Algebra 1 4.4

Write the equation of a line parallel to a given line

Write the equation of a line perpendicular to a given line

What do we need to write an equation for any line?

slope $m=$

vertical $x=-2$

horizontal $y=6$

parallel

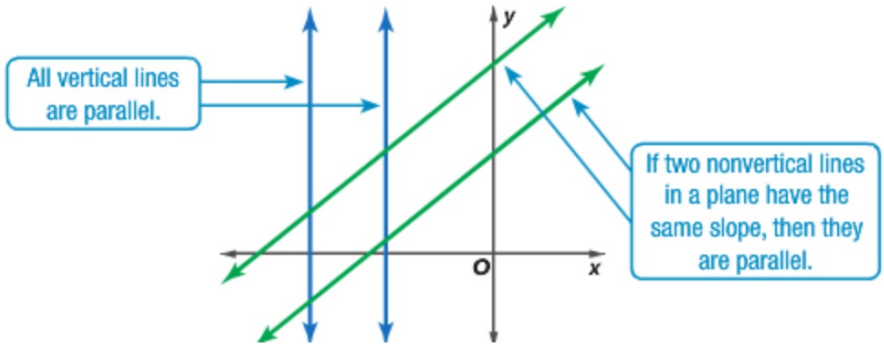
perpendicular

parallel - same $\parallel$

perp - opp + recip $\perp$

whiteboards

1 Parallel Lines Lines in the same plane that do not intersect are called **parallel lines**. Nonvertical parallel lines have the same slope.



Whiteboards

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

Write an equation in slope-intercept form for the line that passes through the given point and is parallel to the graph of the given equation.

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

2. $(0, 4), y = -4x + 5$

$m = \frac{1}{2}$

$(-1, 2)$

$x \quad y$

$y = \frac{1}{2} \cdot x + B$

$2 = \frac{1}{2} \cdot -1 + B$

$2 = -\frac{1}{2} + B$

$+\frac{1}{2} \quad +\frac{1}{2}$

$2\frac{1}{2} = B$

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

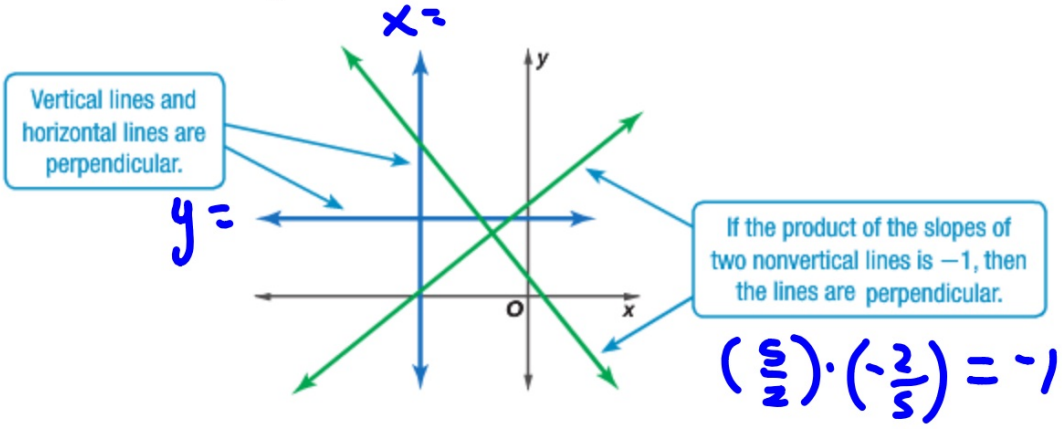
$y = 2$

parallel

12. $(4, -3), y = 3x - 5$

13. $(0, 2), y = -5x + 8$

2 Perpendicular Lines Lines that intersect at right angles are called **perpendicular lines**. The slopes of nonvertical perpendicular lines are opposite reciprocals. That is, if the slope of a line is 4, the slope of the line perpendicular to it is $-\frac{1}{4}$.



GuidedPractice

4. Write an equation in slope-intercept form for the line that passes through (4, 7) and is perpendicular to the graph of $y = \frac{2}{3}x - 1$.

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

$(4, 7)$

$x \quad y$

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

$7 = \frac{-3}{2} \cdot \frac{4}{1} + B$

$7 = \frac{-12}{2} + B$

$B = 13 \quad +7 = +6 + B$

$y = \frac{-3}{2}x + 13$

How is this problem different?

Example 4 Perpendicular Line Through a Given Point

PT

Write an equation in slope-intercept form for the line that passes through $(-4, 6)$ and is perpendicular to the graph of $2x + 3y = 12$.

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

$(-4, 6)$

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

$6 = \frac{3}{2} \cdot -4 + B$

$6 = \frac{-12}{2} + B$

$6 = -6 + B$

$+6 \quad +6$

$12 = B$

$-2x \quad -2x$

$3y = -2x + 12$

$\frac{3y}{3} = \frac{-2x}{3} + \frac{12}{3}$

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

$y = \frac{3}{2}x + 12$

$y = _x + _$

Whiteboards ⊥

Write an equation in slope-intercept form for the line that passes through the given point and is perpendicular to the graph of the equation.

7. $(-2, 3), y = -\frac{1}{2}x - 4$

8. $(-1, 4), y = 3x + 5$

1

9. $(2, 3), 2x + 3y = 4$

10. $(3, 6), 3x - 4y = -2$

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

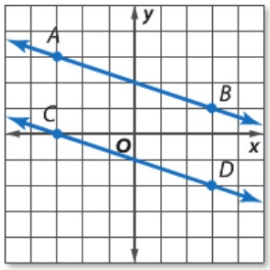
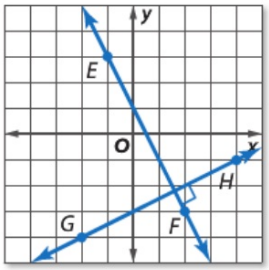
WB 4.4 pgs. (p.54)

odds +26

ReadingMath

Parallel and Perpendicular Lines The symbol for parallel is ||. The symbol for perpendicular is ⊥.

ConceptSummary Parallel and Perpendicular Lines

	Parallel Lines	Perpendicular Lines
Words	Two nonvertical lines are parallel if they have the same slope.	Two nonvertical lines are perpendicular if the product of their slopes is −1.
Symbols	$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$	$\overleftrightarrow{EF} \perp \overleftrightarrow{GH}$
Models		

3. Determine whether the graphs of $6x - 2y = -2$, $y = 3x - 4$, and $y = 4$ are *parallel* or *perpendicular*. Explain.