

Geometry 3.3

*8th grade standard

**Algebra 1 Ch. 5

Calculate slopes of lines*

Use slope to identify parallel and perpendicular lines**

slope

rate of change

parallel //

$$m = \frac{\text{vert}}{\text{horiz.}} \pm$$

perpendicular $\perp$

same
opp + recip

Quiz 3.1-3.2

slope song

whiteboards

whiteboards

Guided Practice

1A. the line containing (6, -2) and (-3, -5)

1B. the line containing (8, -3) and (-6, -2)

1C. the line containing (4, 2) and (4, -3)

1D. the line containing (-3, 3) and (4, 3)

←
Horiz. line $m = 0$ $\frac{0}{3} = 0$

Study Tip

Dividing by 0 The slope $\frac{-5}{0}$ is undefined because there is no number that you can multiply by 0 and get -5. Since this is true for any number, all numbers divided by 0 will have an undefined slope. All vertical lines have undefined slopes.

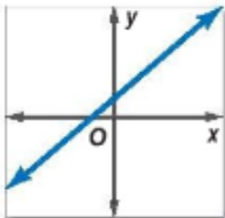
Vert line $m = \text{undef}$
 $\frac{3}{0} =$ $\updownarrow$

p. 189

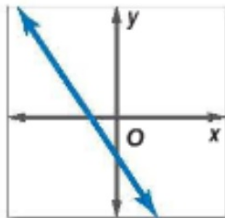


ConceptSummary Classifying Slopes

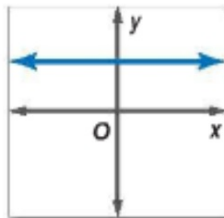
Positive Slope



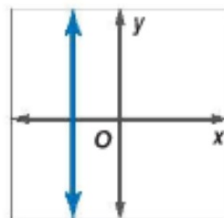
Negative Slope



Zero Slope



Undefined Slope



Slope = rate of change

ℓ/m

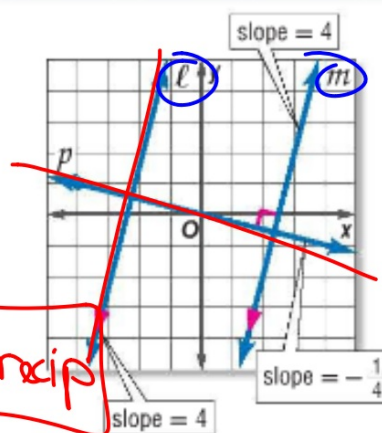
Postulates Parallel and Perpendicular Lines

3.2 Slopes of Parallel Lines Two nonvertical lines have the same slope if and only if they are parallel. All vertical lines are parallel.

Example Parallel lines ℓ and m have the same slope, 4.

3.3 Slopes of Perpendicular Lines Two nonvertical lines are perpendicular if and only if the product of their slopes is -1 . Vertical and horizontal lines are perpendicular.

Example line $m \perp$ line p
product of slopes $= 4 \cdot -\frac{1}{4}$ or -1



Opposite recip

$$(\quad) \cdot (\quad) = -1$$

Determine whether $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are parallel, perpendicular, or neither.
Graph each line to verify your answer.

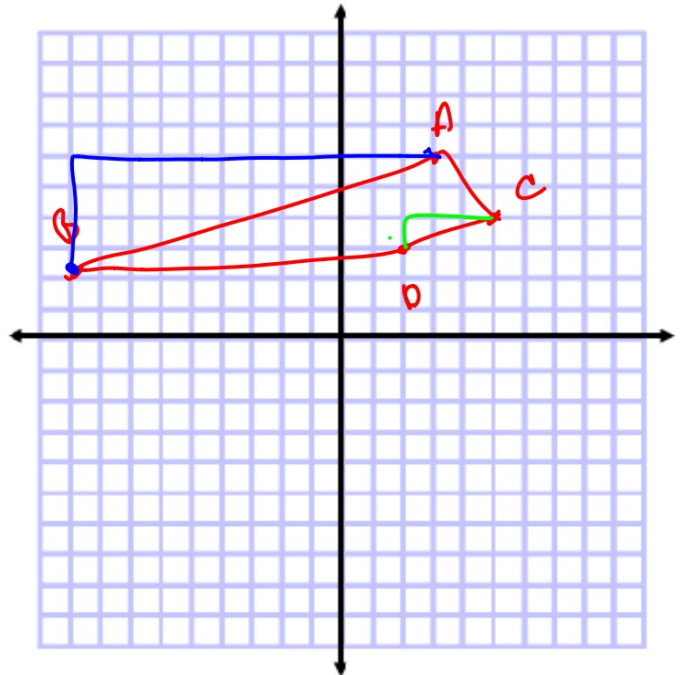
3A. $A(14, 13), B(-11, 0), C(-3, 7), D(-4, -5)$

3B. $A(3, 6), B(-9, 2), C(5, 4), D(2, 3)$

$$m \overline{AB} = ? \frac{4}{12} = \frac{1}{3}$$

$$m \overline{CD} = ? \frac{1}{3}$$

$$\overline{AB} \parallel \overline{CD}$$



4. Graph the line that contains $P(0, 1)$ and is perpendicular to $\overrightarrow{QR}$ with $Q(-6, -2)$ and $R(0, -6)$.

$$m_{\overrightarrow{QR}} = -\frac{1}{6} \quad + \frac{6}{1}$$

