

Objectives: Find the slope of a line. Use slopes to identify parallel and perpendicular lines.

Slope: a number, usually written as a fraction, describing the steepness of a line.

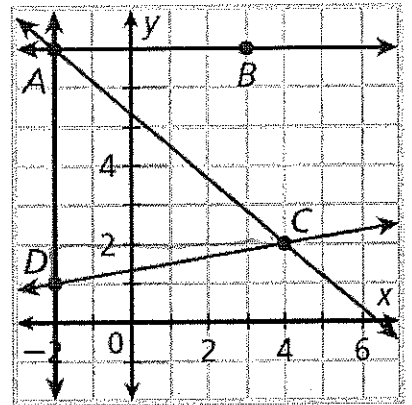
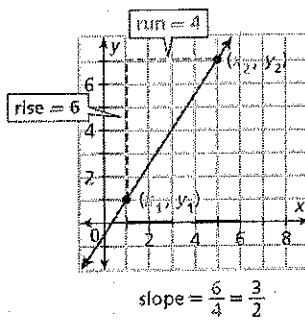
LEFT TO RIGHT

Slope of a Line

DEFINITION

The rise is the difference in the y-values of two points on a line.
 The run is the difference in the x-values of two points on a line.
 The slope of a line is the ratio of the rise to run. If (x_1, y_1) and (x_2, y_2) are any two points on a line, the slope of the line is $m = \frac{y_2 - y_1}{x_2 - x_1}$.

EXAMPLE



EX 1: Use the picture to find the slope of AB and AC.

left to right
0/5

$m_{\overline{AB}} = 0$, $m_{\overline{AC}} = -5/6$

always reduce slope

EX 2: Use the slope formula to find the slope of AD and DC.

$\frac{1-7}{-2+2} = \frac{-6}{0}$

$m_{\overline{AD}} = \text{undefined}$

$m_{\overline{DC}} = 1/6$

Slope of a Line

Positive Slope	Negative Slope	Zero Slope	Undefined Slope

Slopes of Parallel Lines

are same.

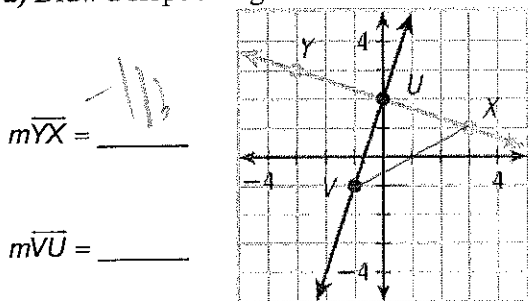
Slopes of Perpendicular Lines are opposite reciprocals

reciprocals

Ex: $1/2$ & $-2/5$ & $-1/3$

EX 2: Determine if the lines are parallel, perpendicular, or neither.

a) Draw a slope triangle.



$m_{\overline{VX}} = 3/2$

$m_{\overline{VU}} = 3/2$

The lines are parallel.

b) KL and MN for $K(-4, 4)$, $L(-2, -3)$, $M(3, 1)$, and $N(-5, -1)$

$-1 - 1 = -2$
 $-3 - 1 = -4$

$m_{\overline{KL}} = -7/2$, $m_{\overline{MN}} = 1/4$

The lines are perpendicular.