10/23/19 - Warm Up Problem

Find the slope of each line.

Line 1: (4,6) and (-3, -8)

$x_1\ y_1 \quad x_2\ y_2$

$$\frac{-8-6}{-3-4} = \frac{-14}{-7} = \frac{2}{1}$$

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

Line 2: (5,-1) and (3, 0)

$$\frac{0--1}{3-5} = \frac{1}{-2} = \frac{1}{-2}$$

Are the lines parallel, perpendicular, or neither?

Perpendicular

Section 3.7-3.8 - Writing Equations of Lines

Goal: Write equations of lines using point-slope form

Point-Slope Form

$y - y_1 = m(x - x_1)$

Slope-Intercept Form

$y = mx + b$

Write the equation of the line through point P(-1,4) with a slope of 3. Write your final answer in slope-intercept form.

x_1, y_1 m

Step 1: Fill in the numbers given for x_1, y_1, and m

$y - y_1 = m(x - x_1)$

$y - 4 = 3(x + 1)$

Step 2: Change the equation into slope-intercept form

- distribute to get rid of the parenthesis
- add or subtract to get y by itself

$y - 4 = 3(x + 1)$

$y - 4 = 3x + 3$

$+4 \quad +4$

$y = 3x + 7$

Point-Slope Form

$y - y_1 = m(x - x_1)$

Using Parallel or Perpendicular Lines

Write the equation of the line that is parallel to $y = -\frac{1}{2}x + 8$ and contains point P(2,-6).

x_1, y_1

$m = -\frac{1}{2}$

$y + 6 = -\frac{1}{2}(x - 2)$

$y + 6 = -\frac{1}{2}x + 1$

$-6 \quad -6$

$y = -\frac{1}{2}x - 5$

Write the equation of the line perpendicular to $y = -\frac{1}{2}x + 8$ and contains point P(2,-6).

x_1, y_1

$m = \frac{2}{1} = 2$

Do the last example in your notes.

EXAMPLE 2: Write the equation of a line that is parallel to $y = -3x + 5$ and contains point P(-6, 5).

$y - y_1 = m(x - x_1)$

x_1 y_1

$m = -3$

$y - 5 = -3(x + 6)$

$y - 5 = -3x - 18$

$+5 \qquad +5$

$y = -3x - 13$

Assignment:

Concept 8 Worksheet - due Friday 10/25
(#20-28)

$y - y_1 = m(x - x_1)$

WRITING LINEAR EQUATIONS

Write an equation for the line that contains the given point and has the given slope. Your final answer should be in slope-intercept form.

20. P(2,3), slope = 2 (x_1, y_1; m)

$y - 3 = 2(x - 2)$

$y - 3 = 2x - 4$

$+3 \quad +3$

$y = 2x - 1$

21. P(4,-1), slope = -3 (m)

$y + 1 = -3(x - 4)$

$y + 1 = -3x + 12$

$-1 \quad -1$

$y = -3x + 11$

22. P(6,1), slope = $\frac{1}{2}$ (x_1, y_1; m)

Write the equation of a line that fits each description. Your final answer should be in slope-intercept form.

23. Through (-1,5) parallel to $y = -2x + 7$

24. Through (6,-4) perpendicular to $y = 3x - 1$

25. Through (4,10) perpendicular to $y = \frac{2}{3}x - 6$

26. Through (12,8) parallel to $y = \frac{3}{4}x + 22$

27. Through (-2,-1) perpendicular to $y = -2x + 7$

28. Through (5,4) parallel to $y = -2x$