1.4 Meaning of Slope

Study 1.4
probl # 1 - 33,
37, 39, 41(opt)

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1.4 Meaning of Slope

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,

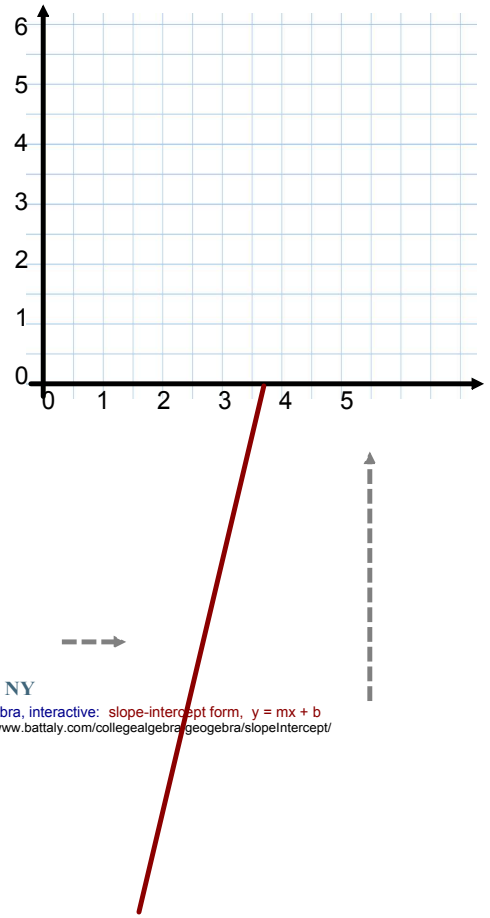
$$m = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x}$$

Consider the equation: $y = 4x + 1$

$$m = 4 = \frac{\Delta y}{\Delta x} = \frac{+4}{+1}$$

If x increases 1 unit,

then y _____



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

1.4 Meaning of Slope

What part of the linear equation deals with steepness?

Consider the equation: $y = 4x + 1$

$$m = 4 = \frac{\Delta y}{\Delta x} = \frac{+4}{+1}$$

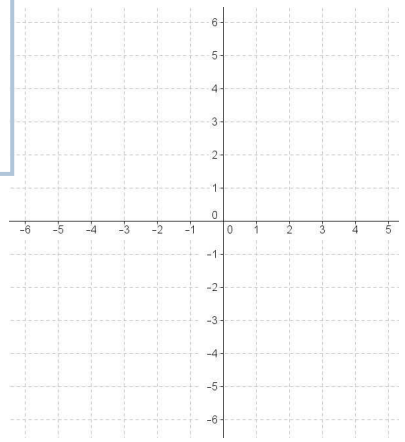
If x increases 1 unit, then y increases 4 units

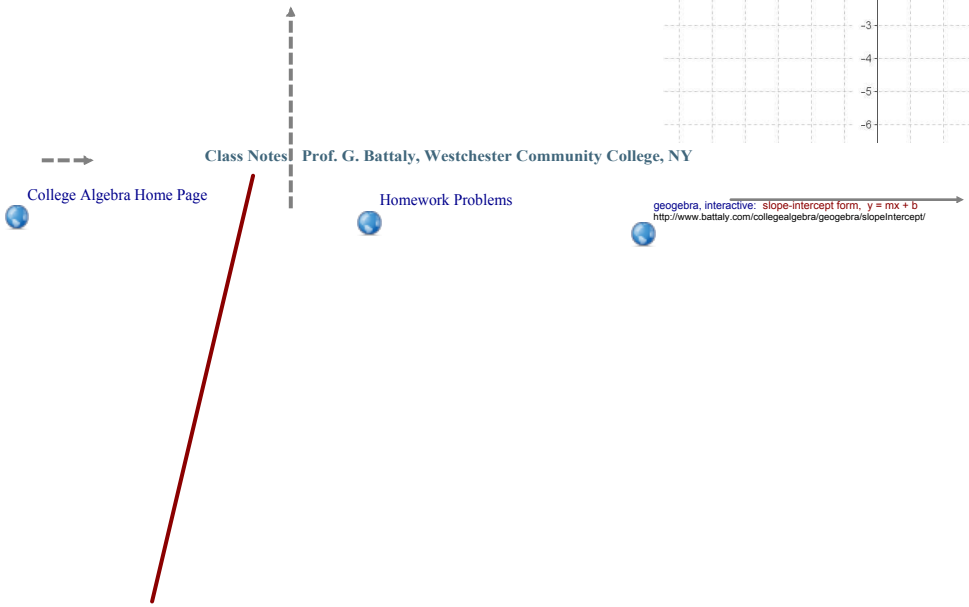
Consider the equation: $y = -4x + 1$

$$m = -4 = \frac{\Delta y}{\Delta x} = \frac{-4}{+1}$$

If x increases 1 unit,

then y _____





1.4 Meaning of Slope

What part of the linear equation deals with steepness?

Consider the equation: $y = 4x + 1$

$m = 4 = \frac{\Delta y}{\Delta x} = \frac{+4}{+1}$

If x increases 1 unit, then y increases 4 units

$y = -4x + 1$ $m = -4 = \frac{\Delta y}{\Delta x} = \frac{-4}{+1}$

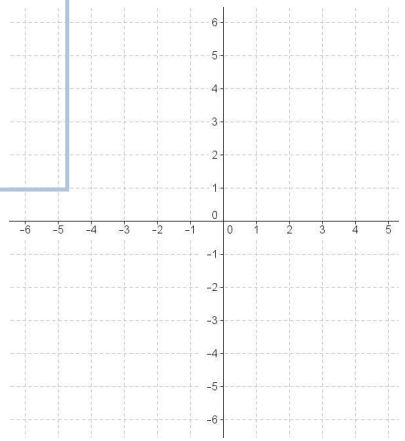
If x increases 1 unit, then y decreases 4 units

Consider the equation: $y = \frac{-3}{2}x + 1$

$m = \frac{-3}{2} = \frac{\Delta y}{\Delta x} = \frac{-3}{+2}$

If x increases 2 units,

then y _____



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1.4 Meaning of Slope

What part of the linear equation deals with steepness?

Consider the equation: $y = 4x + 1$

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If x increases 1 unit, then y increases 4 units

$y = -4x + 1$ $m = -4 = \frac{\Delta y}{\Delta x} = \frac{-4}{+1}$

If x increases 1 unit, then y decreases 4 units

$y = \frac{-3}{2} x + 1$ $m = \frac{-3}{2} = \frac{\Delta y}{\Delta x} = \frac{-3}{+2}$

If x increases 2 units, then y decreases 3 units

Therefore, for: $y = m x + b$

$$m = \frac{\Delta y}{\Delta x} = \frac{m}{1}$$

If x increases 1 unit, then:
y changes by m units ...
up if m > 0, down if m < 0

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Given a non-vertical line:

$$y = m x + b$$

If $x = 0$, then $y = b$

$(0, b)$ is:

1) a solution of the equation
2) a point on the line
3) the y-intercept (on the y-axis)

1.4 Meaning of Slope

Slope-intercept Form
of a Linear Equation

$$y = m x + b$$

What is the coefficient on y?

$$\square y = m x + b$$

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1.4 Meaning of Slope examples from even problems