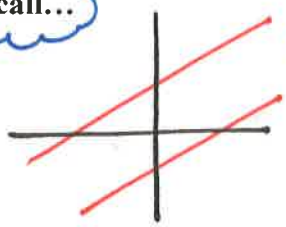
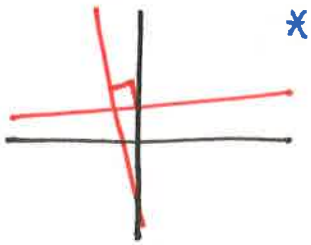
Key

2.4 Parallel and Perpendicular Lines (Day 2)

Recall...



* parallel lines have the same slope



* perpendicular lines have the opposite reciprical slopes

Ex 1: Are the graphs of $-3y = -4x + 6$ and $y = -\frac{3}{4}x - 5$ parallel, perpendicular or neither?

Step 1: Identify both slopes (get both into $y = mx + b$)

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

$\frac{-3y}{-3} = \frac{-4x + 6}{-3}$

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

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

Step 2: Compare Slopes!

$-\frac{3}{4}$ & $\frac{4}{3}$ are opposite reciprocals so they are perpendicular!

Ex 2 (you try): Are the graphs of $y = -5x$ and $25x + 5y = 1$ parallel, perpendicular or neither?

$y = -5x$

$25x + 5y = 1$

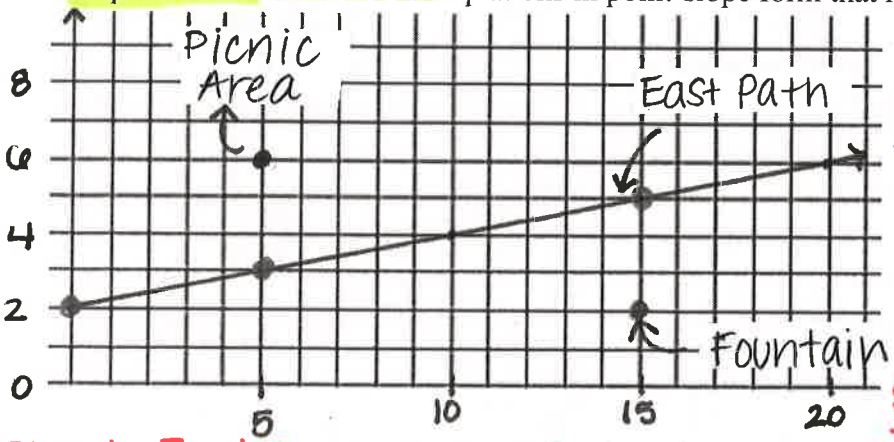
$\frac{5y}{5} = \frac{-25x + 1}{5}$

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

-5 & -5 are the same so they are parallel!

opposite recip.

Ex 3: A landscaper plans to install two new paths in a park. The new Fountain Path will be perpendicular to the East Path and lead to the fountain. The new Picnic Path will be parallel to the Fountain Path and pass through the picnic area. What are the equations in point-slope form that represent the new paths?



Step 1: Find Slope of East Path

(5, 3) & (0, 2)

x_2 y_2 x_1 y_1

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

Step 2: write eqt. for new fountain path

Slope: $-\frac{5}{1}$ (opposite recip.)

point: (15, 2)

$\therefore y - 2 = -5(x - 15)$

Step 3: write eqt. for picnic path.

Slope: -5 (same b/c parallel to fountain).

point: (5, 6)

$\therefore y - 6 = -5(x - 5)$ ok