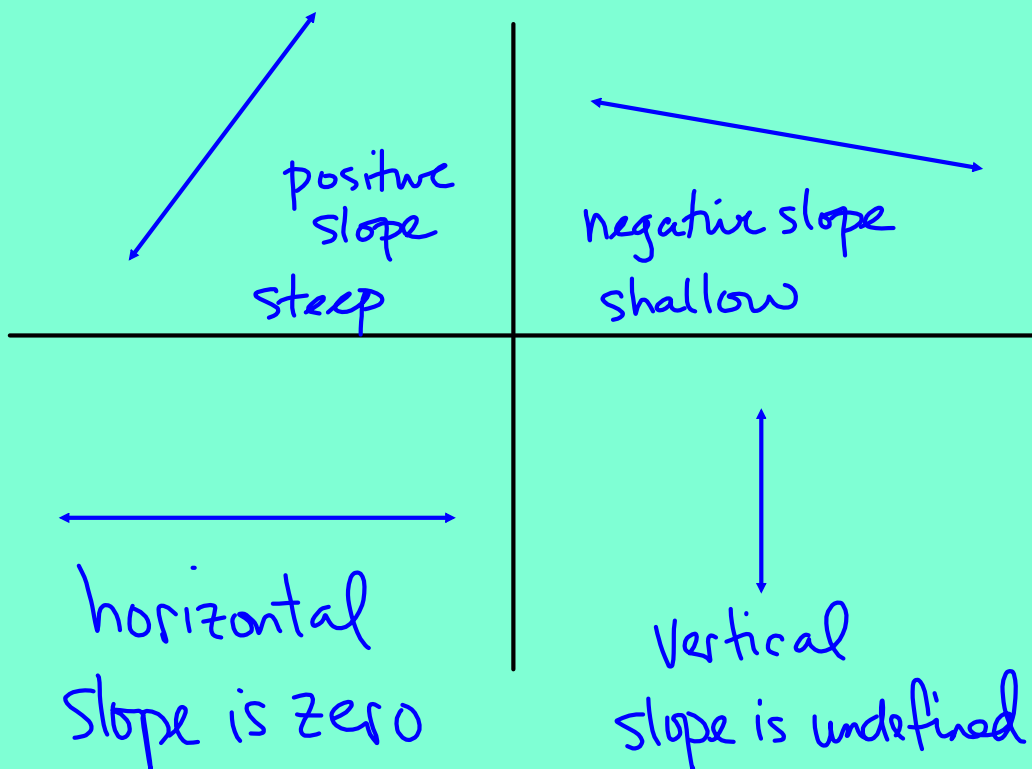


Review - Part 4

Slope & the Equation of a Line

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What can you say about the slope of these lines?



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What can you say about the slope of the red lines?

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Slope & the Equation of a Line

Feb 5/2016

To write the equation of a line, we need

- slope (m)
- y-intercept (b)

$$y = m x + b$$

- to calculate m (slope), we need two points:
(x_1, y_1) and (x_2, y_2)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

- write the equation with the new slope.
- substitute any point on the line back into the equation and solve for b , the y-intercept

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Ex.1 Determine the equation of the line:

(a) through (5, 1) and (7, -3).

 x_1, y_1, x_2, y_2

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{-3 - 1}{7 - 5}$$

$$m = \frac{-4}{2}$$

$$m = -2$$

- ✓ calculate slope
- ✓ write equation
- ✓ sub point (x,y)
- ✓ solve for b
- rewrite equation

$$y = mx + b$$

$$y = -2x + b$$

Sub (5,1) or (7,-3)

$$1 = -2(5) + b$$

$$1 = -10 + b$$

$$11 = b$$

$$y = -2x + 11$$

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(b) through (2, 6) and (-1, 7)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

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

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

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

- calculate slope
- write equation
- sub point (x,y)
- solve for b
- rewrite equation

$$y = mx + b$$

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

Sub (2,6) or (-1,7)

$$6 = -\frac{1}{3}(2) + b$$

$$6 = -\frac{2}{3} + b$$

$$6 + \frac{2}{3} = b$$

$$\frac{18}{3} + \frac{2}{3} = b$$

$$\frac{20}{3} = b$$

$$y = -\frac{1}{3}x + \frac{20}{3}$$

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(c) a horizontal line through (5,2)

- calculate slope
- write equation
- sub point (x,y)
- solve for b
- rewrite equation

$y = 2$ equation of line

$y = mx + b$
 $m = 0$
 $y = 0x + b$
 $y = b$
 $y = 2$

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(d) a vertical line through (5,2)

- calculate slope
- write equation
- sub point (x,y)
- solve for b
- rewrite equation

$x = 5$ equation of vertical line

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Assigned Work:

worksheet 3c e
 4d
 2c
 6de

$$2(c) \quad m=6 \quad P(1,5)$$

$$y = 6x + b$$

sub (1,5)

$$5 = 6(1) + b$$

$$5 = 6 + b$$

$$5 - 6 = b$$

$$b = -1$$

$$\boxed{y = 6x - 1}$$

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3c e

 $Ax + By + C = 0$

$$(c) \quad 6x + 3y = 12$$

$$\frac{6x}{3} + \frac{3y}{3} - \frac{12}{3} = \frac{0}{3} \quad CF = 3$$

$$\boxed{2x + y - 4 = 0}$$

$$(e) \quad \frac{5}{2}x - \frac{3}{4}y = \frac{1}{3}$$

$$\frac{5}{2}x - \frac{3}{4}y - \frac{1}{3} = 0 \quad LCD = 12$$

$$12 \left[\frac{5}{2}x - \frac{3}{4}y - \frac{1}{3} \right] = 0 \times 12$$

$$\frac{12(5)}{2}x - \frac{12(3)}{4}y - \frac{12(1)}{3} = 0$$

$$\boxed{30x - 9y - 4 = 0}$$

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4(d) 1(d) $(-4, 0)$ $(4, 6)$

$m = \frac{3}{4}$

$(0, 3)$ $b = 3$

$y = \frac{3}{4}x + 3$

$-\frac{3}{4}x + y - 3 = 0$ LCD = 4

$-3x + 4y - 12 = 0$ $[\times (-1)]$

$3x - 4y + 12 = 0$

multiply all by (-1)

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6 de // "parallel"

(d) \perp to $y = 4$ $P(1, 1)$

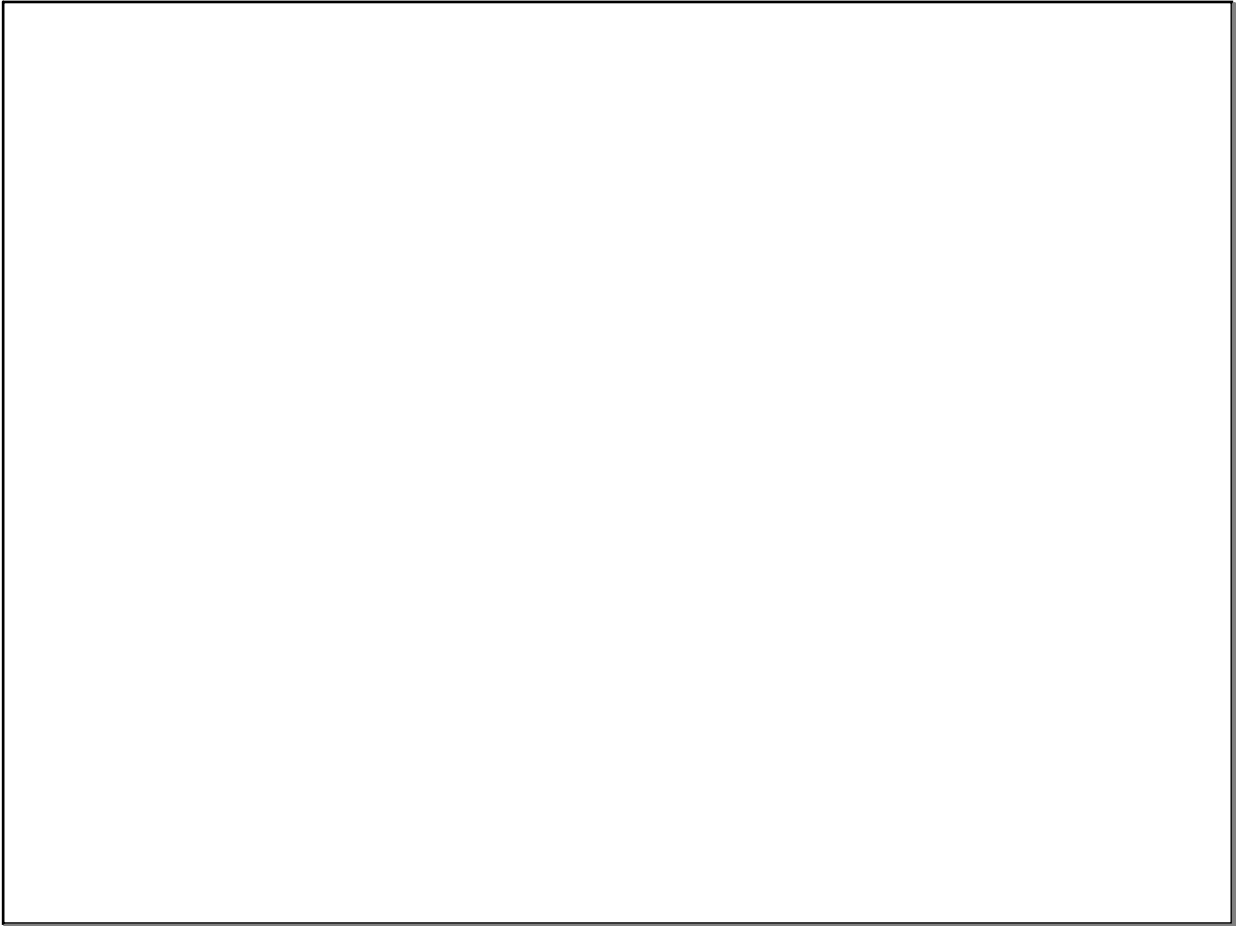
"perpendicular"

$y = 4$ has $m = 0$

new line, m is undefined (vertical)

$x = 1$

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