KEY

AA Notes – Section 5.6 – Parallel and Perpendicular Lines

Review: *Slope:* $m = \frac{y_2 - y_1}{x_2 - x_1}$ *remember to label points (x_1, y_1) (x_2, y_2)

Slope-Intercept Form: **$y = mx + b$** *m is slope, b is the y-intercept

Graphing from slope-intercept form: plot the y-intercept first, then count the slope (rise over run) and plot the second point, continue counting the slope to plot four points when they will fit on the graph provided; draw a line with a ruler and arrows.

Point-Slope Form: **$y - y_1 = m(x - x_1)$** *m is slope, *point (x_1, y_1)*

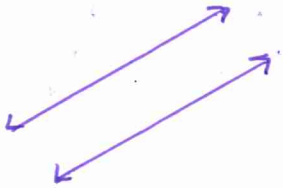
Graphing from point-slope form: plot the point first, then count the slope (rise over run) and plot the second point, continue counting the slope to plot four points when they will fit on the graph provided; draw a line with a ruler and arrows.

Standard Form: **$Ax + By = C$** *cannot have fractions/decimals, lead coefficient should be positive

Graphing using standard form: Find the *x*-intercept by substituting a zero in for *y*, and solve for *x*. Find the *y*-intercept by substituting a zero in for *x*, and solve for *y*. Plot both the *x* and the *y* intercepts, and draw a line using only those two points.

New material: 5.6 Parallel and Perpendicular Lines

Parallel lines are lines in the same plane that never intersect. Parallel lines are always the same distance apart...think railroad tracks.



* What are some examples around the room?

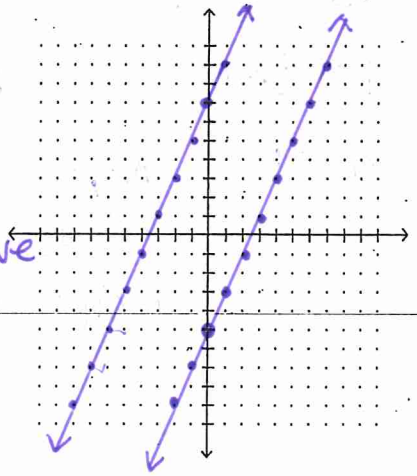
Parallel lines have the same slopes, but different y-intercepts.

Examples – Are these lines parallel? (hint: first...are they are in slope-intercept form?)

1. $y = 2x - 5$

   $y = 2x + 7$

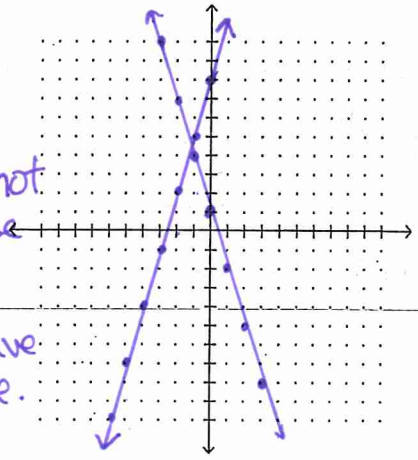
Yes, they do not intersect & they have the same slope.



2. $y = -3x + 1$

   $y = 3x + 8$

No, they are not parallel because they intersect & they do not have the same slope.



3. $y = \frac{3}{4}x + 9$ $m = \frac{3}{4}$

$\frac{3y}{3} = \frac{4x}{3} + \frac{9}{3}$

$y = \frac{4}{3}x + 3$ $m = \frac{4}{3}$

No, these lines do not have the same slopes.

4. $y = -2x + 1$ $m = -2$

$4x + 2y = 6$

$-4x \quad -4x$

$\frac{2y}{2} = \frac{-4x}{2} + \frac{6}{2}$

$y = -2x + 3$ $m = -2$

Yes, these lines have the same slopes.

Perpendicular lines are lines that intersect to form 90° angles.

The slopes of perpendicular lines are opposite (or negative) reciprocals.

Remember to find the reciprocal...flip it over!

Opposite (or negative) means to change the sign!

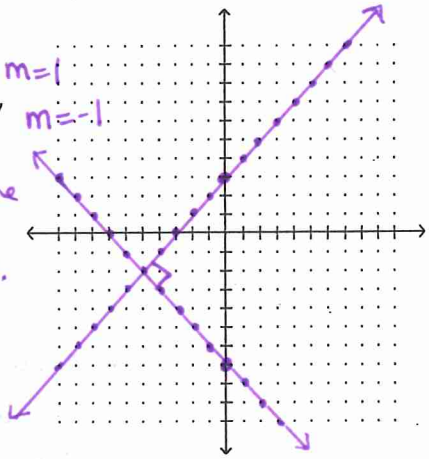
Examples – Are the following lines perpendicular?

(Hint: Are they in slope intercept form? Compare the slopes!)

5. $y = x + 3$ $m = 1$

$y = -x - 7$ $m = -1$

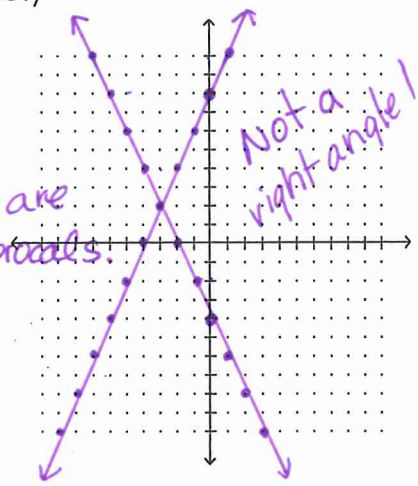
Yes, the slopes are opposite reciprocals.



6. $y = 2x + 8$

$y = -2x - 4$

No, the slopes are not opposite reciprocals.



7. $y = \frac{3}{2}x - 6$ and $\frac{3y}{3} = \frac{2x}{3} + \frac{5}{3}$

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

$y = \frac{2}{3}x + \frac{5}{3}$

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

No, they are not perpendicular. The slopes are reciprocals but not opposites.

8. $4x + 5y = 10$ and $-3x + 6y = 18$

$-4x \quad -4x$ $+3x \quad +3x$

$\frac{5y}{5} = \frac{-4x}{5} + \frac{10}{5}$ $\frac{6y}{6} = \frac{3x}{6} + \frac{18}{6}$

$y = -\frac{4}{5}x + 2$ $y = \frac{1}{2}x + 3$

$m = -\frac{4}{5}$ $m = \frac{1}{2}$

No, they are not perpendicular. The slopes are not opposite reciprocals.