Lines and Angles

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Class 9

Comprehensive study notes for

Lines and Angles

by

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(Math King of Katargam). Master every concept with clear explanations, solved examples, and practice problems.

Key Concepts

Basic Terms

A

line segment

has two endpoints. A

ray

has one endpoint. A

line

extends infinitely in both directions. An

angle

is formed when two rays originate from a common point (vertex).

Types of Angles

? can be:

Acute

(0?<?<90?),

Right

(?=90?),

Obtuse

(90?<?<180?),

Straight

(?=180?),

Reflex

(180?<?<360?),

Complete

(?=360?).

Complementary & Supplementary

Complementary angles:

Sum = 90?.

Supplementary angles:

Sum = 180?.
Adjacent & Linear Pair
Adjacent angles
share a common arm and vertex. A
linear pair
is formed when two adjacent angles sum to 180?.
Vertically Opposite Angles
When two lines intersect,
vertically opposite angles
are equal. If lines AB and CD intersect at O, then ?AOC = ?BOD and ?AOD = ?BOC.
Parallel Lines & Transversal
When a transversal cuts two parallel lines:
Corresponding angles
are equal,
Alternate interior angles
are equal,
Co-interior angles
sum to 180?.
Angle Sum of a Triangle
The sum of the three interior angles of a triangle is
180?
. If a side is extended, the
exterior angle
equals the sum of the two opposite interior angles.
Important Formulas
Linear Pair
?1 + ?2 = 180?
Vertically Opposite
?AOC = ?BOD
Corresponding Angles
?1 = ?5, ?2 = ?6, ?3 = ?7, ?4 = ?8
Alternate Interior
?3 = ?6, ?4 = ?5
Co-interior (Consecutive)
?3 + ?5 = 180?, ?4 + ?6 = 180?
Angle Sum of Triangle
?A + ?B + ?C = 180?
Exterior Angle
Exterior ? = Sum of opposite interior angles
Solved Examples
Example 1:
Find the angle which is equal to its complement.
Solution:
Let the angle be x. Then x + x = 90? => 2x = 90? =>

x = 45?

Example 2:

If two adjacent angles on a straight line are (3x-10)? and (2x+20)?, find x.

Solution:

Since they form a linear pair: (3x-10) + (2x+20) = 180 => 5x + 10 = 180 => 5x = 170 =>

x = 34

Example 3:

In ?ABC, ?A = 60? and ?B = 70?. Find ?C.

Solution:

?A + ?B + ?C = 180? => 60 + 70 + ?C = 180 =>

?C = 50?

Practice Questions

Find the supplement of 125?.

If two lines intersect, prove that vertically opposite angles are equal.

Two parallel lines are cut by a transversal. If one interior angle is 110?, find all other angles.

In ?PQR, ?P = 2?Q and ?R = 3?Q. Find all angles.

An exterior angle of a triangle is 120? and its interior opposite angles are equal. Find each angle.

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