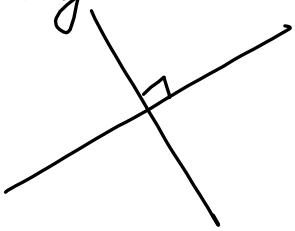
# Sec. 5.6 Parallel and Perpendicular Lines

Vocabulary

parallel lines : lines in the same plane that never intersect

* SAME slope, different y-intercepts

perpendicular lines : lines that intersect to form right angles.



Slope: OPPOSITE RECIPROCALS
(change sign & flip fraction)
product is $-1$ ; $a \cdot \left(-\frac{1}{a}\right) = -1$

Problem 1: Write an equation in slope-intercept form of the line that passes through (2, 15) and is parallel to the graph of $y = 4x - 1$? SAME m

$m = 4$

$y = mx + b$

$m = 4 \quad (2, 15)$

$y - 15 = 4(x - 2)$

$y - 15 = 4x - 8$

$+15 \qquad +15$

$y = 4x + 7$

Problem 2: Are the graph of the following lines parallel, perpendicular, or neither?

$\frac{2y}{2} = \frac{-3x}{2} + \frac{6}{2}$

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

$m = -\frac{3}{2}$

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

$m = \frac{2}{3}$

opposite reciprocals

$\frac{2}{3}\left(-\frac{3}{2}\right) = -\frac{6}{6} = -1$

perpendicular lines

Problem 3: The graph of which equation passes through (10, 15) and is perpendicular to the graph of $y = -\frac{5}{6}x - 2$?

~~A.~~ $y = -\frac{5}{6}x + 4$

~~B.~~ $y = -\frac{5}{6}x - 6$

C. $y = \frac{6}{5}x + 3$

D. $y = \frac{6}{5}x - 5$

$m = -\frac{5}{6}$

$m_{\perp} = +\frac{6}{5}$

(10, 15)

$y - 15 = \frac{6}{5}(x - 10)$ $\left(-\frac{60}{5}\right)$

$y - 15 = \frac{6}{5}x - 12$

$+15 \qquad +15$

$y = \frac{6}{5}x + 3$

Problem 4: Carla is making a map of her hometown. She plots Main Street as shown. If 3rd Street is perpendicular to Main Street at (5, 7), what is an equation for 3rd Street?

$m = +\frac{5}{1} = 5$

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

$y - 7 = 5x - 25$

$+7 \qquad +7$

$y = 5x - 18$