Algebra 2   2.4

Write the equation of a line given a slope and a point on the line.*

Write the equation of a line parallel to a given line.* $//$

Write the equation of a line perpendicular to a given line.*

$$A x + B y = c \quad \underline{\perp}$$

*Algebra 1

slope $\ell \perp m$

$//$ parallel $a // b$ same m

$\perp$ perpendicular $90°$ opp + recip

slope intercept form $y = m x + B$

point slope form $y - ? = m (x - ?)$

whiteboards (x, y) Quiz 2.3-2.4 Thurs.

4. $y = \overset{4 \cdot}{\frac{1}{4}} x + \overset{4 \cdot}{3}$

$4y = x + 12$

$-x \qquad -x$

_____

$\dfrac{-x + 4y}{-1} \dfrac{=}{-1} \dfrac{12}{-1}$

$1x - 4y = -12$

$A = 1$
$B = -4$
$C = -12$

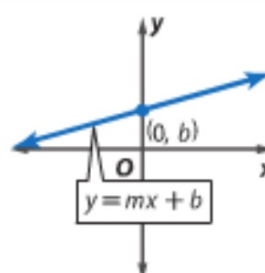$\dfrac{2}{2}x + \dfrac{8}{2}y = \dfrac{-12}{2}$

$x + 4y = -6$

KeyConcept Slope-Intercept Form

Words

The slope-intercept form of the equation of a line is $y = mx + b$, where m is the slope and b is the y-intercept.

Model

$$y = mx + b$$

$(0, b)$

Symbols

$$y = mx + b$$

slope ⟶ ↑   ↑ ⟵ y-intercept

KeyConcept Point-Slope Form

Words		Symbols	
Words	The point-slope form of the equation of a line is $y - y_1 = m(x - x_1)$, where (x_1, y_1) are the coordinates of a point on the line and m is the slope of the line.	Symbols	slope $$y - y_1 = m(x - x_1)$$ coordinates of a point on the line

Follow directions for form: if not specified, then you can decide.

Whiteboards

Example 2 Write an Equation Given Slope and One Point

Write an equation of the line through $(6, -2)$ with a slope of -4.

Write an equation in slope-intercept form for the line described.
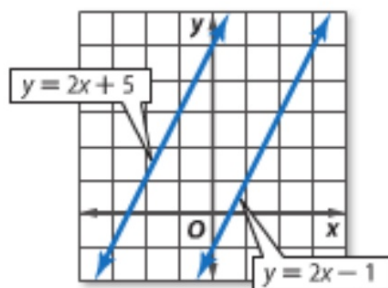
2A. passes through $(2, 3)$; $m = \frac{1}{2}$

2B. passes through $(-2, -1)$; $m = -3$

$$(\quad) \cdot (\quad) = -1$$

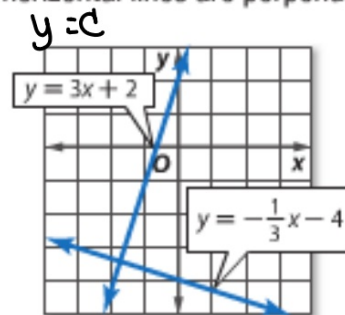## KeyConcept Parallel and Perpendicular Lines

Parallel Lines	Perpendicular Lines
Two nonvertical lines are **parallel** if and only if they have the same slope. All vertical lines are parallel.	Two nonvertical lines are **perpendicular** if and only if the product of the slopes is -1. Vertical lines and horizontal lines are perpendicular. $x = c$ $y = c$

$y = 2x + 5$

$y = 2x - 1$

$y = 2x + 5$ and $y = 2x - 1$

$y = 3x + 2$

$y = -\dfrac{1}{3}x - 4$

$y = 3x + 2$ and $y = -\dfrac{1}{3}x - 4$

GuidedPractice

4. Write an equation in slope-intercept form for the line that passes through $(3, 7)$ and is parallel to the line with equation $y = \frac{3}{4}x - 5$.

7 passes through $(4, -10)$, parallel to $y = \frac{7}{8}x - 3$

6. passes through $(-9, -3)$, perpendicular to $y = -\frac{5}{3}x - 8$

23. passes through $(4, 2)$, perpendicular to $y = -2x + 3$