Algebra I
Lesson 5.8 – Slopes of Parallel and Perpendicular Lines
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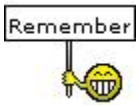
Mathematics often deals with situations involving more than one line, these are known as system of equations and we will be studying these in greater detail in the next chapter. What we want to look at are 2 special types of systems s of equations known as parallel and perpendicular lines.

Parallel lines review: parallel lines have the same slope. Symbolically we write the relationship between the lines and slopes as: $l_1 \parallel l_2 \rightarrow m_1 \perp m_2$. Parallel lines never intersect because they have the same slope. In slope-intercept form, lines that are parallel will have the same x coefficient.

Perpendicular lines - perpendicular lines intersect at right angles, the slopes are negative reciprocal slopes. Symbolically we have: $l_1 \perp l_2 \rightarrow m_1 = -\frac{1}{m_2}$. To find a negative reciprocal of a slope, flip the number over (one over the number) and negate the value (opposite sign). In slope-intercept form, perpendicular lines will have x coefficients that are opposite reciprocals.

Which system of equations is parallel and which is perpendicular? *Remember if not in slope-intercept form; get the equation into that form*



$8x - 6y = 10$
$4x - 3y = -1$

$x - 3x = -6$
$9x + 3y = 12$

2 are parallel and 2 are perpendicular:

$y = 2x + 2$

$y - 6 = 5(x + 4)$

$-2x + y = 2$

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

Write an equation in slope-intercept form for the line that passes through (5, 7) and is parallel to the line described by $y = \frac{4}{5}x - 6$

Write an equation in slope-intercept form for the line that passes through (-5, 3) and is perpendicular to the line described by $y = 5x$

Show that the points A(0, 2), B(4, 2), C(1, -3), and D(-3, -3) are the vertices of a parallelogram. *If it is a parallelogram, we will have to systems of equations that are parallel. Yes, we can graph this but, now we are not, do this algebraically!*