U6D1_T Slope y-intercept Form

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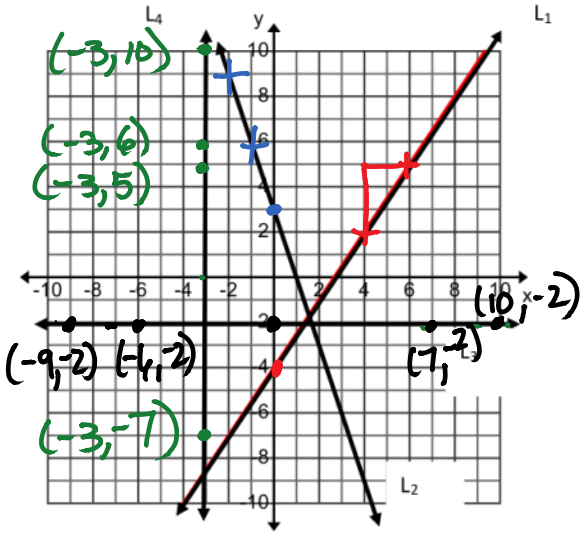
U6D1_T
Slope y-in...

U6D1 Analytic Geometry Part 2

Equation of a Line in Slope Y-Intercept Form

Example 1: Determine the slope and y-intercept of each line. Then determine the equation of each linear relation.



L_1: $m = \frac{3}{2}$ $b = -4$

$y = \frac{3}{2}x - 4$

L_2: $m = \frac{-3}{1}$ $b = 3$

$m = -3$

$y = -3x + 3$

L_3: $m = 0$ $b = -2$

$y = 0x - 2$

$y = -2$

L_4: m is undefined
no y-intercept
$x = -3$

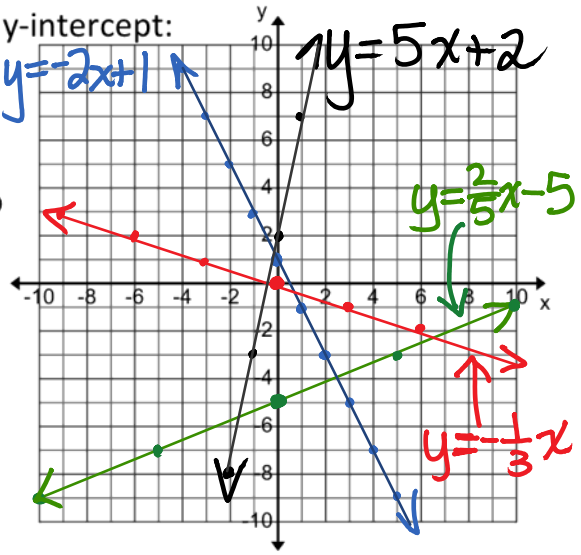
Example 2: Given the slope and y-intercept, write an equation of the linear relation and then graph the line.

To graph a line given slope and y-intercept:

Step 1: Plot the y-intercept. (0, b)

Step 2:

Use the slope value to determine the rise and run from the y-intercept.



a. $m = \frac{2}{5}, b = -5$ (rise / run) $y = mx + b$

$y = \frac{2}{5}x - 5$

b. $m = -2, b = 1$ ($-2 = \frac{-2}{1}$)

$y = -2x + 1$

c. $m = -\frac{1}{3}, b = 0$

$y = -\frac{1}{3}x$

d. $m = 5, b = 2$ ($5 = \frac{5}{1}$)

$y = 5x + 2$

Therefore, the equation of a line can be written in slope y-intercept form

$$y = mx + b$$

where m is the slope and b in the y-intercept.

Special Cases:

A. Horizontal Lines

- The slope of a horizontal line is zero.
- Putting that slope into the equation $y = mx + b$, we get $y = 0x + b$

∴ $y = b$ is the equation of a horizontal line.

* cuts through y-axis so y = y-intercept

B. Vertical Lines

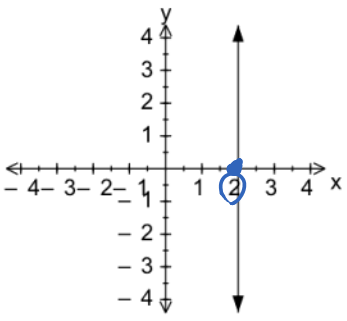
- The slope of a vertical line does not exist. We call this undefined.

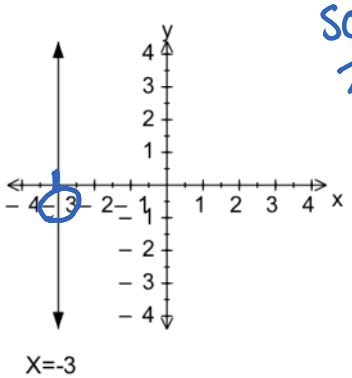
∴ We cannot use slope y-intercept form for vertical lines.

- Vertical lines are written in the form of where 'a' is the x-intercept.

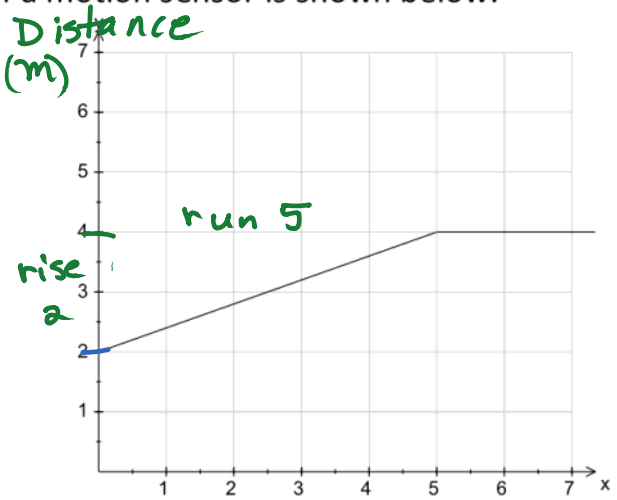
cut through the x-axis so x = x-intercept

x = a





Example 3 (interpreting graphs): The distance time graph of a person walking in front of a motion sensor is shown below.



a. How far from the sensor did the person start walking?

2 m

b. How fast did the person walk?

$m = \frac{2}{5}$ or 0.4m/s

c. Did the person walk away or towards the sensor?

away

(distance from sensor is increasing)

d. What is happening after 5 seconds?

The person is stopped.