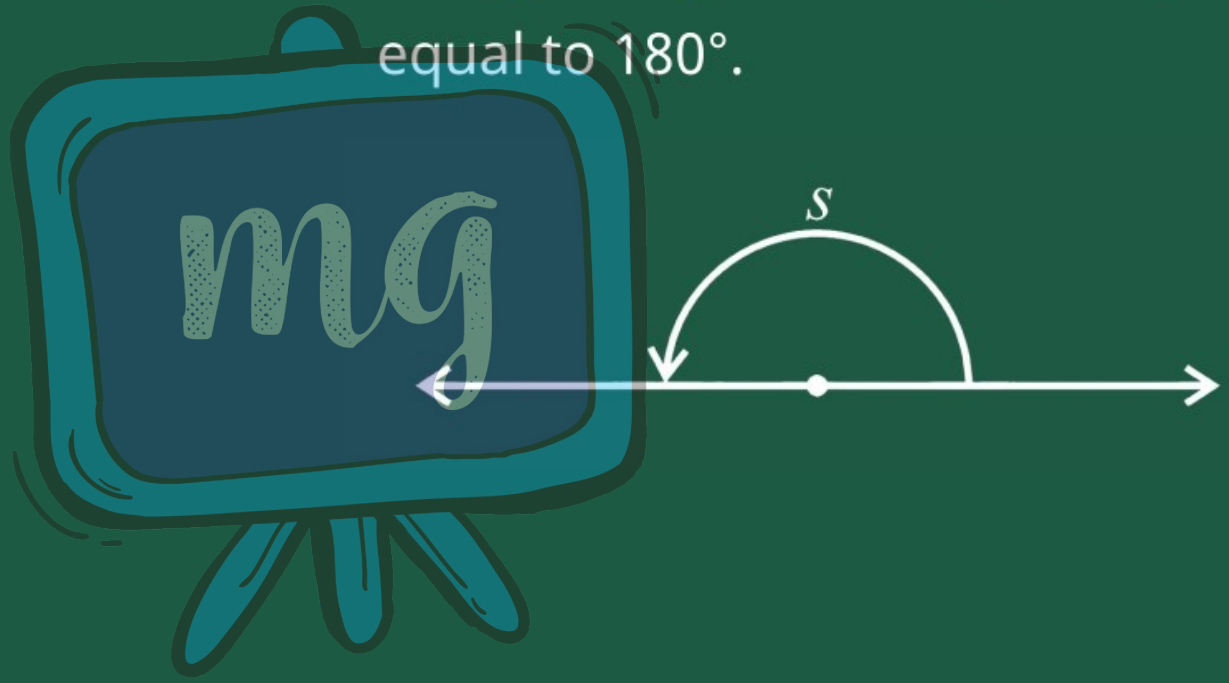
4. **Straight Angle :** A straight angle is equal to 180°.



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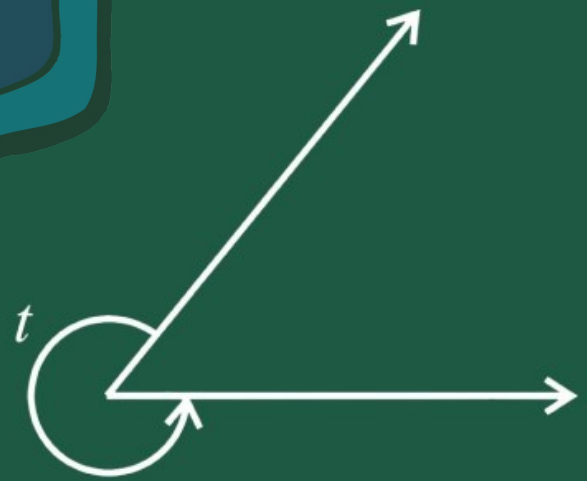
5. **Reflex angle :** An angle whose measure is more than 180° but less than 360° is called a reflex angle.

$180° < x < 360°$



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Geometrical Representation of two Angle

Acute angle



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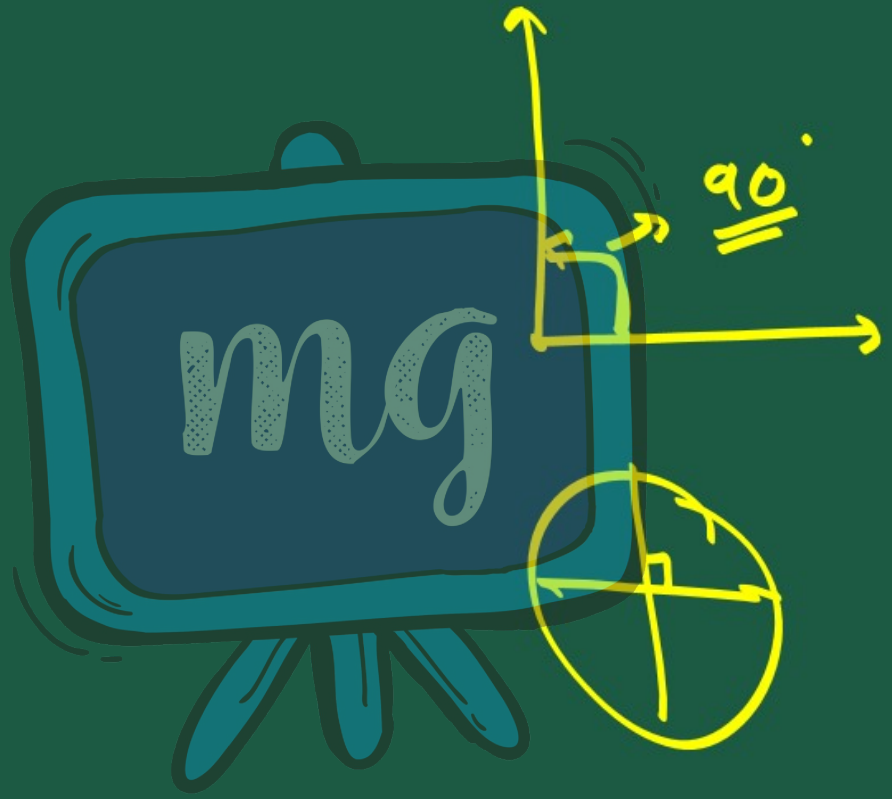

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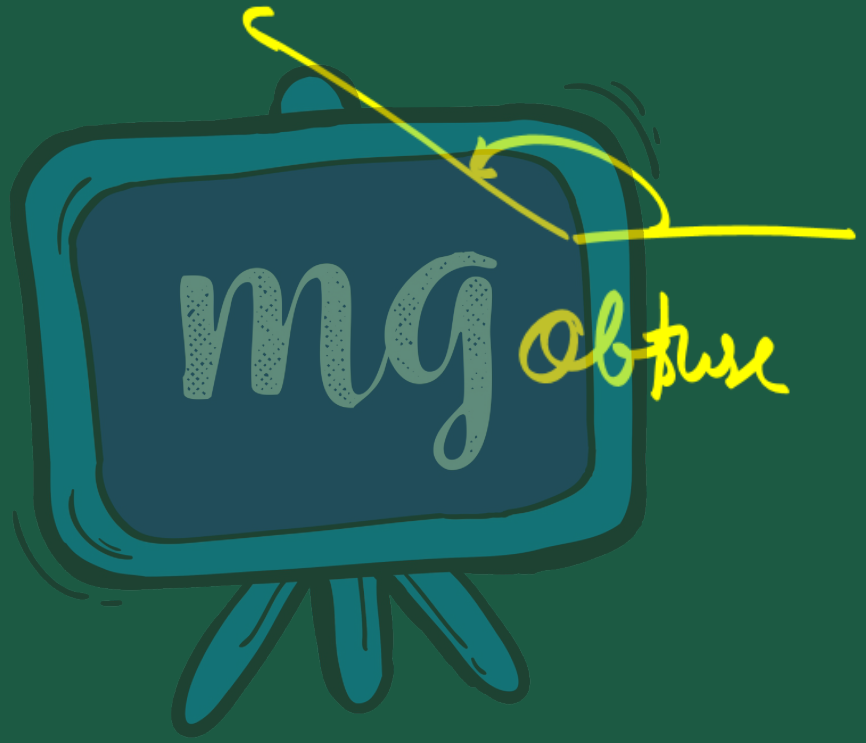

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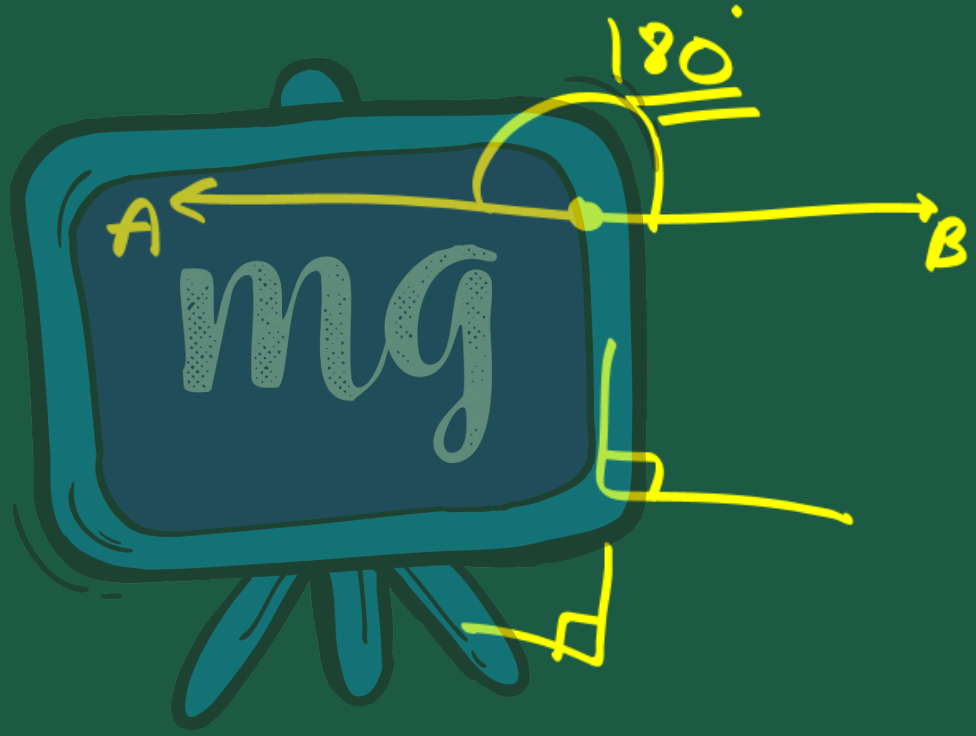

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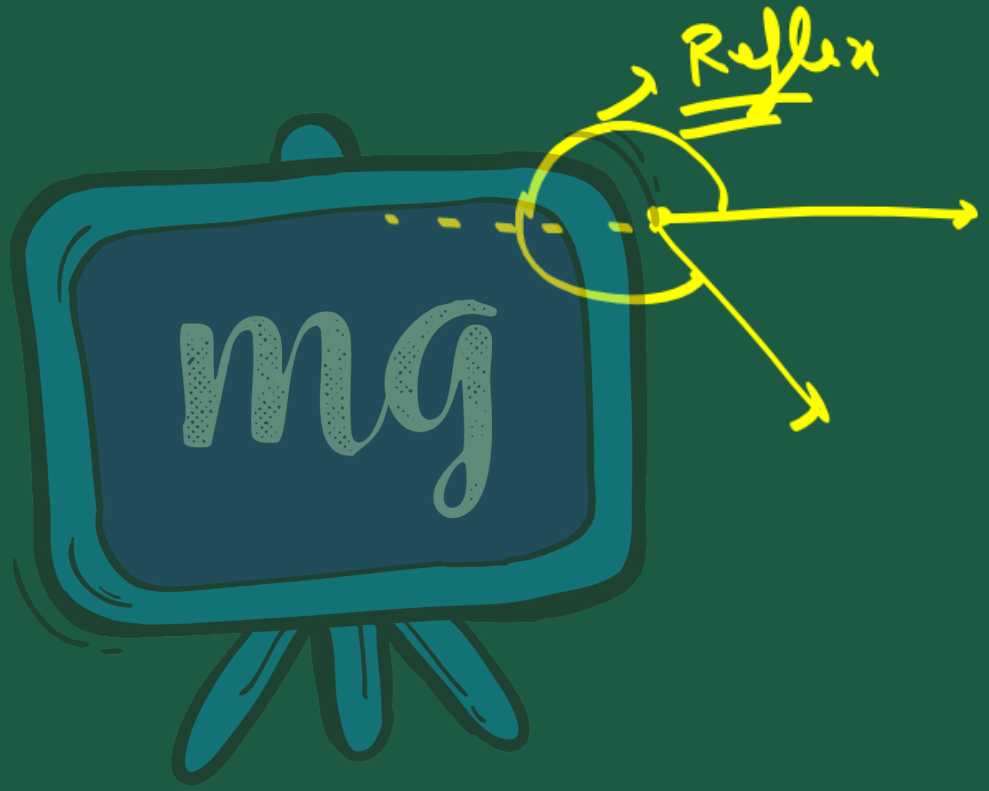

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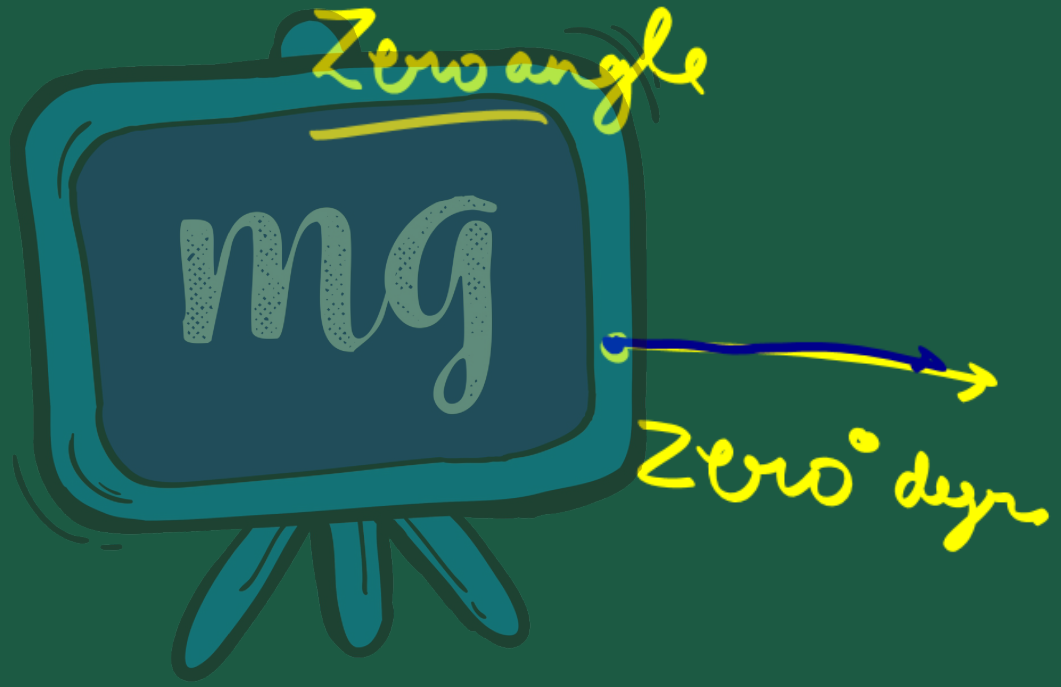

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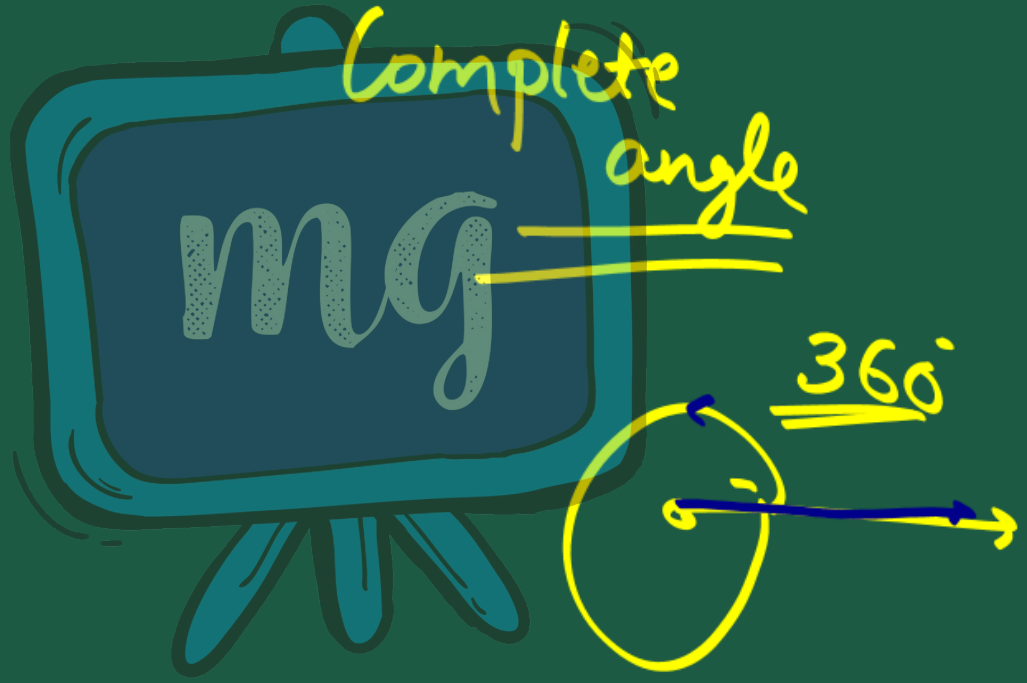

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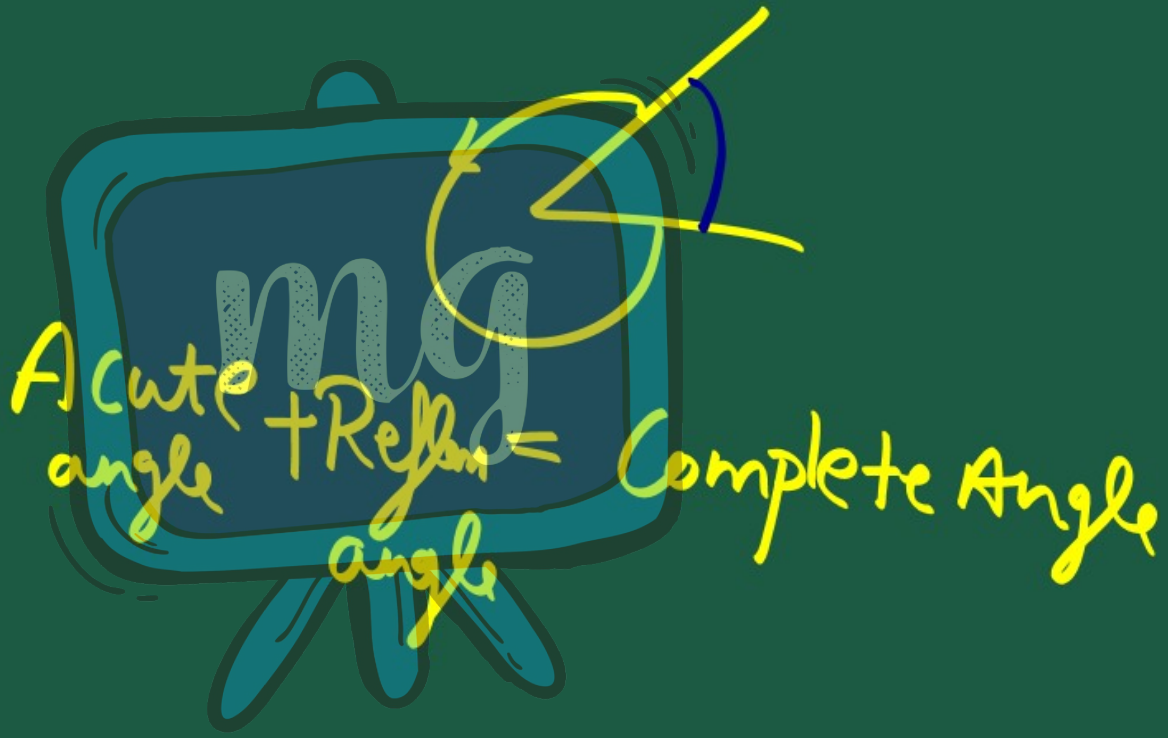

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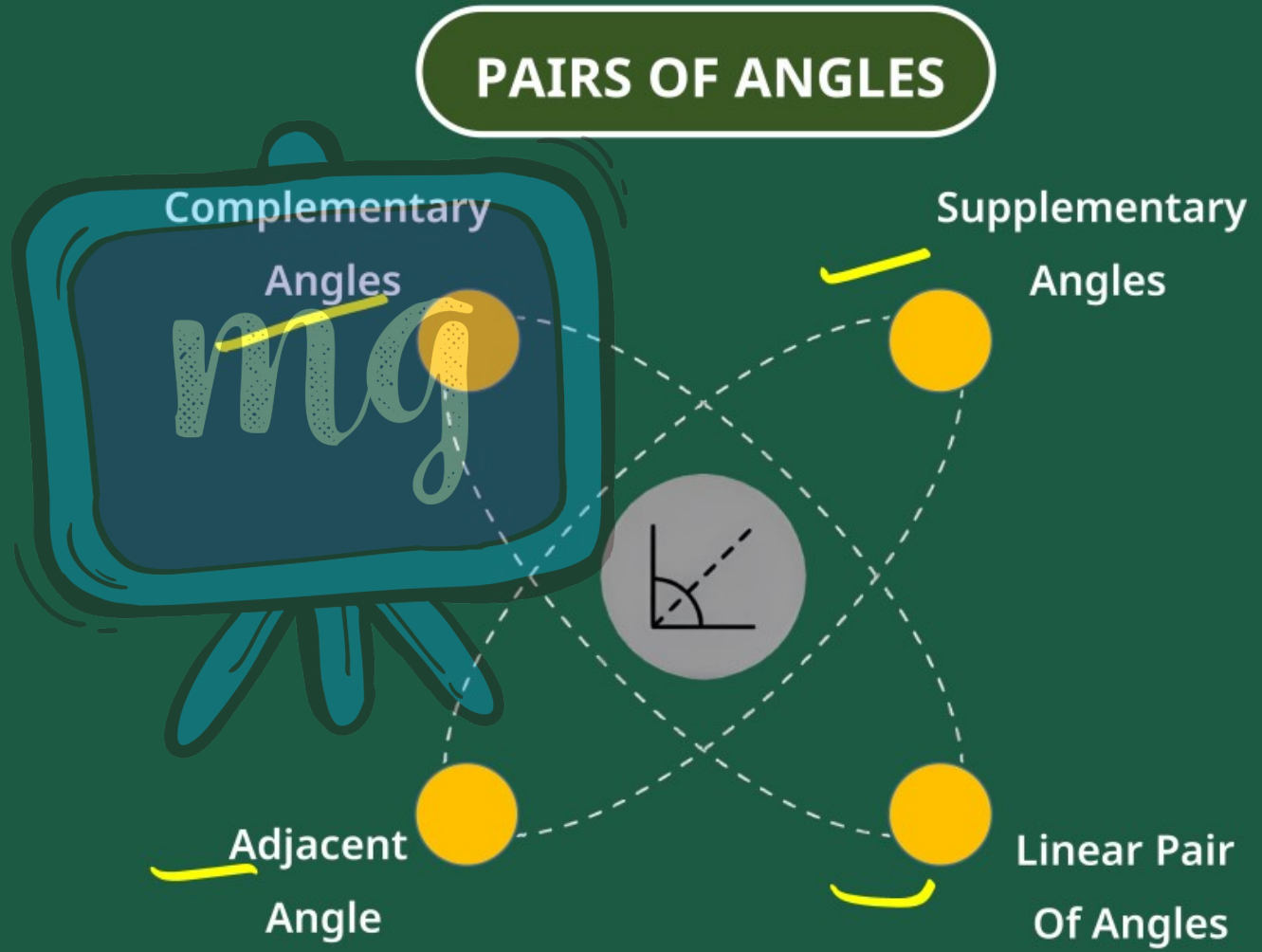
PAIRS OF ANGLES



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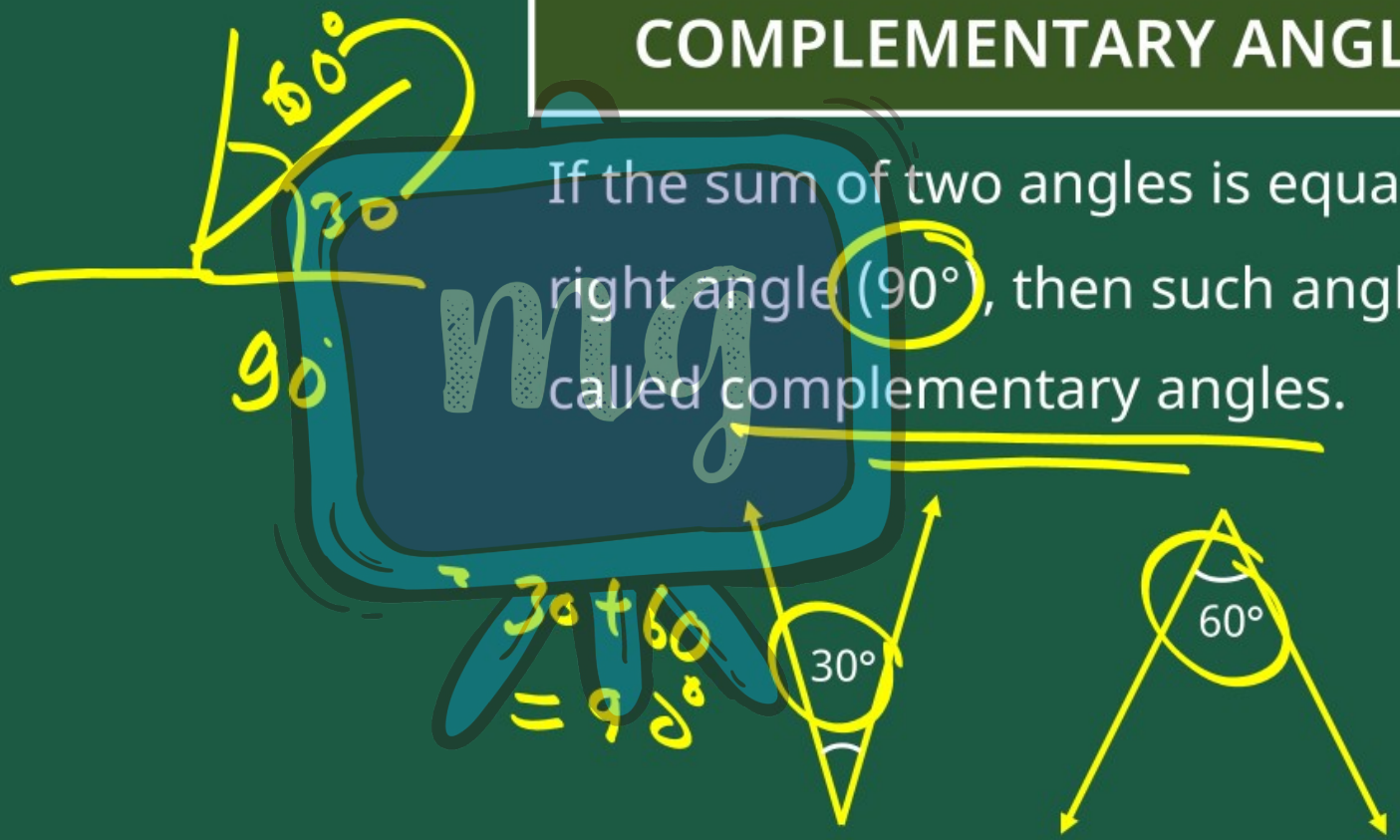
COMPLEMENTARY ANGLES

If the sum of two angles is equal to a right angle (90°), then such angles are called complementary angles.



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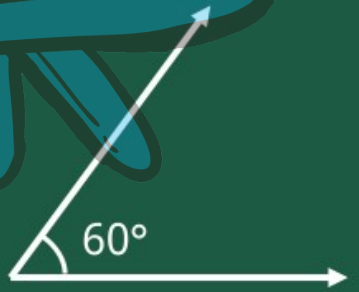
SUPPLEMENTARY ANGLES

If the sum of two angles is equal to 180°, then such angles are called supplementary angles.

$\angle A + \angle B = 180^\circ$





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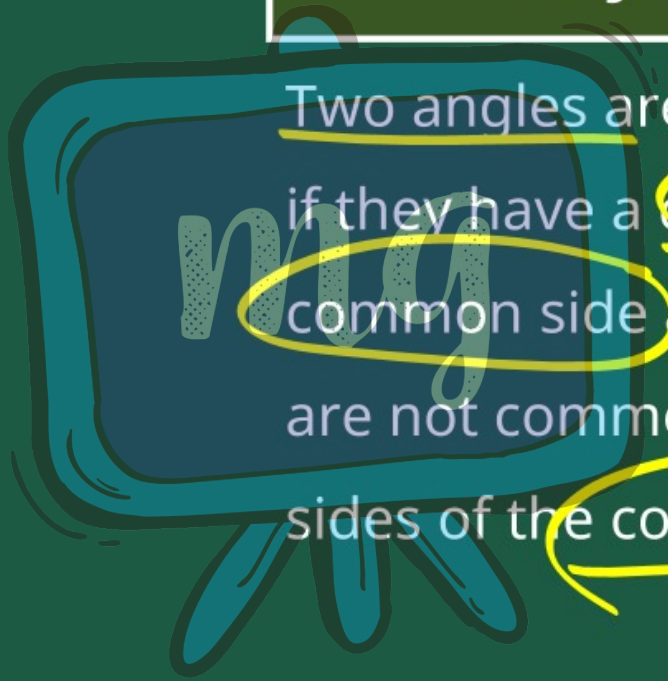
ADJACENT ANGLE



Two angles are called adjacent angles if they have a common vertex, a common side and their sides which are not common lie on the opposite sides of the common side.

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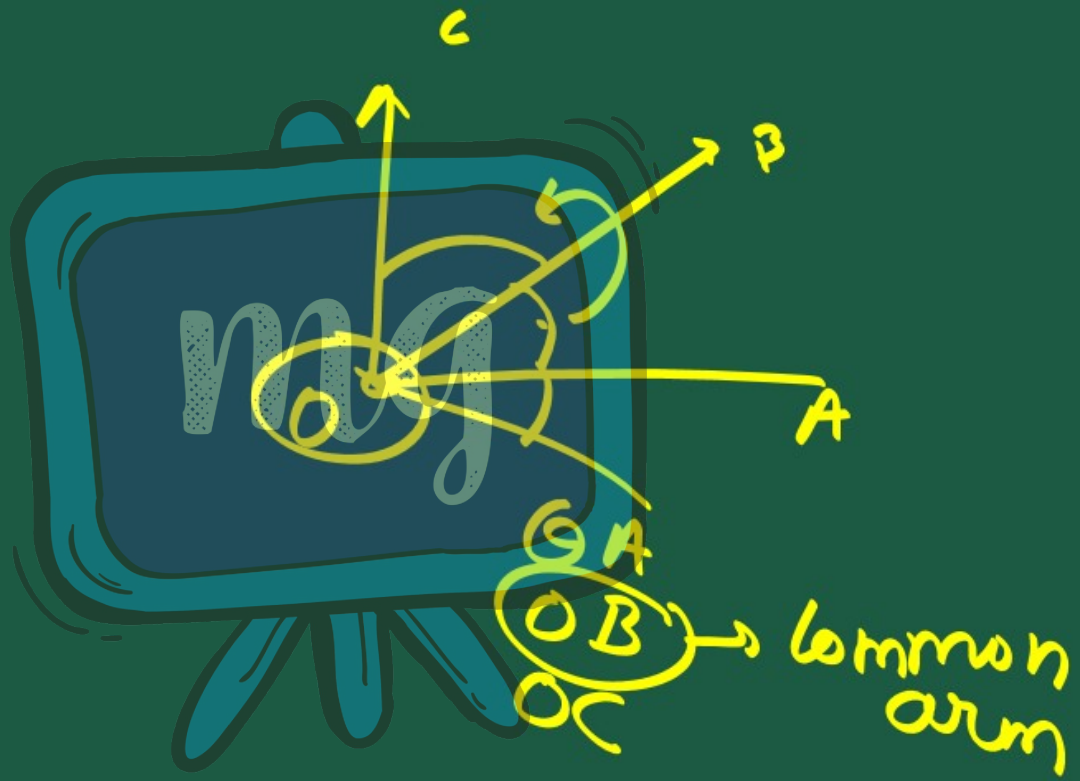

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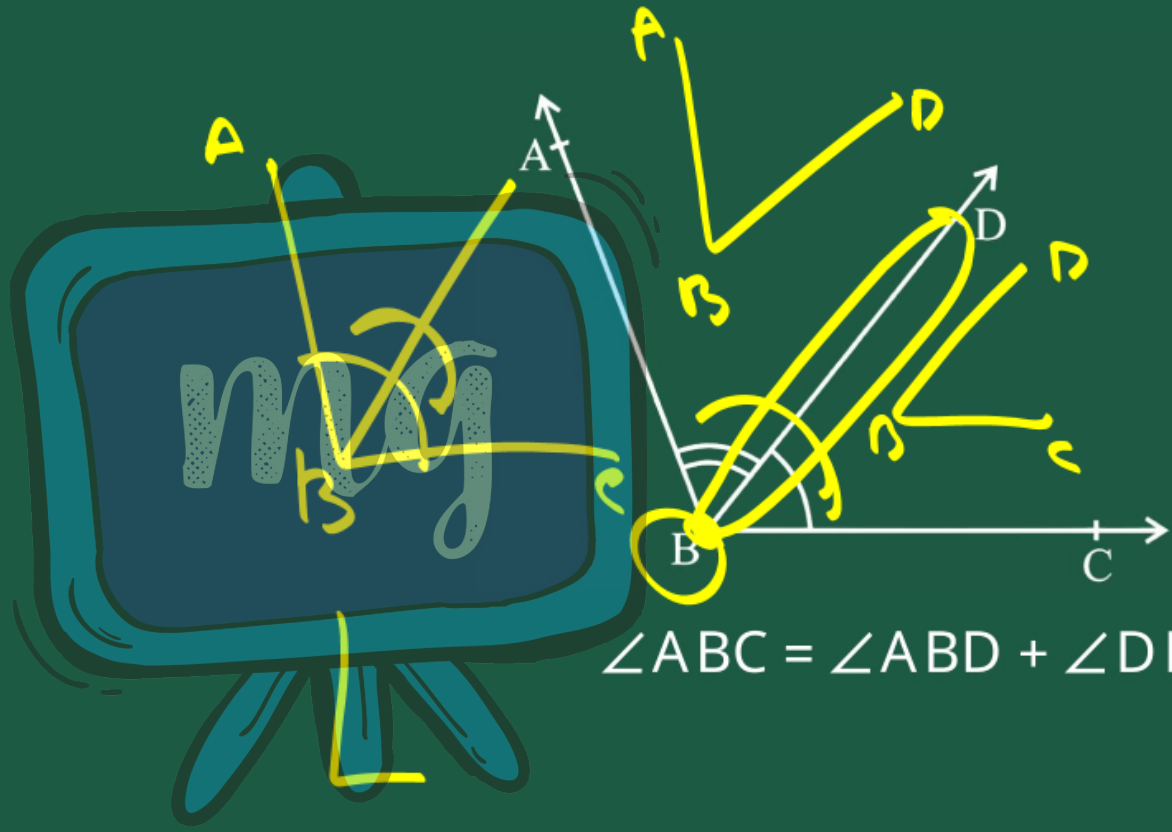

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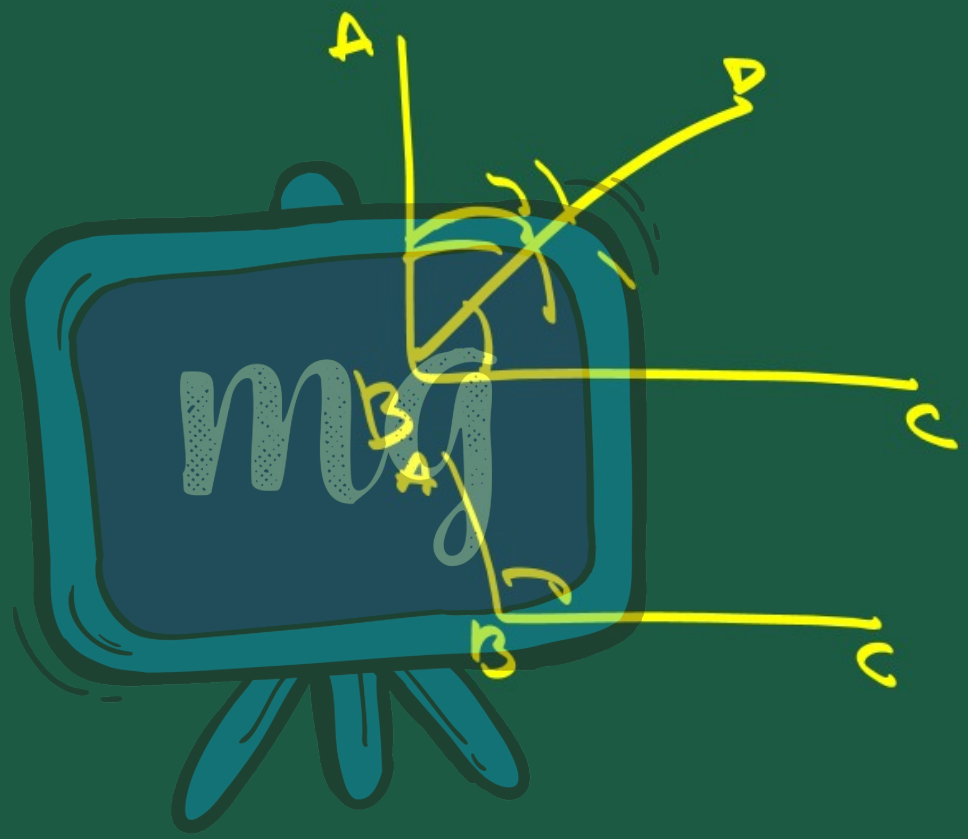

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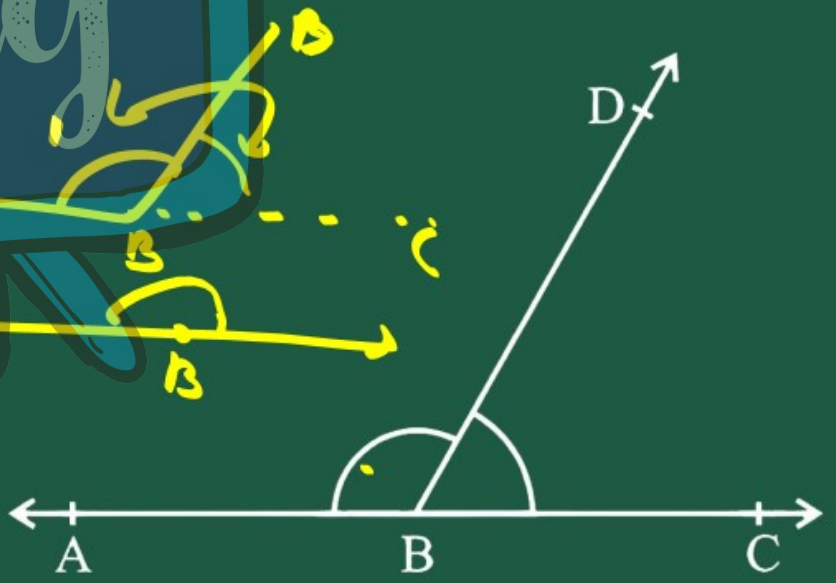
LINEAR PAIR OF ANGLES

A linear pair of angles are two adjacent angles that sum to 180°.



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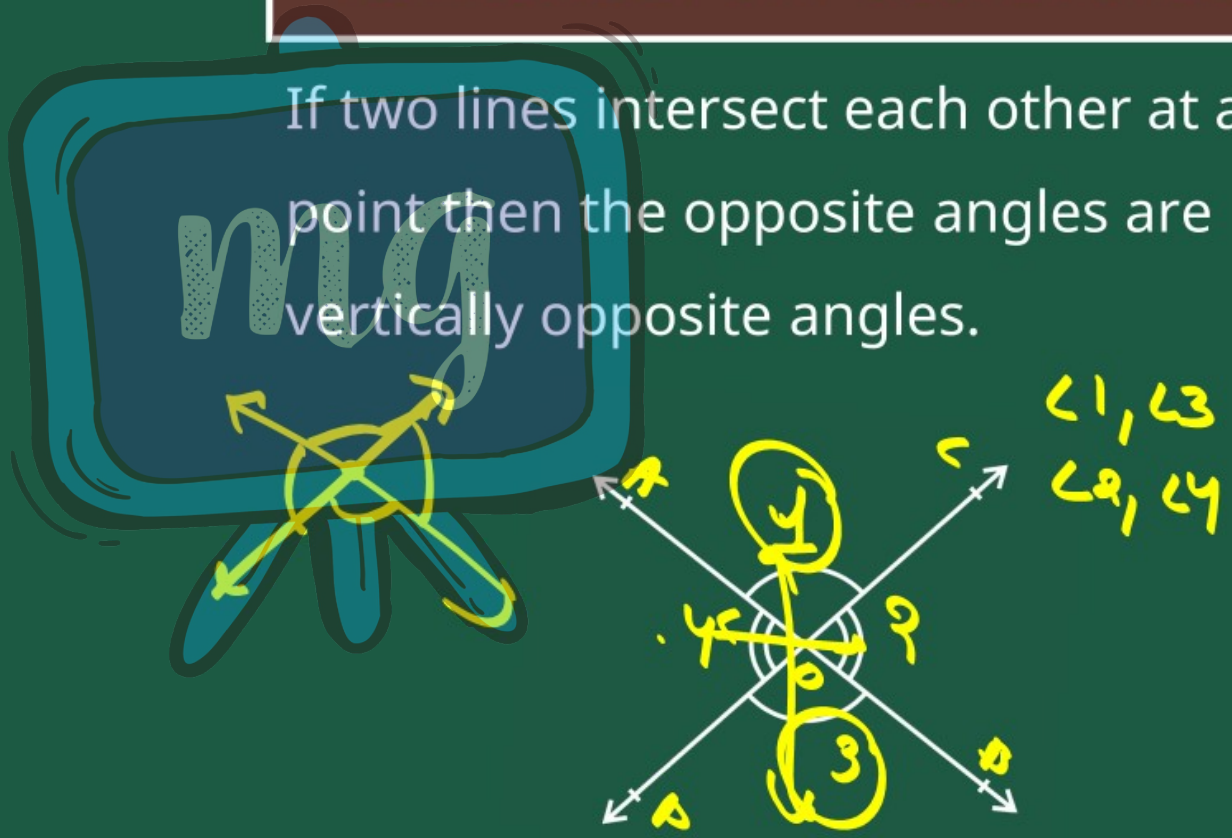
VERTICALLY OPPOSITE ANGLE

If two lines intersect each other at a point then the opposite angles are vertically opposite angles.



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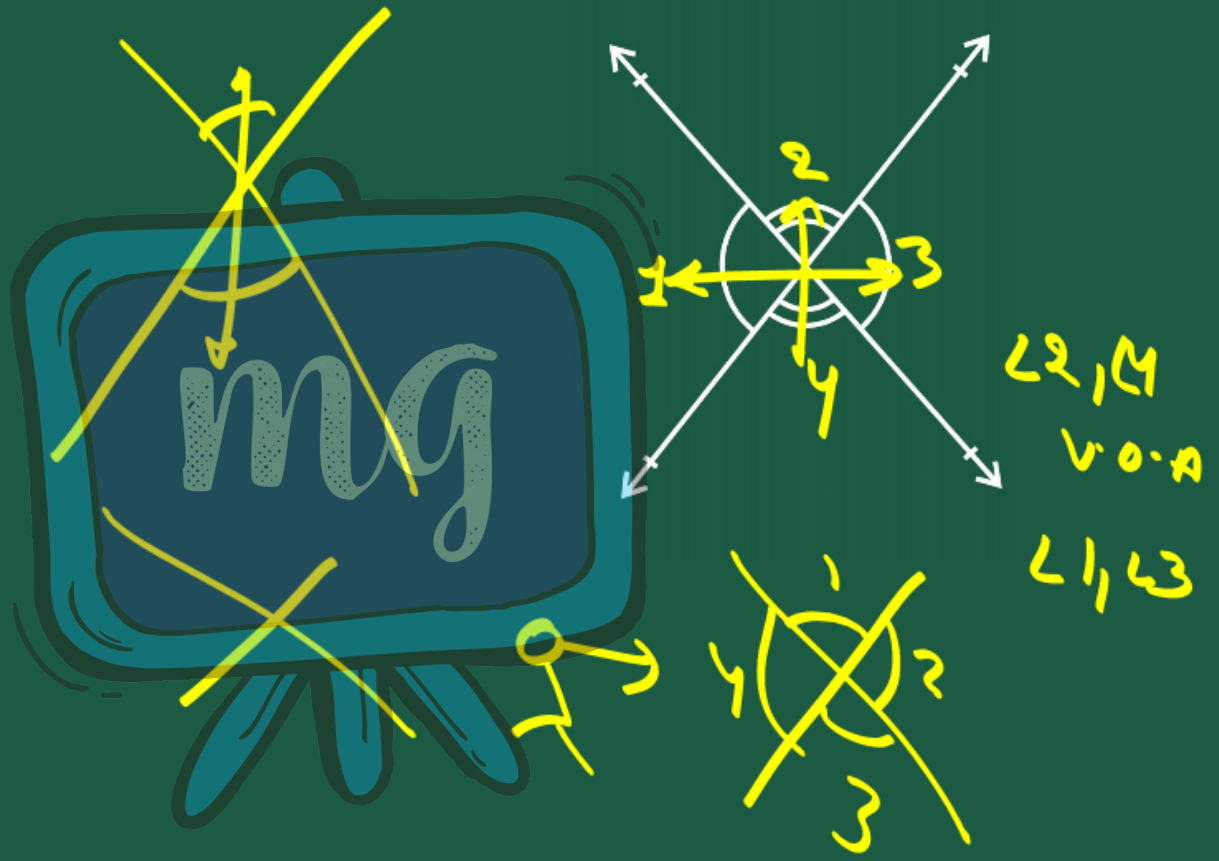

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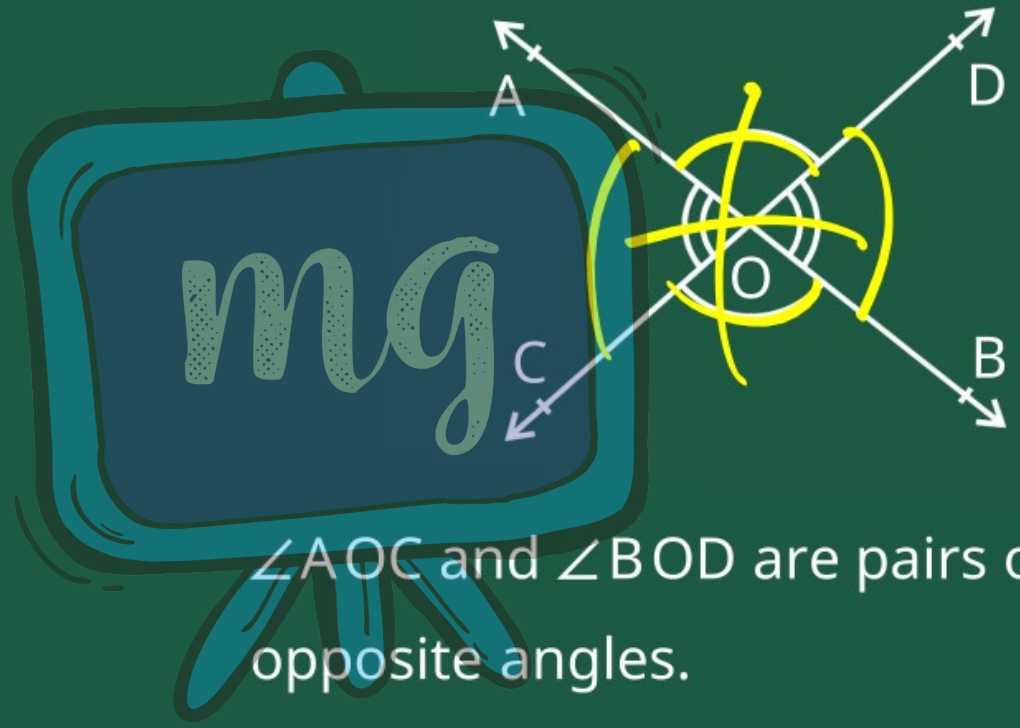

$\angle AOC$ and $\angle BOD$ are pairs of vertically opposite angles.

$\angle AOD$ and $\angle COB$ are pairs of vertically opposite angles.

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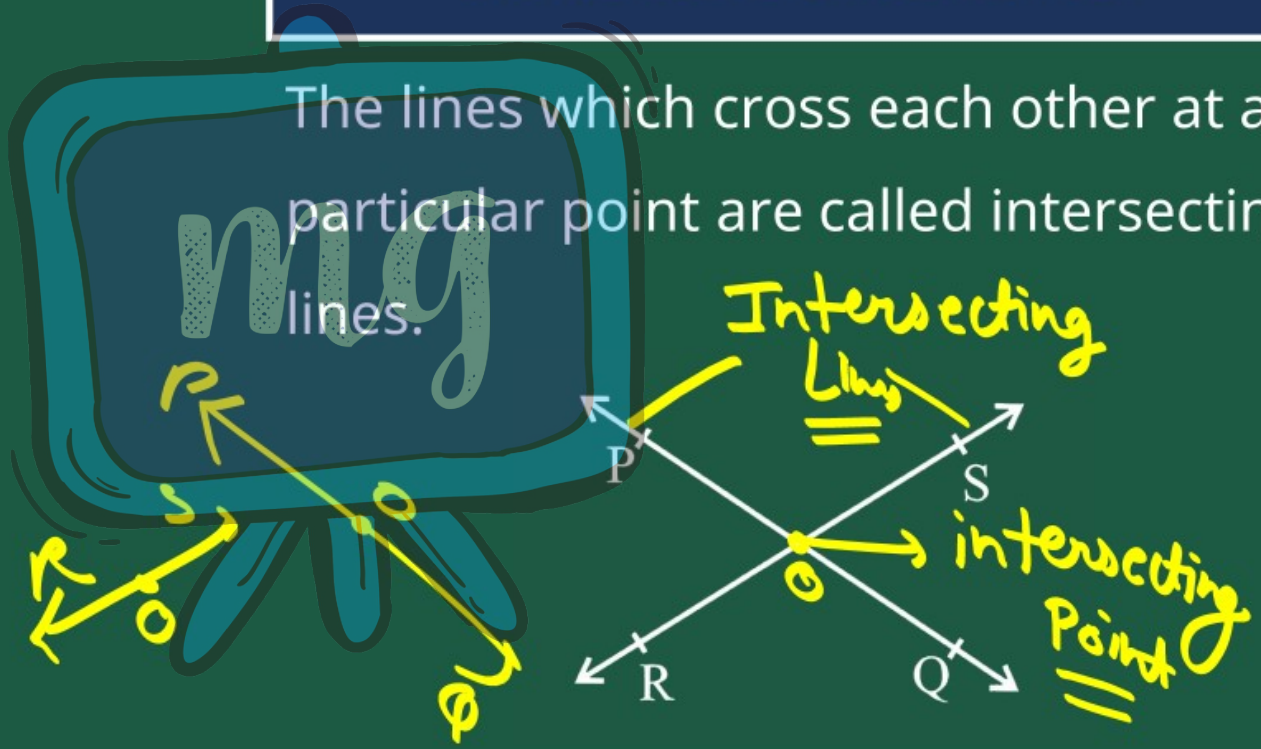
INTERSECTING LINES

The lines which cross each other at a particular point are called intersecting lines.



Intersecting lines

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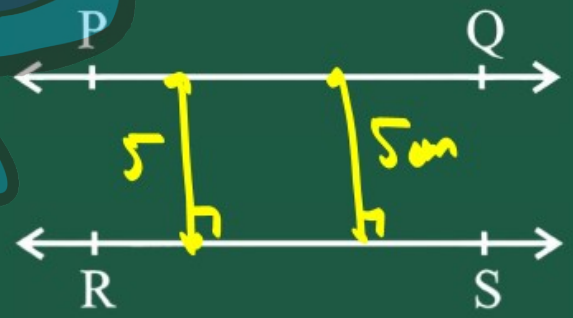
PARALLEL LINES

Lines that never cross each other at any point are called non-intersecting lines. These lines are called parallel lines.



Non intersecting (parallel) lines

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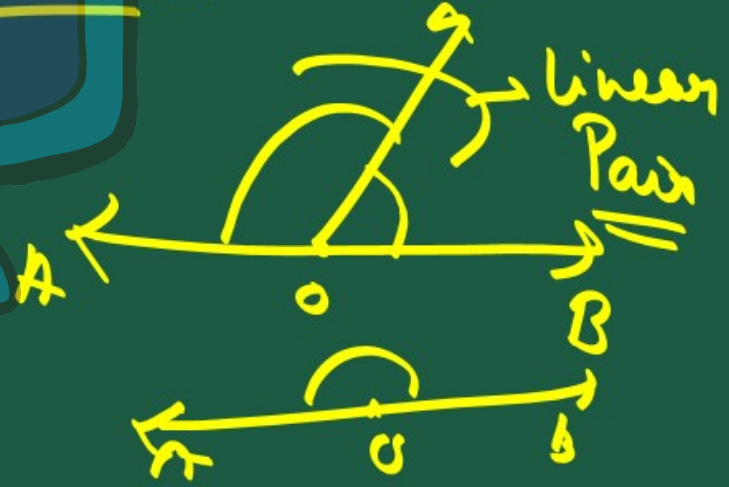
Axiom – 6.1

If a ray stands on a line, then the sum of two adjacent angles so formed is 180°.



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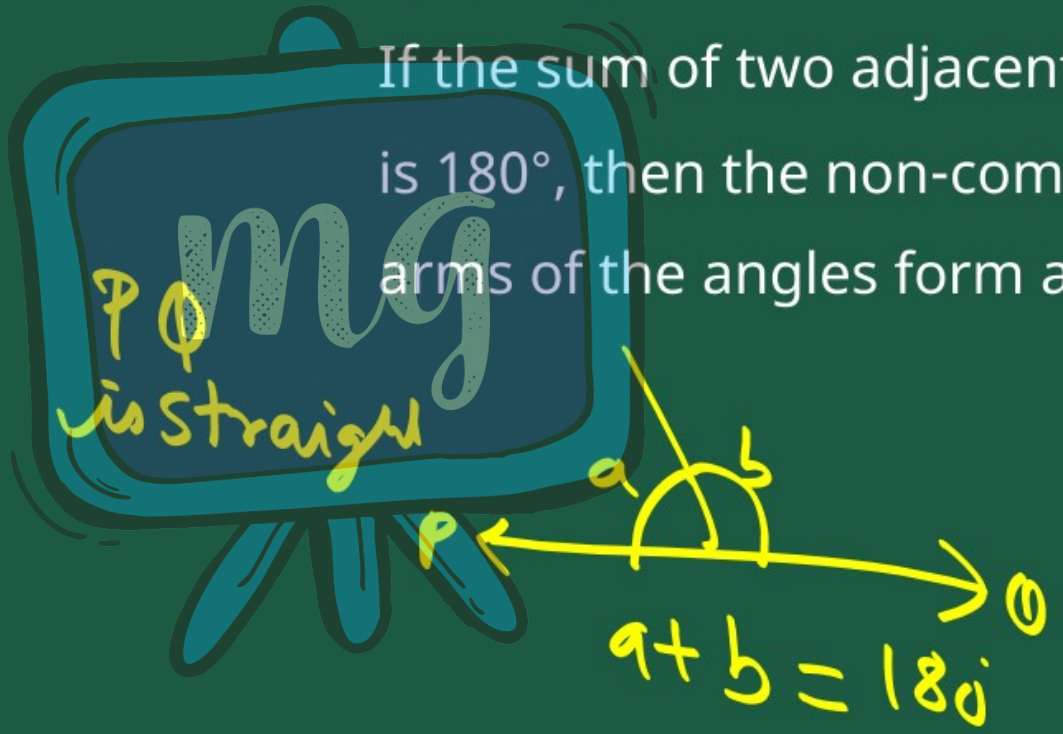
Axiom – 6.2

If the sum of two adjacent angles is 180°, then the non-common arms of the angles form a line.



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LEARNING OUTCOMES

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1. Lines
2. Types of Angles
3. Pairs of Angles

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ASSESSMENT

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2 If two lines intersect each other, then the vertical opposite angles will be:

A Equal

B Unequal

C Cannot be determined

D None of the above

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3 The pair of two angles who sum is 180°are called:

A Vertically opposite angles

B Complementary angles

C Adjacent angles

D Supplementary angles

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4 Angles that share a common vertex and a common side are called:

A Supplementary angles

B Complementary angles

C Adjacent angles

D Vertical angles

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1 The complementary angle of 30° is:

A 60°

B 150°

C 135°

D 105°

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1 The complementary angle of 30° is:

A 60°

B 150°

C 135°

D 105°

$30^\circ + x = 90^\circ$

$x = 90^\circ - 30^\circ$

$x = 60^\circ$

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2 The pair of two angles who sum is 180°are called:

A Vertically opposite angles

B Complementary angles

C Adjacent angles

D Supplementary angles

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3 Angles that share a common vertex and a common side are called:

A Supplementary angles

B Complementary angles

C Adjacent angles

D Vertical angles