

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.*

*Algebra 1

slope m

parallel same m

perpendicular opp + recip. m

slope intercept form

point slope form

whiteboards

$$y = mx + b$$

$$y - ? = m(x - ?)$$

$$x\text{-int} = 3$$

$$(3, 0)$$

$$y\text{-int} = -6$$
$$(0, -6)$$

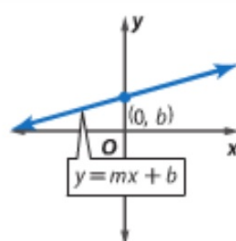
Quiz 2.3-2.4 tomorrow
MCT 2.1-2.4 Tues.!

Key Concept 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.

Symbols $y = mx + b$
slope $\xrightarrow{\quad}$ m $\xrightarrow{\quad}$ b $\xleftarrow{\quad}$ y -intercept

Model





KeyConcept Point-Slope Form

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 .

$$y + 2 = -4(x - 6)$$

GuidedPractice

Write an equation in slope-intercept form for the line described.

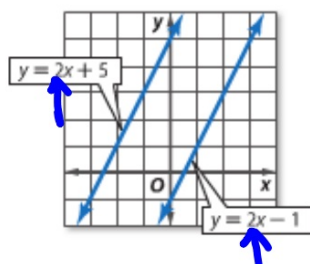
2A. passes through $(2, 3)$; $m = \frac{1}{2}$

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

KeyConcept Parallel and Perpendicular Lines

Parallel Lines

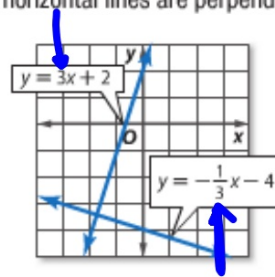
Two nonvertical lines are **parallel** if and only if they have the same slope. All vertical lines are parallel.



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

Perpendicular Lines

Two nonvertical lines are **perpendicular** if and only if the product of the slopes is -1 . Vertical lines and horizontal lines are perpendicular.



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

$$(3) \cdot \left(-\frac{1}{3}\right) = -1$$

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

$$y = mx + b$$
$$7 = \frac{3}{4} \cdot 3 + b$$

$$7 = \frac{9}{4} + b$$

$$\frac{19}{4} = b$$

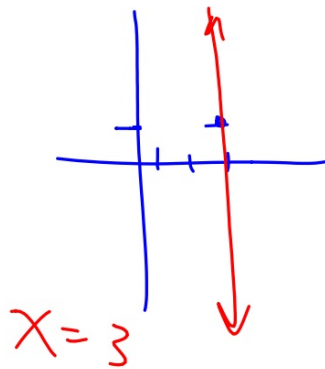
$$y = \frac{3}{4}x + \frac{19}{4}$$

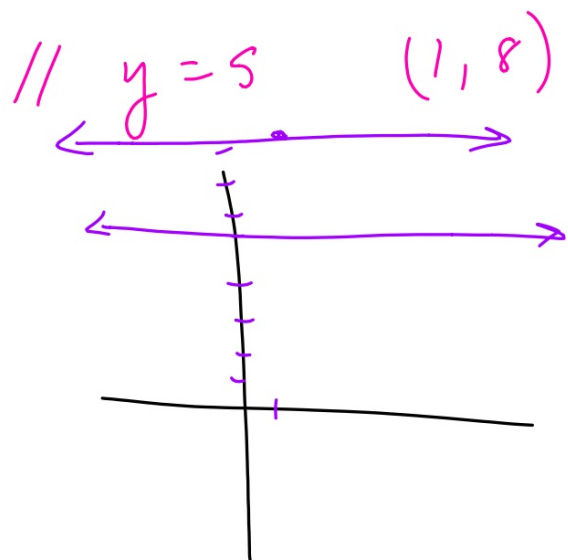
7 passes through $(4, -10)$, parallel to $y = \frac{7}{8}x - 3$

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

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

line $\perp$ to $y = 4$
 $\downarrow$
 $(3, 1)$





$$// \quad x=2 \quad (3,7)$$

WB 2.4 prac
1-19

$$\perp \quad y=4 \quad (1,7)$$