1.3 Slope of a Line

Study 1.3
probl # 1, 3, 5, 9, 13,
17-23, 27, 31-39,
43, 45, 49, 50, 61

geogebra, interactive: slope-intercept form, y = mx + b
http://www.battaly.com/collegealgebra/geogebra/slopeIntercept/

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1.3 Slope of a Line

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geogebra, interactive: slope-intercept form, y = mx + b
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What part of the linear equation deals with steepness?

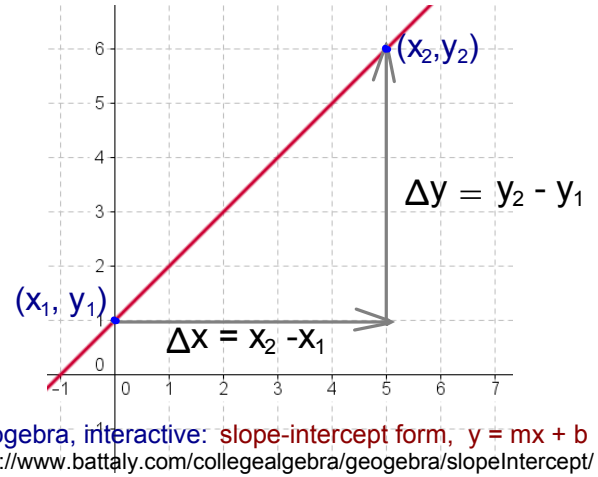
1.3 Slope of a Line

What part of the linear equation deals with steepness?

Definition: Slope of a Non-vertical Line

Let (x_1, y_1) and (x_2, y_2) be two distinct points of a non-vertical line. Then,

$$m = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x}$$



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1.3 Slope of a Line

Find the slope of the line through the points (2, 3) and (4, 9).
Is the line increasing, decreasing, horizontal, or vertical?

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\square - \square}{\square - \square}$$

$$m = \frac{\square}{\square} = \square$$

Is the line increasing, decreasing, horizontal, or vertical?

1.3 Slope of a Line

Find the slope of the line through the points (2, 3) and (4, 9).
Is the line increasing, decreasing, horizontal, or vertical?

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9 - 3}{4 - 2}$$

$$m = \frac{6}{2} = 3$$

Is the line increasing, decreasing, horizontal, or vertical?

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1.3 Slope of a Line

1.3 problems 8, 18, 22

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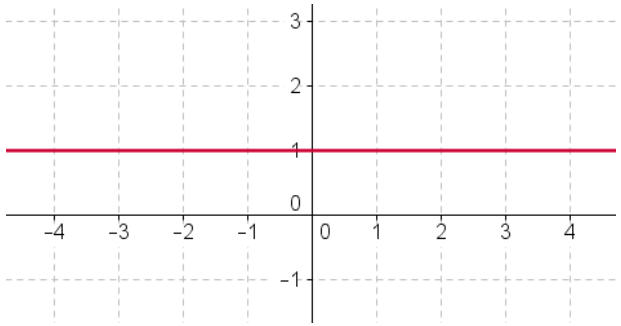
1.3 Slope of a Line

Describe a line with slope, m = 0

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0}{a}, \quad a \neq 0$$

A line with slope = 0:

1. has the same y value for every x.
2. has the form $y = k$
3. is a horizontal line

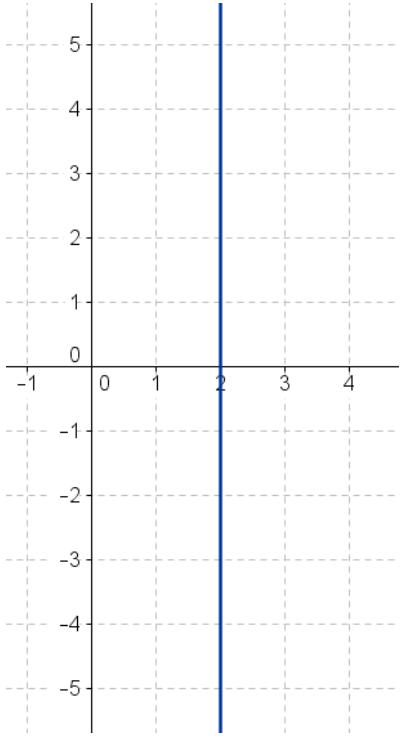


1.3 Slope of a Line

Describe a line with an undefined slope

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{a}{0}$$

Division by 0 is not defined.



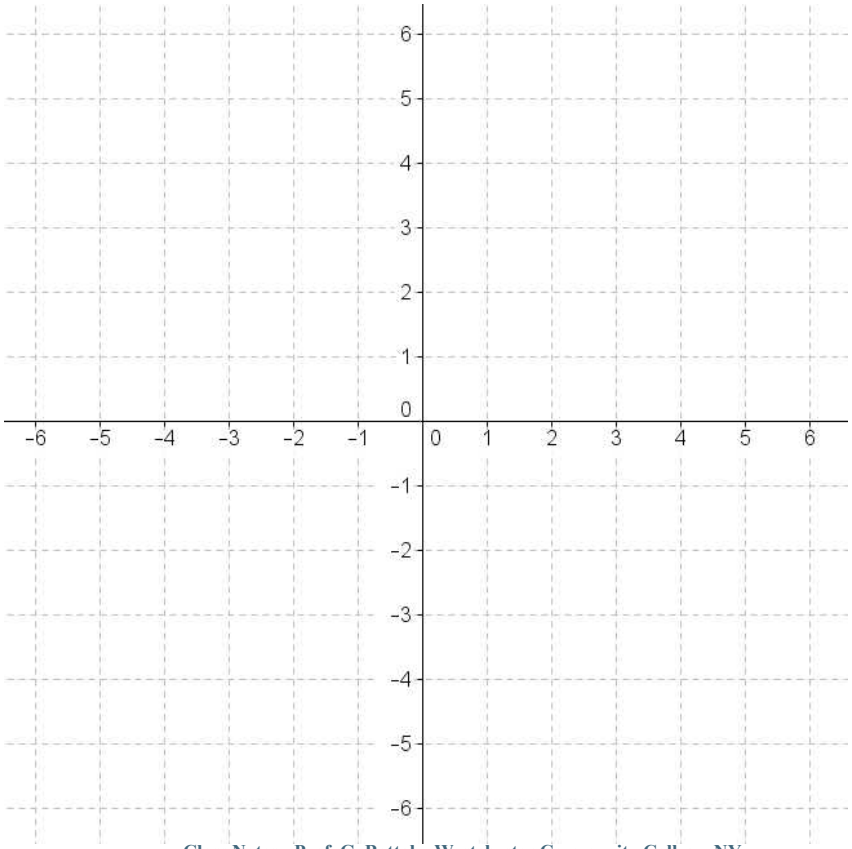
A line with an undefined slope:

1. has the same x value for every y.
2. has the form $x = c$
3. is a vertical line

1.3 Slope of a Line

How do these lines compare?

$y = 2x + 5$ and $y = 2x$



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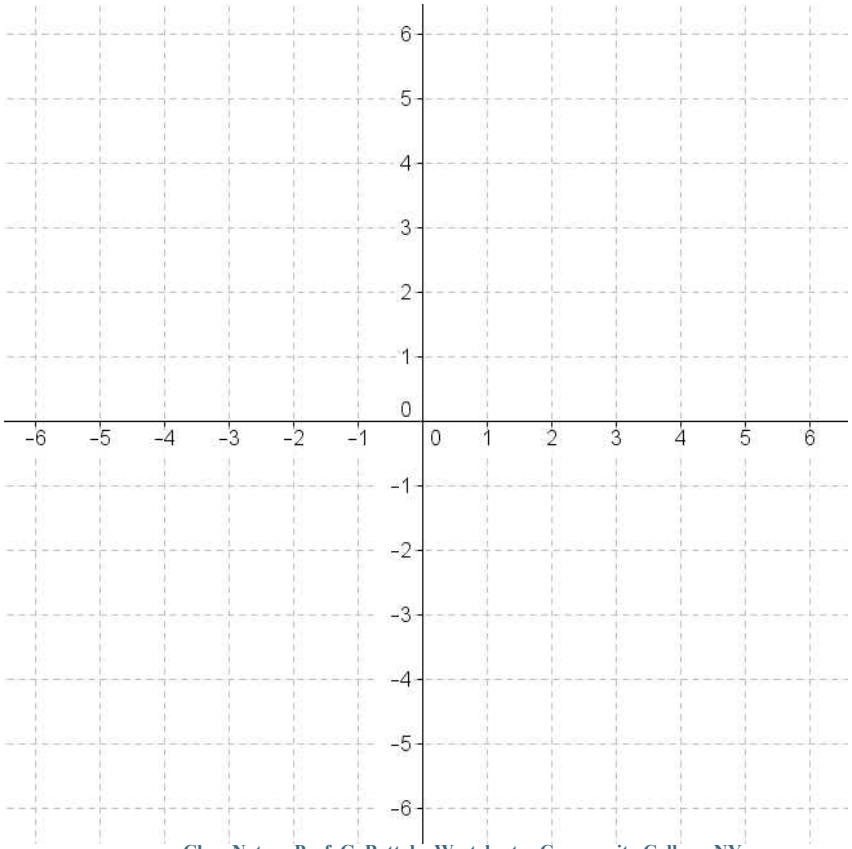
1.3 Slope of a Line

How do these lines compare?

$y = 2x + 5$ and $y = (-1/2)x$



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1.3 Homework

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1.3 Slope of a Line

lines l_1, l_2	y = mx + b slope, m	example
parallel	$m_1 = m_2$	$y = 2x + 4$ $y = 2x \frac{4}{3}$
perpendicular	$m_1 = \frac{-1}{m_2}$	$y = 2x + 4$ $y = \frac{-1}{2} x - \frac{4}{3}$

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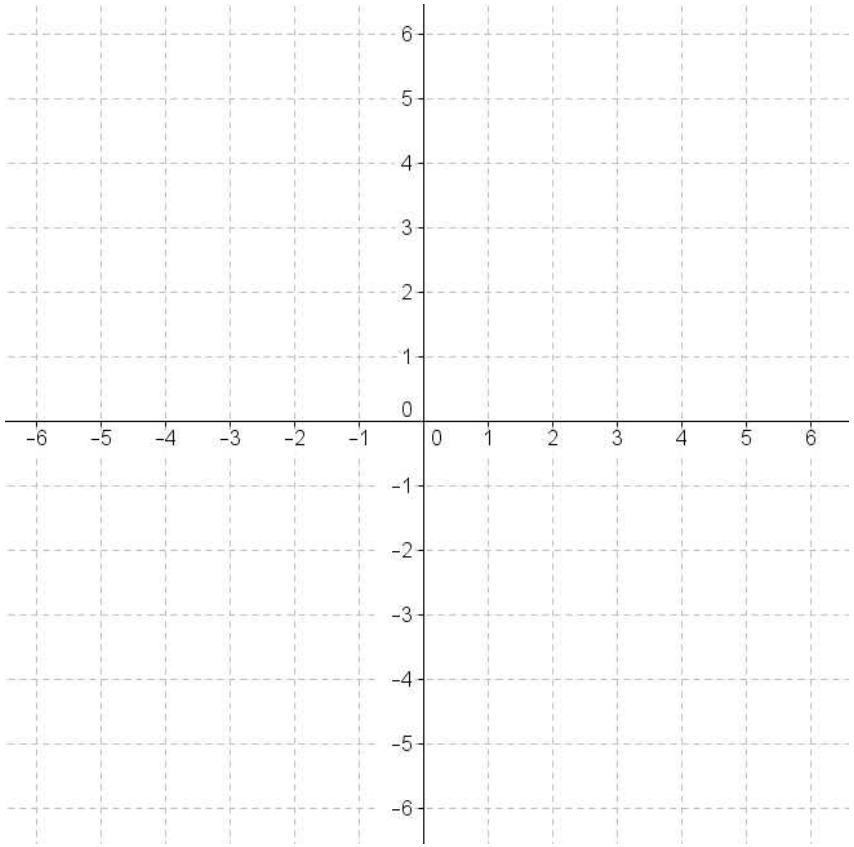

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