

Slope
- $\frac{\text{"rise"}}{\text{"run"}}$

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

EX $\rightarrow A(5, 2)$
 $B(8, 3)$

$$m = \frac{3 - 2}{8 - 5} = \frac{1}{3}$$

EX $\rightarrow A(4, 7)$
 $B(3, 4)$

$$m = \frac{4 - 7}{3 - 4} = \frac{-3}{-1} = 3$$

EX $\rightarrow A(2, 3)$
 $B(5, -9)$

$$m = \frac{-9 - 3}{5 - 2} = \frac{-12}{3} = -4$$

EX $\rightarrow A(4, 2)$
 $B(-7, 8)$

$$m = \frac{8 - 2}{-7 - 4} = \frac{6}{-11}$$

$$\underline{EX} \rightarrow A(-7, -4) \\ B(3, -5)$$

$$m = \frac{-5 - (-4)}{3 - (-7)} = \frac{-1}{10}$$

$$\underline{EX} \rightarrow A(-8, 5) \\ B(-1, -1)$$

$$m = \frac{-1 - 5}{-1 - (-8)} = \frac{-6}{7}$$

$$\underline{EX} \rightarrow A(-3, 1) \\ B(7, 2)$$

$$m = \frac{2 - 1}{7 - (-3)} = \frac{1}{10}$$

- Parallel vs. Perpendicular

↳ Parallel → same slope

↳ Perpendicular → slopes are opposite reciprocals

(EX → $\frac{3}{2}$, ⊥ slope = $-\frac{2}{3}$)

HW: p. 194 → 8-15

p. 201 → 7-10, 15-18

Equations of Lines

- Slope-Intercept Form

$$y = mx + b$$

↑ ↑
slope y-int.

- Point-Slope Form

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

↑ ↑
slope point

EX → A(3,4), B(4,9)

$$m = \frac{9-4}{4-3} = \frac{5}{1} = 5$$

$$y - 4 = 5(x - 3) \leftarrow \text{Pt-Slope}$$

$$y - 4 = 5x - 15$$

$$y = 5x - 11 \leftarrow \text{Slope-Int.}$$

EX → A(7,2), B(9,4)

$$m = \frac{4-2}{9-7} = \frac{2}{2} = 1$$

$$y - 2 = 1(x - 7)$$

EX → A(1,3),
B(5,-6)

$$m = \frac{-6-3}{5-1} = \frac{-9}{4}$$

$$y - (-6) = -\frac{9}{4}(x - 5)$$

$$y + 6 = -\frac{9}{4}(x - 5)$$

- Writing Eqns of Parallel & Perpendicular Lines

→ Use slope from line given

EX → Parallel to $y = 2x - 7$ thru $(3, 4)$

$$y - 4 = 2(x - 3)$$

EX → Parallel to $y = 5x + 8$ thru $(-9, 7)$

$$y - 7 = 5(x - (-9))$$

$$y - 7 = 5(x + 9)$$

EX → Perp. to $y = \frac{3}{2}x$ thru $(-1, -4)$

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

$$y + 4 = -\frac{2}{3}(x + 1)$$

EX → Perp. to $y = 3x - 6$ thru $(-9, 3)$

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

$$y - 3 = -\frac{1}{3}(x - (-9))$$

$$y - 3 = -\frac{1}{3}(x + 9)$$

EX → Perp. to $y = -\frac{4}{3}x - 6$ thru $(5, 2)$

$$\hookrightarrow +\frac{4}{3} \Rightarrow \frac{3}{4}$$

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

EX → Perp. to $y = -4x - 3$ thru $(-1, 5)$

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

$$\boxed{y - 5 = \frac{1}{4}(x + 1)}$$

EX → Perp. to $y = -\frac{7}{4}x + 1$ thru $(-5, -5)$

$$\boxed{y + 5 = \frac{4}{7}(x + 5)}$$

HW: p. 194 → 24-33
p. 201 → 11-14, 19-21