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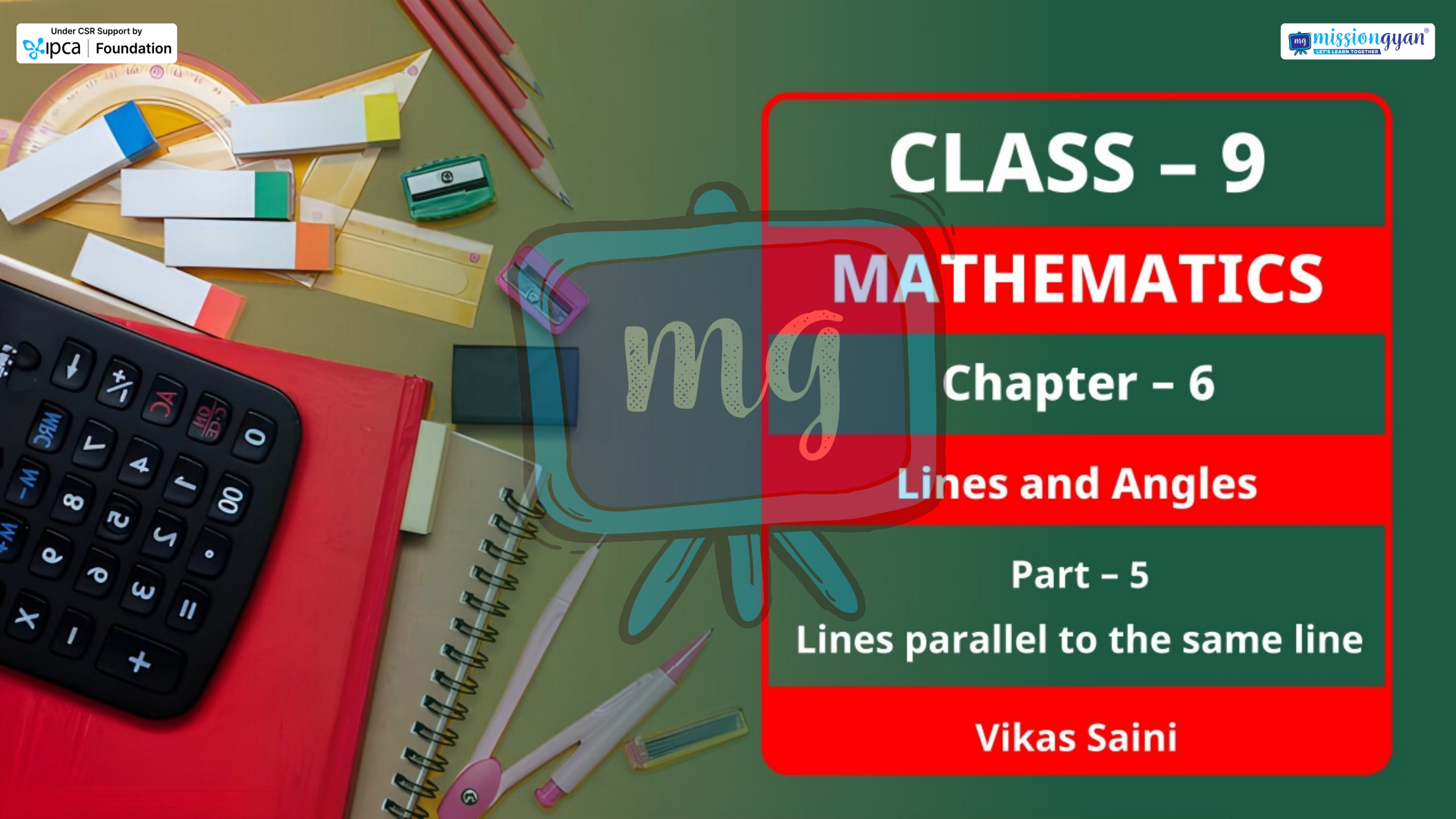

CLASS – 9

MATHEMATICS

Chapter – 6

Lines and Angles

Part – 5

Lines parallel to the same line

Vikas Saini

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OVERVIEW

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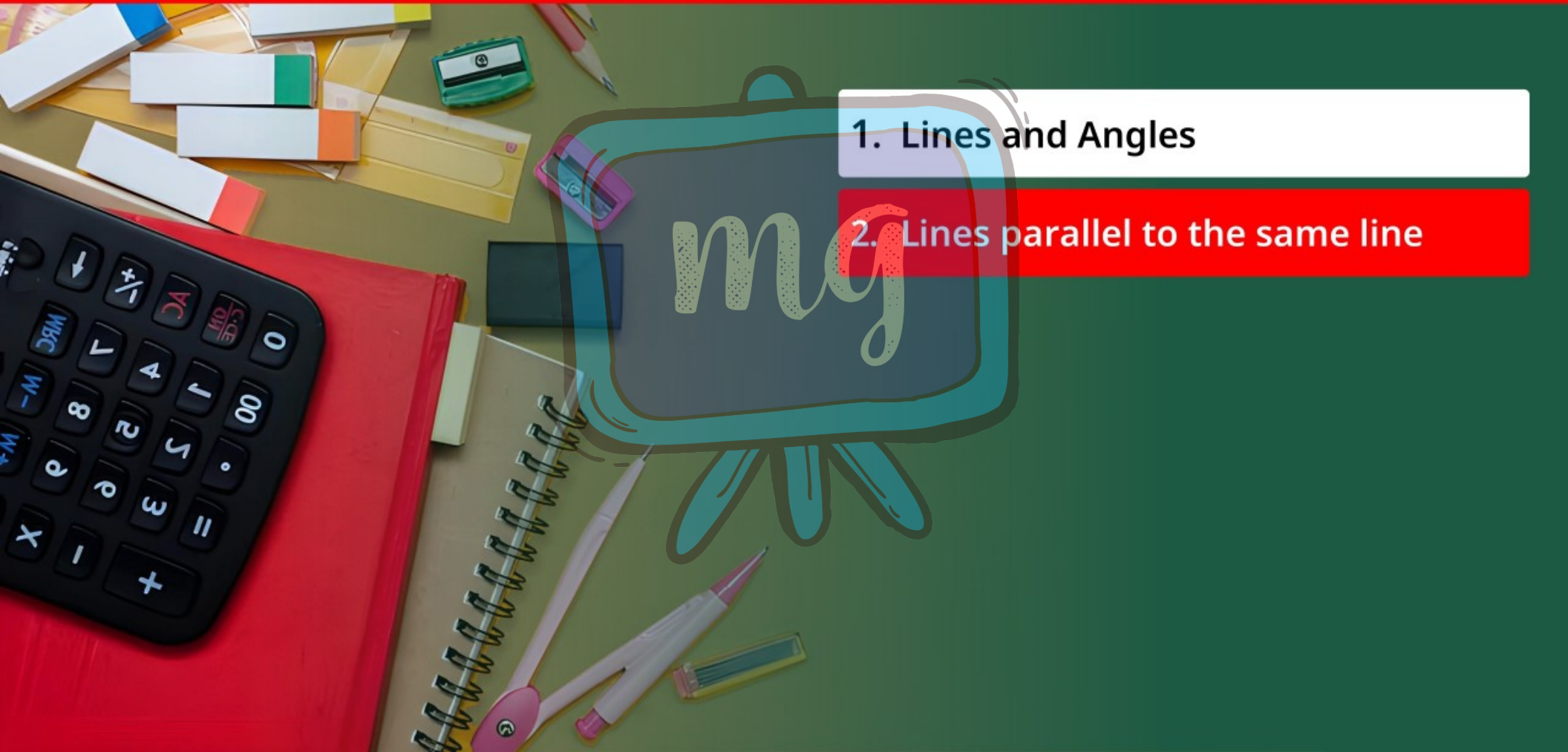

1. Lines and Angles
2. Lines parallel to the same line

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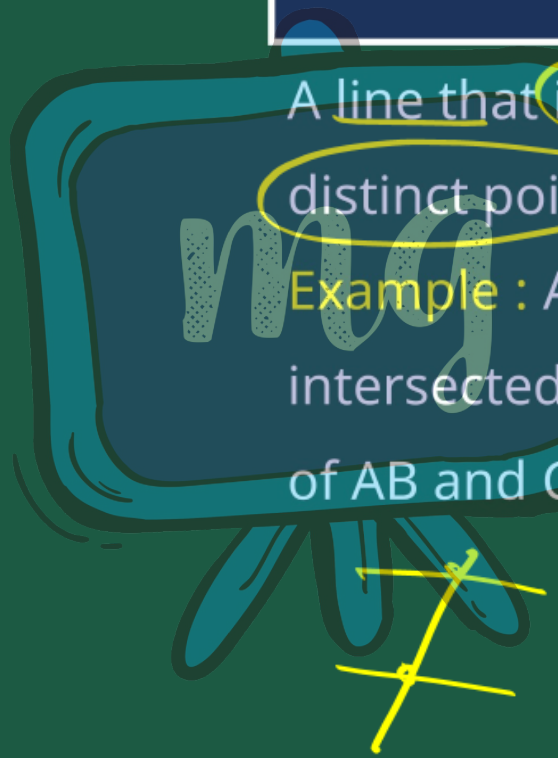
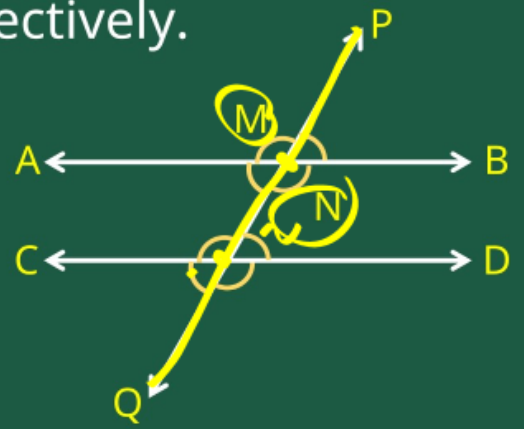
TRANSVERSAL

A line that intersect two or more lines at distinct points

Example : AB and CD are two lines intersected by a line PQ at M & N points of AB and CD respectively.





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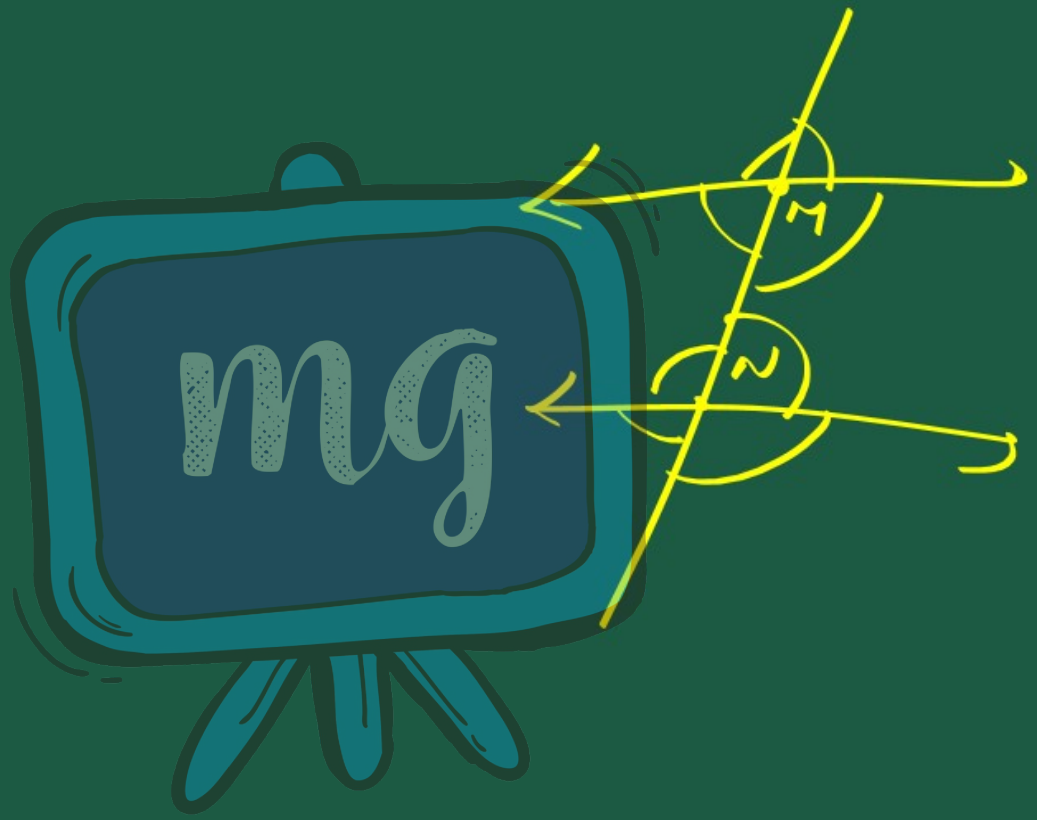

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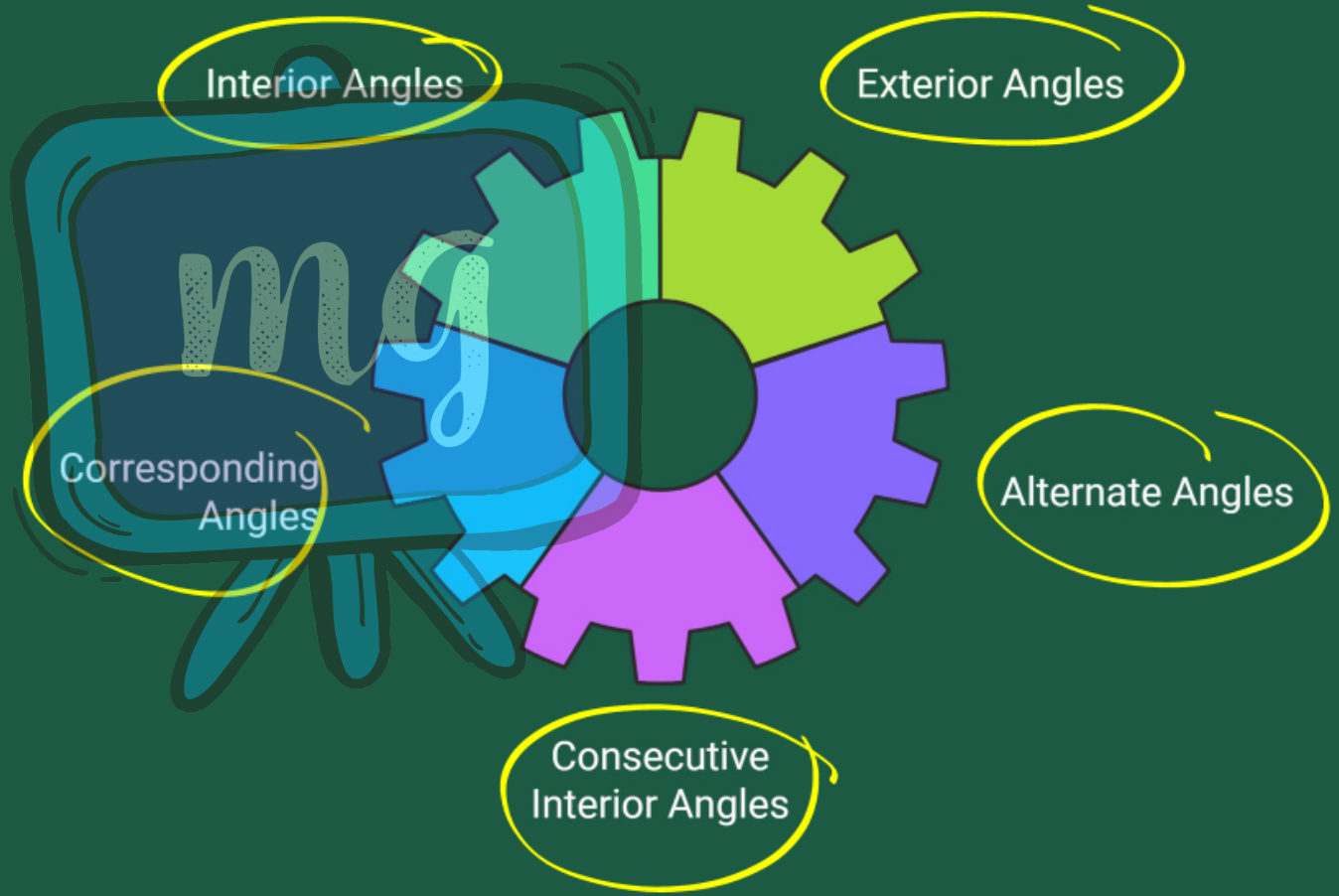
ANGLES DUE TO TRANSVERSAL



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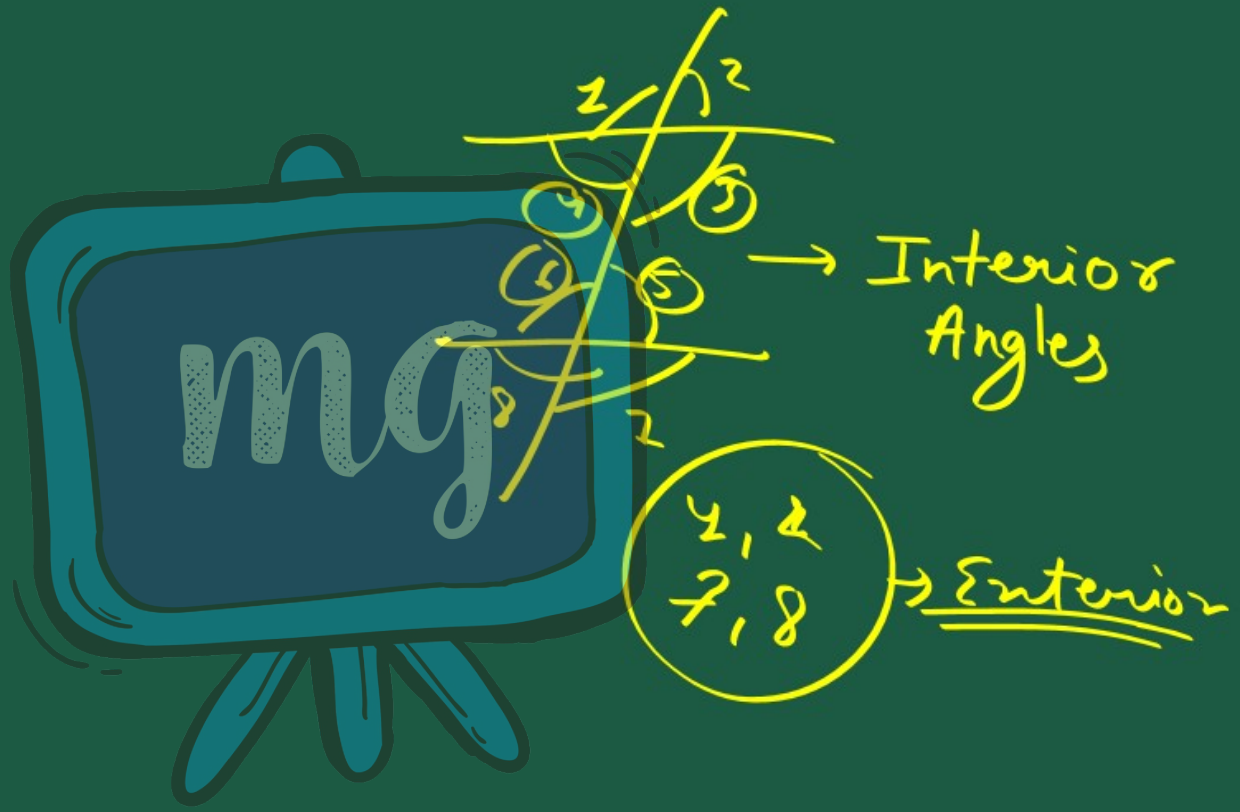

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Interior
Exterior

Corresponding
Alternate
Consecutive

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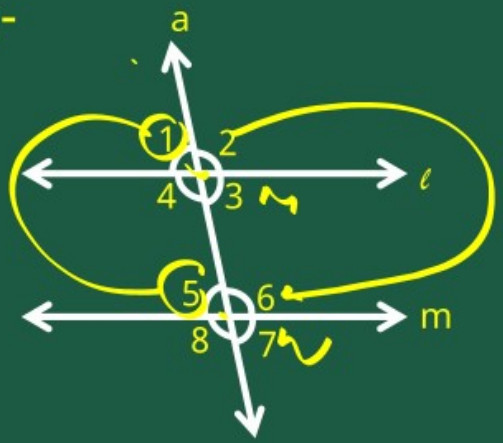
CORRESPONDING ANGLES

The angle which occupy the same relative position at each intersection where a transversal intersect two or more lines.

☛ Corresponding angles-

∠1 & ∠5 ∠2 & ∠6

∠4 & ∠8 ∠3 & ∠7



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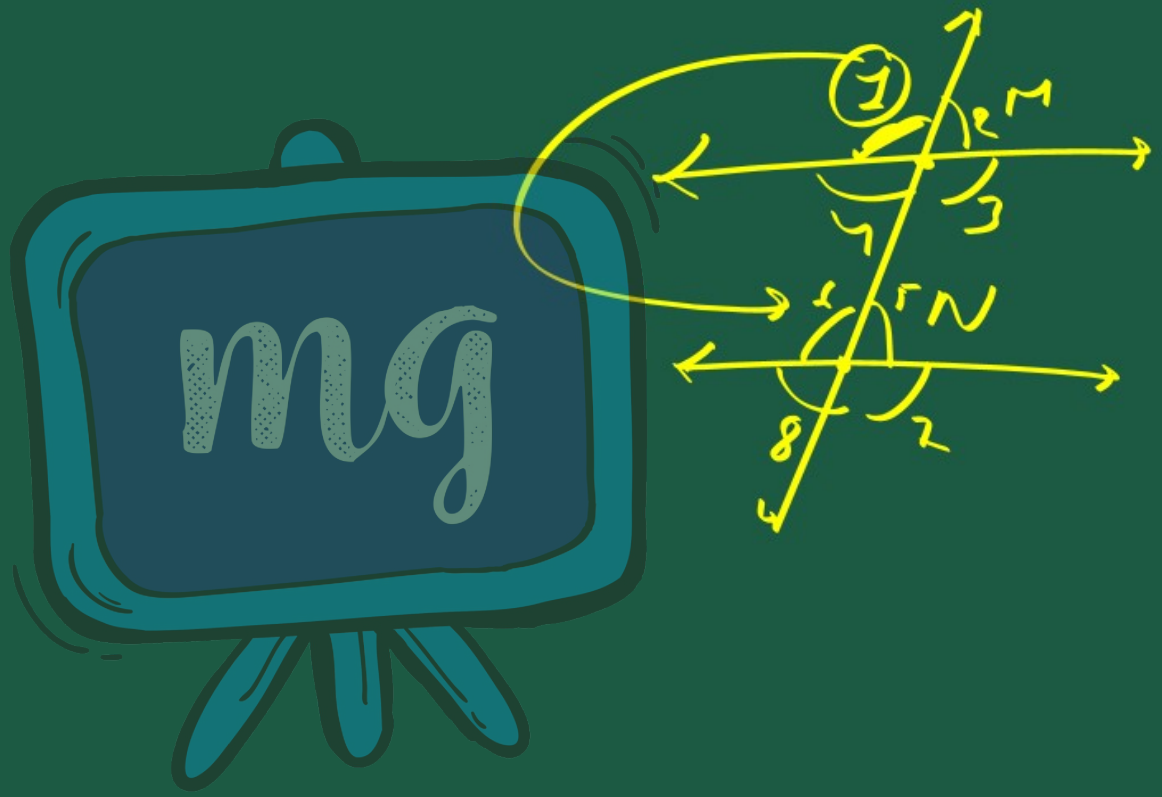

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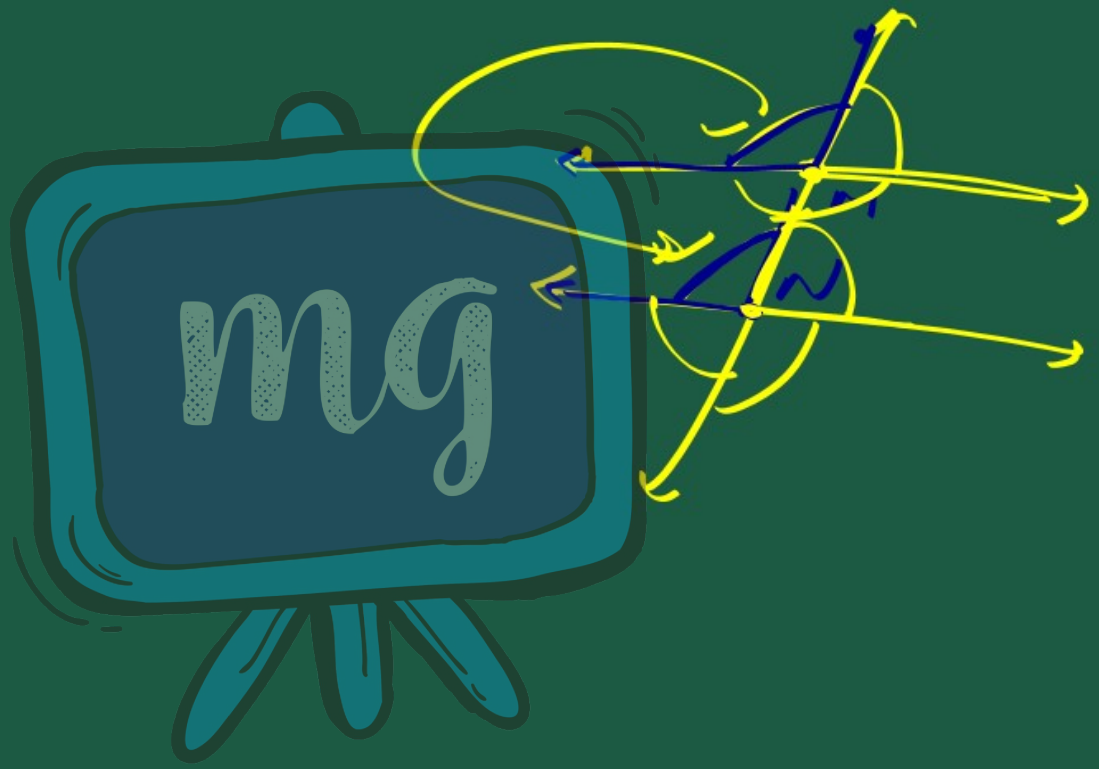

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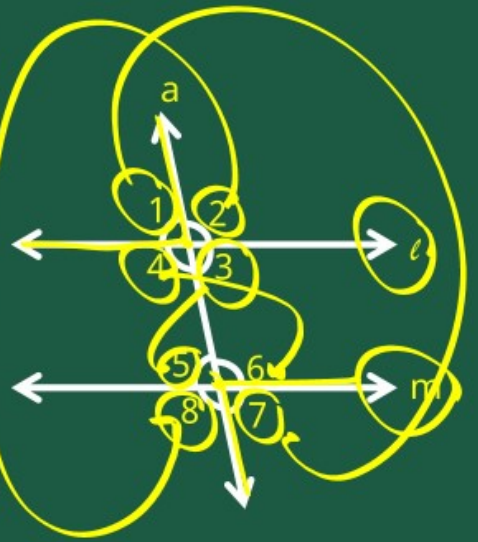
ALTERNATE ANGLES

The angles formed on opposite sides of the transversal are called alternate angles.

- Alternate Angles -

Interior	External
∠4 & ∠6	∠2 & ∠8
∠3 & ∠5	∠1 & ∠7



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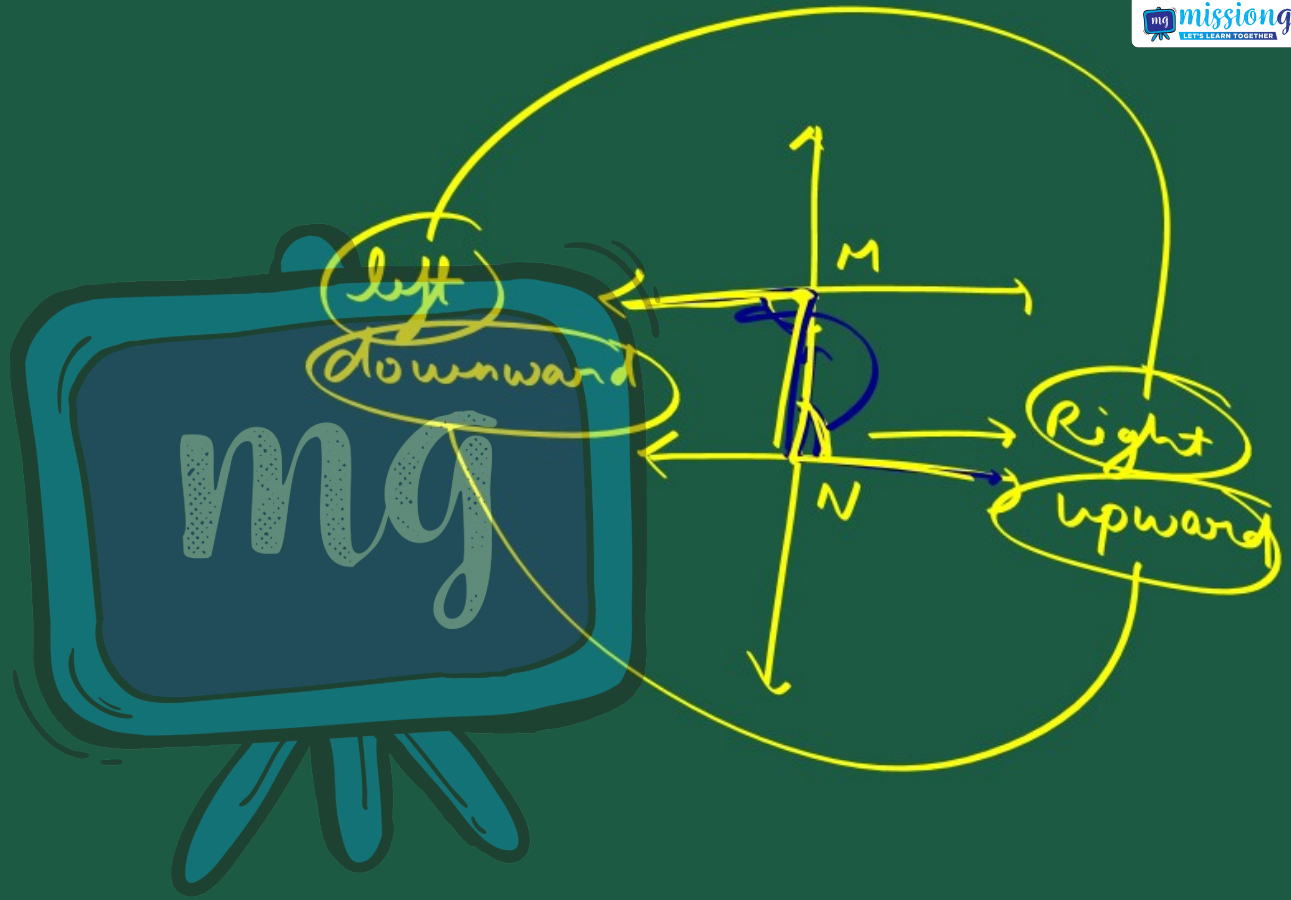

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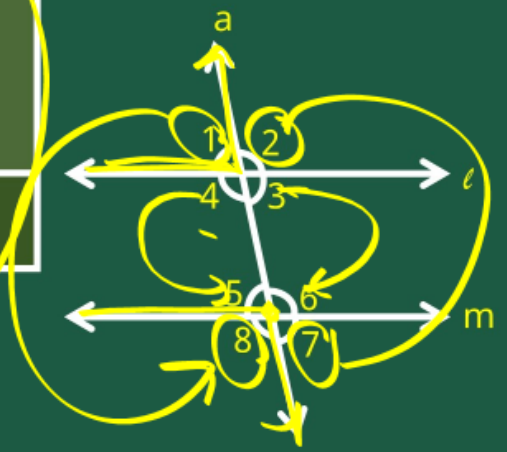
CONSECUTIVE ANGLES

angles on the same side of a transversal are called consecutive angles.

☞ Consecutive Angles -

Interior	External
∠4 & ∠5	∠1 & ∠8
∠3 & ∠6	∠2 & ∠7

Co-interior
Co-exterior



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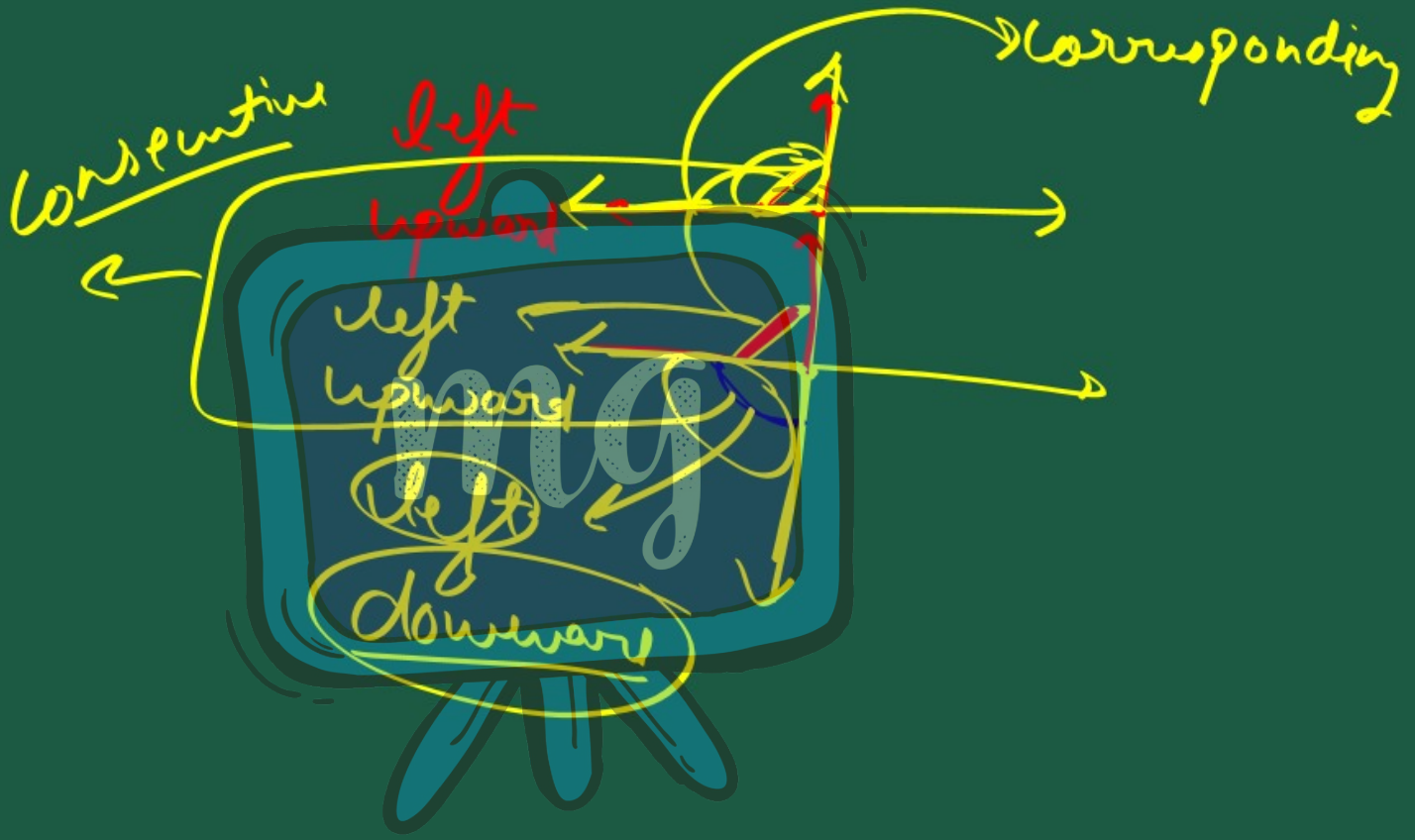

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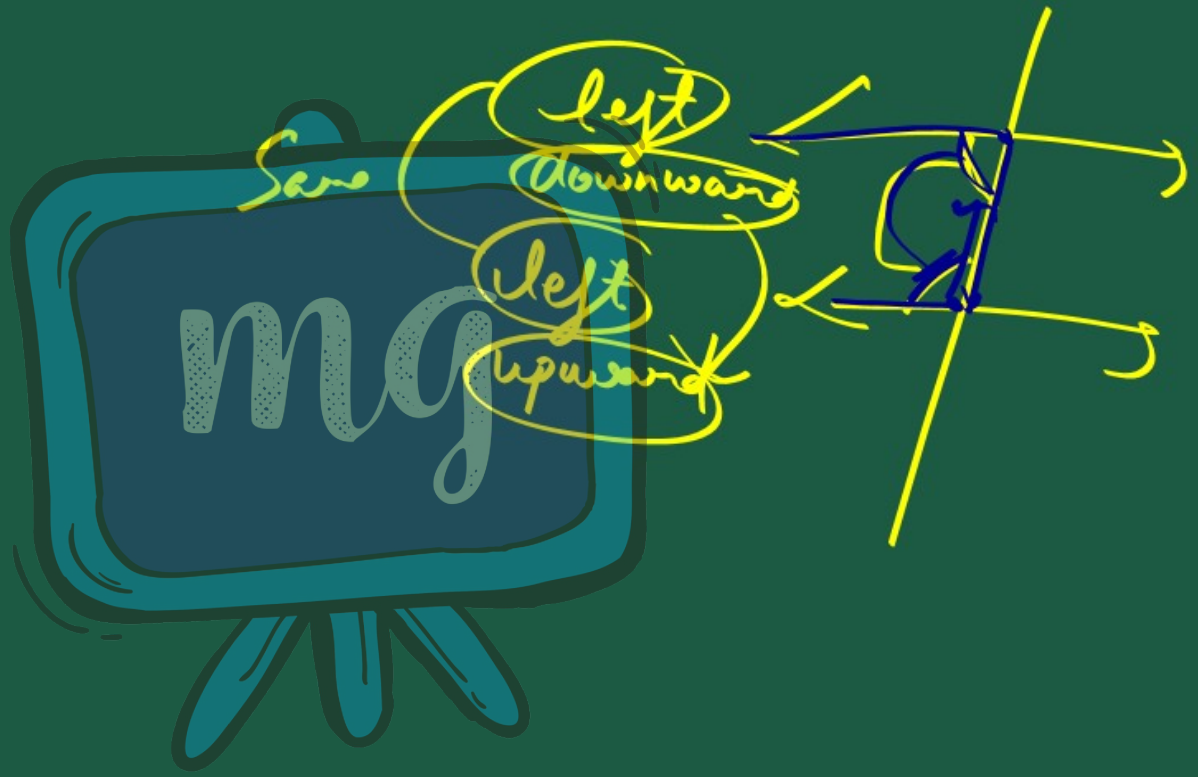

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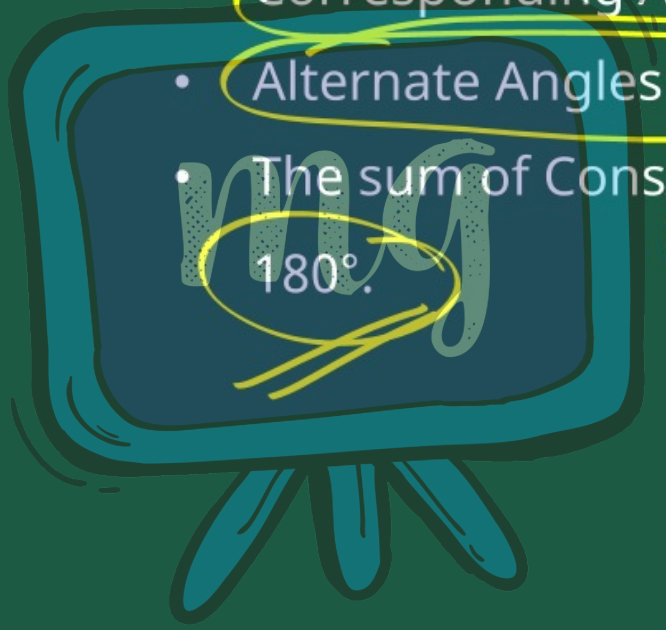
If a transversal intersect parallel lines then

- Corresponding Angles are equal
- Alternate Angles are equal
- The sum of Consecutive Interior Angles is 180°.

(Co-interior Angles)



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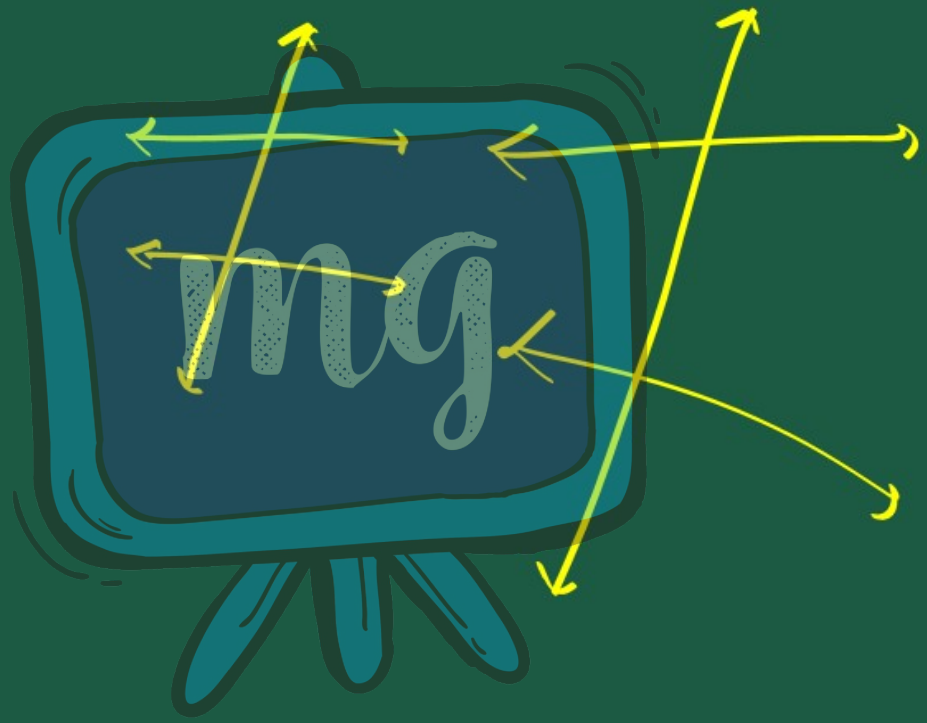

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Example :

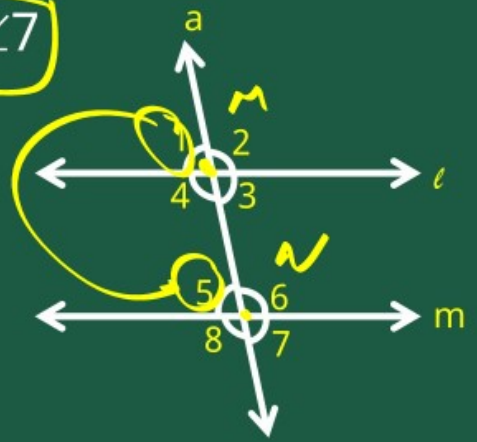
L and M are two parallel lines where h is a transversal for them.

☛ Corresponding angles

$\angle 1 = \angle 5$ $\angle 2 = \angle 6$

$\angle 4 = \angle 8$ $\angle 3 = \angle 7$

$l \parallel m$



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☛ Alternate Angles

$\angle 4 = \angle 6$

$\angle 3 = \angle 5$

Internal

$\angle 2 = \angle 8$

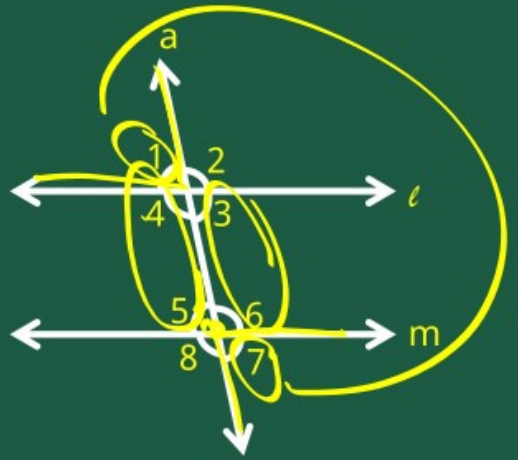
$\angle 1 = \angle 7$

External

☛ Consecutive Interior Angles

$\angle 4 + \angle 5 = 180°$

$\angle 3 + \angle 6 = 180°$



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Note

If a transversal intersect two lines such that

- Corresponding Angles are equal
- Alternate Angles are equal
- The sum of Consecutive Interior Angles is 180°.

Then those two lines are parallel to each other.

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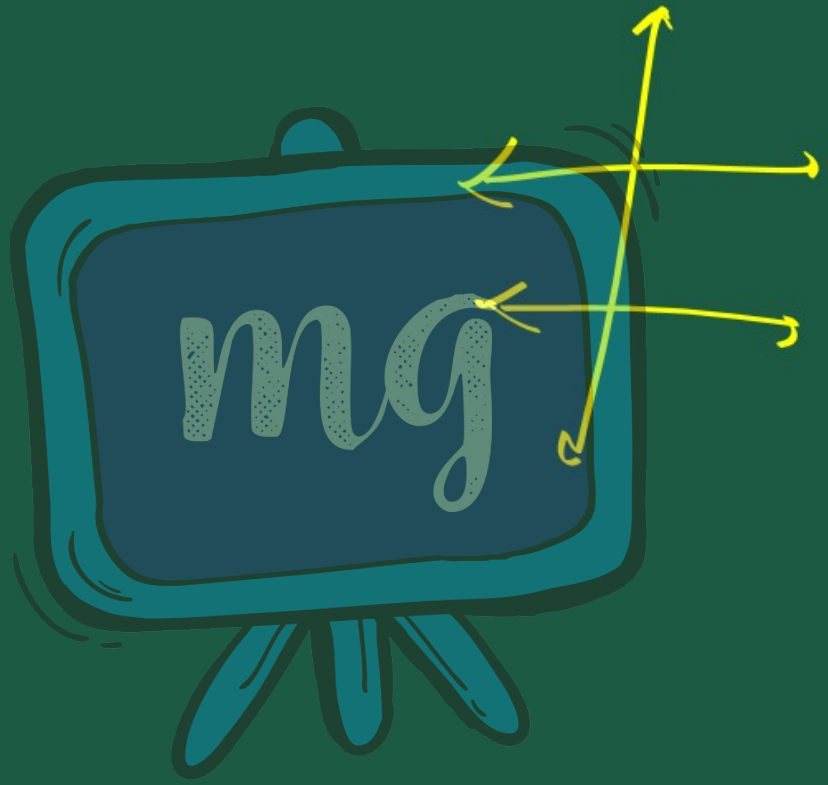

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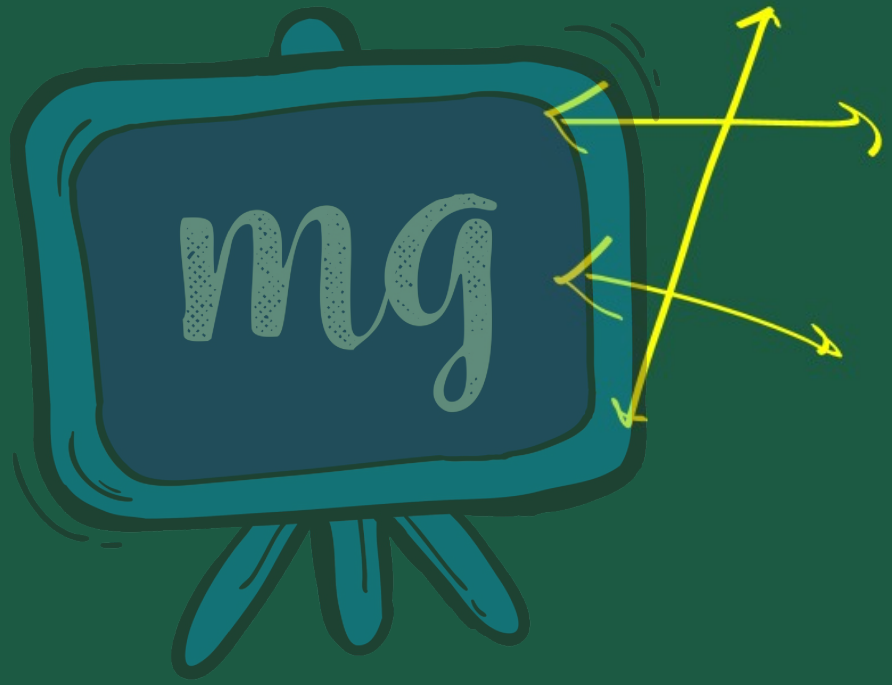

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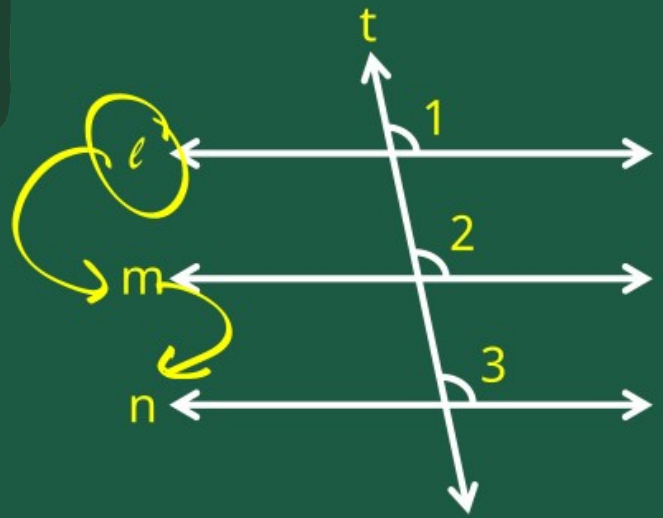
LINES PARALLEL TO THE SAME LINE

If two lines are parallel to a common line then these two lines will also be parallel to each other.

If $\ell \parallel m$, $m \parallel n$

So, $\ell \parallel n$ also



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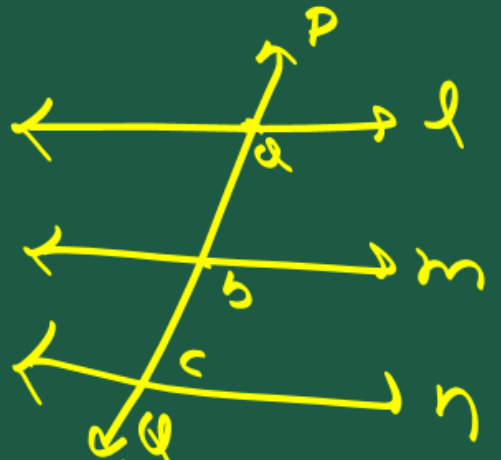
Theorem : 6.2

Lines which are parallel to the same line are parallel to each other.

Given: $l \parallel m$, $m \parallel n$

To prove: $l \parallel n$

Construction: draw a transversal PQ which intersect l, m and n line at a, b, c respectively.



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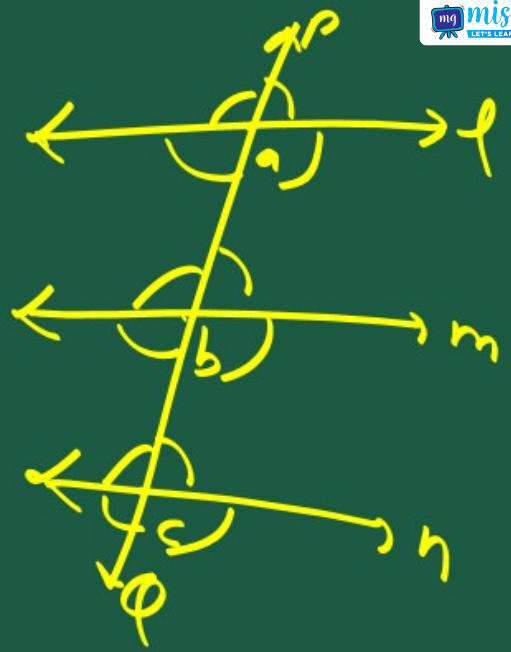

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Sol:- Given $l \parallel m$ [Given]
PQ is transversal

$\angle K = \angle H$ [Alternate interior Angles]

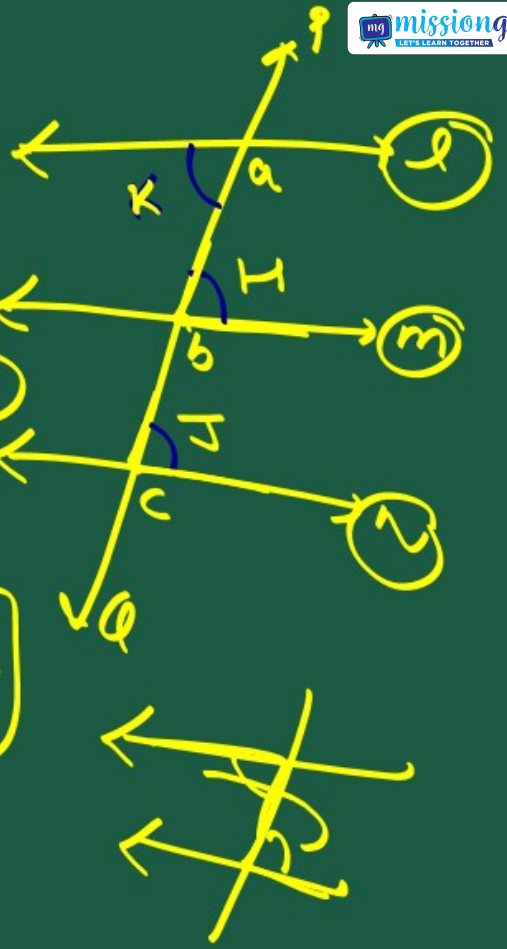
Now

$m \parallel n$, PQ is transversal

$\angle H = \angle J$ [corresponding Angles]

From (1) & (2)

$\angle K = \angle J$



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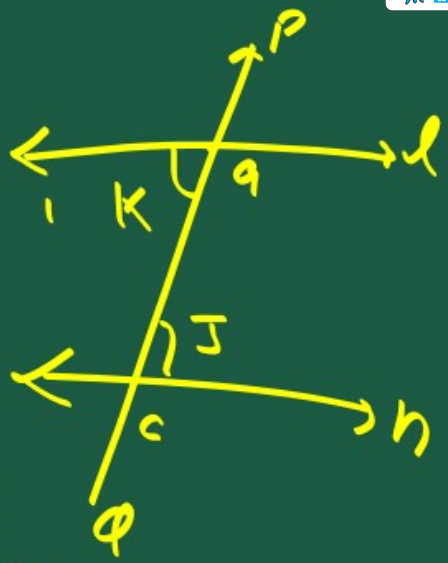
Given $\angle K = \angle J$

l, n are two lines

when PQ is transversal

Line Alternate interior Angle

$\angle K = \angle J$ so, $l \parallel n$



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LEARNING OUTCOME

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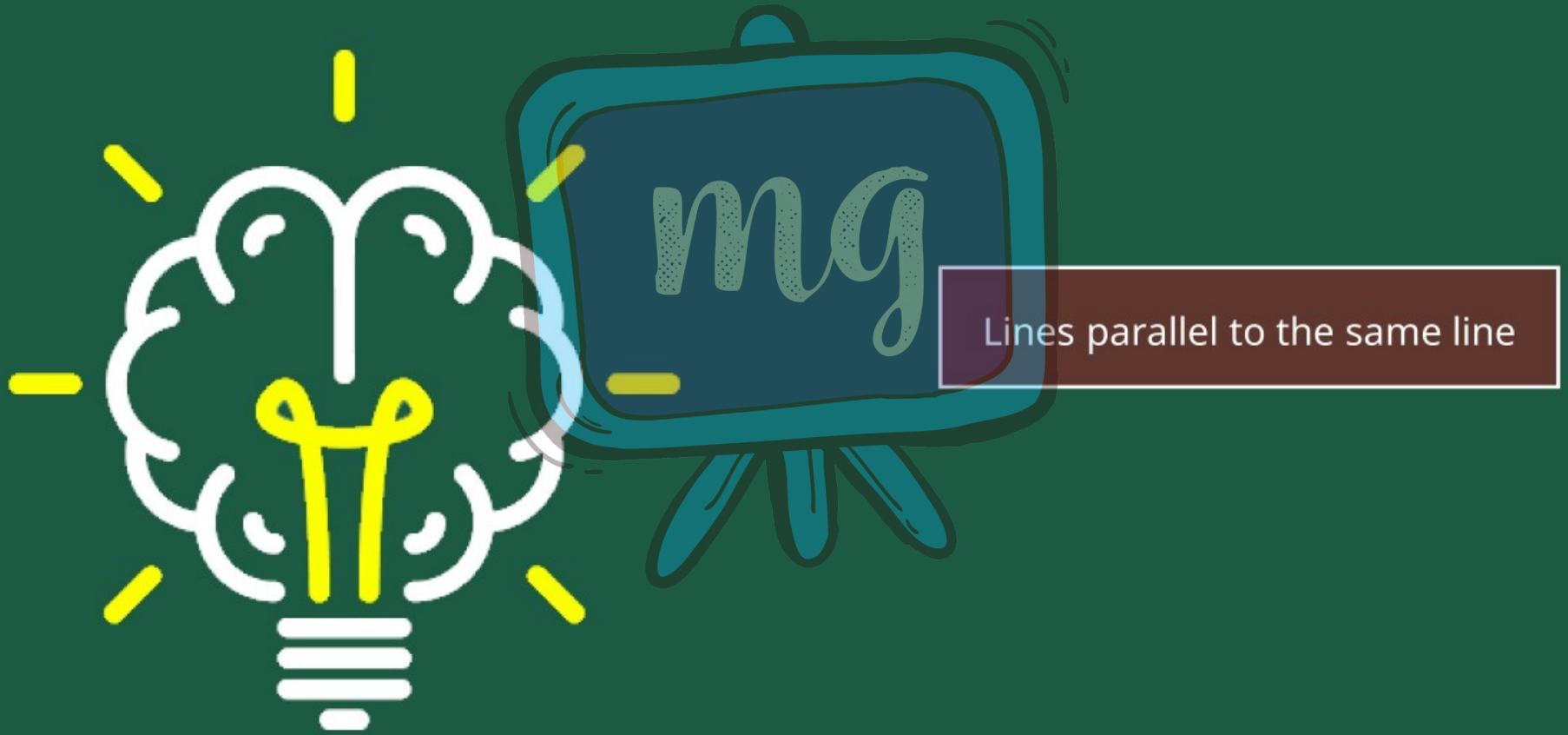

Lines parallel to the same line

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ASSESSMENT

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1 If a transversal intersects two parallel lines, then each pair of corresponding angles–

A is unequal

B is equal

C is complementary

D none of these

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ASSESSMENT

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2 | Lines which are parallel to the same line are parallel to each other.

A True

B False

