Unit 10 Homework Packet

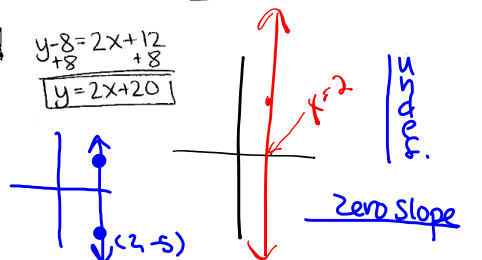**Homework 10-4: Writing Equations of Lines**

Write the equations of the lines given the following information. Start with point-slope form and simplify the equation into slope-intercept form.

1. $m = 5/3$; $(3, 5)$

$\overset{x\ \ y}{}$

point-slope: $y - y_1 = m(x - x_1)$

$\boxed{y - 5 = \frac{5}{3}(x - 3)}$

$y - 5 = \frac{5}{3}x - 5$
$ +5 \phantom{= \frac{5}{3}x} +5$

$\boxed{y = \frac{5}{3}x}$:slope-int.

2. $m = 2$; $(-6, 8)$

$\boxed{y - 8 = 2(x + 6)}$

$y - 8 = 2x + 12$
$+8 +8$

$\boxed{y = 2x + 20}$

3. $m = 0$; $(-2, 5)$

$y - 5 = 0(x + 2)$

$\boxed{y = 5}$

4. $\boxed{m = \text{undefined}}$ $(2, -5)$

$\boxed{x = 2}$

$x = 2$

$u\ n\ d\ e\ f.$

Zero Slope

$(2, -5)$

5. $\boxed{(3, 7)}$ and $(5, 11)$

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

$\boxed{m = \frac{\Delta y}{\Delta x}} = \frac{11 - 7}{5 - 3} = \frac{4}{2} = \boxed{2}$

$\boxed{y - 7 = 2(x - 3)}$ or $y - 11 = 2(x - 5)$

$y - 7 = 2x - 6$
$+7 +7$

$\boxed{y = 2x + 1}$

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

6. $\boxed{(-6, 7)}$ and $(-9, 8)$

$m = \frac{\Delta y}{\Delta x} = \frac{8 - 7}{-9 + (-6)} = \frac{1}{-3}$

$\boxed{y - 7 = -\frac{1}{3}(x + 6)}$ or $y - 8 = -\frac{1}{3}(x + 9)$

$y - 7 = -\frac{1}{3}x - 2$
$+7 \phantom{= -\frac{1}{3}x} +7$

$\boxed{y = -\frac{1}{3}x + 5}$

Quiz 1 due monday

Unit 10 Homework Packet

Graph the following:
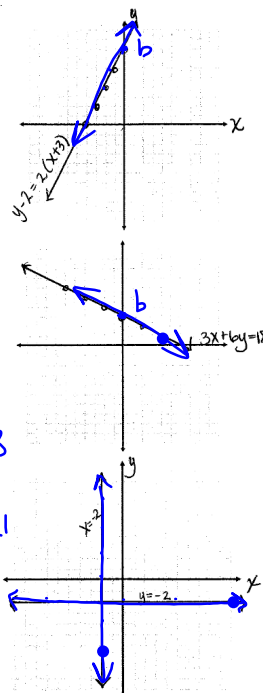
7. $y - 2 = 2(x + 3)$

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

$(-3, 2)$

$y - 2 = 2(x + 3)$
$y - 2 = 2x + 6$
$y = 2x + 8$
$m = 2, \ b = 8$

8. $3x + 6y = 18$
$-3x -3x$

$\frac{6y}{6} = \frac{-3x + 18}{6}$

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

down m = $-\frac{1}{2}$ b = 3
R 2

zero slope

9. $y = -2$ horizontal

10. $x = -2$ vertical   undef slope

$y = -2$

1

Lesson 5: Slopes and Parallel Lines

Warm-up:

1. Find the coordinates of the point P that lies along the directed line segment from C(-3,-2) to D(6,1) and partitions the segment in the ratio of 2 to 1. Make sure to check your work!

2. The point (1,2) lies on a circle. What is the **diameter** of this circle if the center is located at (7,10)?

3. Find the endpoint of a segment that has one endpoint of (5,2) and a midpoint of (-10, -2).

4. How can you check to make sure your answer to #3 is correct?

Slopes and Parallel Lines

Question: *What is the connection between slope and parallel lines?*

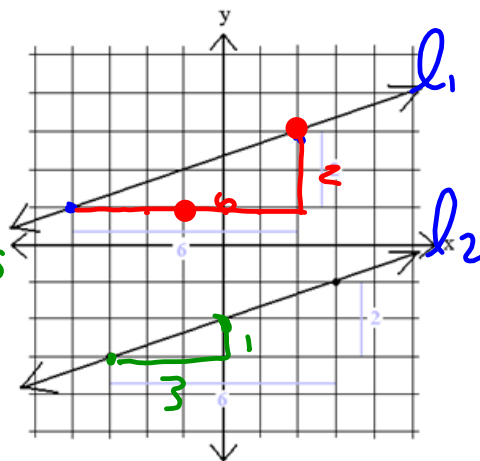Slope is useful for determining whether two lines are parallel.

Slope Criterion for Parallel Lines

Two non-vertical lines are parallel if and only if they have the same **slope**.

$\ell_1 \quad m = \dfrac{\Delta y}{\Delta x} = \dfrac{2}{6} = \dfrac{1}{3}$

$\ell_2 \quad m = \dfrac{\Delta y}{\Delta x} = \dfrac{1}{3}$ ⎬ ‖ lines Same Slope

Graph of Parallel Lines

Proof: Parallel Lines Have the Same Slope

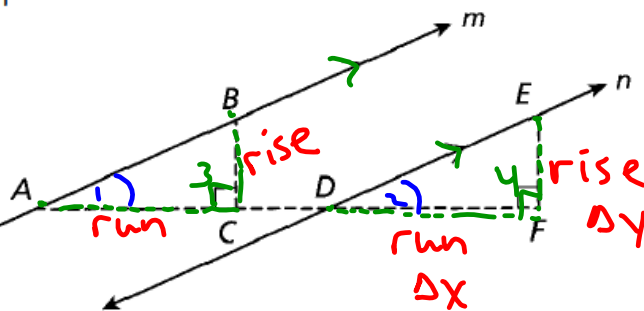**Given:** Non-vertical lines m and n, $m \parallel n$

Prove: Line m and n have the same slope

ST
1. $m \parallel n$
2. $\angle 3 \cong \angle 4$
3. $\angle 1 \cong \angle 2$
4. $\triangle ACB \sim \triangle DFE$
5. $\dfrac{BC}{CA} = \dfrac{EF}{FD}$
6. slope m = slope n

R
1. given
2. Rt $\triangle$s are $\cong$
3. ‖ lines → $\cong$ corresp $\angle$s
4. AA~
5. Corresp. sides of ~ $\triangle$s are proportional
6. $\dfrac{\text{rise } m}{\text{run } m} = \dfrac{\text{rise } n}{\text{run } n} \qquad \dfrac{\Delta y_m}{\Delta x_m} = \dfrac{\Delta y_n}{\Delta x_n}$

rise / run   rise Δy / run Δx

Writing Equations of Parallel Lines

m b

Slope-Intercept Form of a Line

The equation of a line with slope m and y-intercept b is _____ $y=mx+b$

(x_1, y_1) m

Point-Slope Form of a Line

The equation of a line with slope m that passes through the point (x_1, y_1) is

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

$y=mx+b$

Write each of the following equations in <u>slope-intercept form.</u>

Example 1: Write the equation of the line parallel to $y = -2x + 3$ that passes through $(1, -4)$.
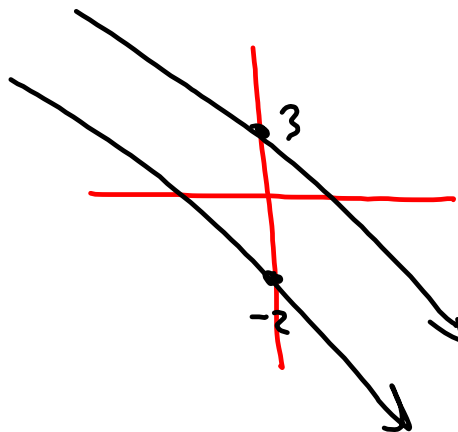
(x_1, y_1)

$M=-\dfrac{2}{1}$

$\parallel$ line $m=-\dfrac{2}{1}$

Pt. slope $\quad y-y_1=m(x-x_1)$

$y-(-4)=-2(x-1)$

$y+4=-2x+2$

$\boxed{y=-2x-2}$

Example 2: Write the equation of the line parallel to $4x + 5y = 6$ that passes through $(-1, -3)$

$\parallel \ m = \dfrac{-4}{5}$

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

$y - (-3) = -\dfrac{4}{5}(x - (-1))$

$y + 3 = -\dfrac{4}{5}(x + 1)$

$y + 3 = -\dfrac{4}{5}x - \dfrac{4}{5}$

$ -3 \phantom{= -\dfrac{4}{5}x} -3$

$y = -\dfrac{4}{5}x - \dfrac{19}{5}$

$\begin{array}{l} -4x -4x \\ \dfrac{5y}{5} = \dfrac{-4x}{5} + \dfrac{6}{5} \\ y = -\dfrac{4}{5}x + \dfrac{6}{5} \\ m = \dfrac{4}{5} \end{array}$

$-\dfrac{4}{5} - 3 \cdot \dfrac{5}{5}$

$ \cdot \dfrac{5}{5}$

$-\dfrac{4}{5} - \dfrac{15}{5}$

$= -\dfrac{19}{5}$

Example 3: Write the equation of the line that passes through $(2, 3)$ and is parallel to the line through $(1, -2)$ and $(7, 1)$.

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

$y - 3 = \dfrac{1}{2}(x - 2)$

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

$m = \dfrac{1 - -2}{7 - 1}$

$\dfrac{3}{6} = \dfrac{1}{2}$