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
parallel - same slope, new y-int
perpendicular - opp + recip slope, new y-int
slope intercept form
point slope form
whiteboards

Quiz 2.3-2.4 Thurs.

KeyConcept Slope-Intercept Form

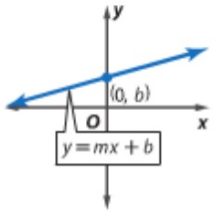
Words The slope-intercept form of the equation of a line is $y = mx + b$, where m is the slope and b is the y-intercept.

Symbols $y = mx + b$

slope — m

y-intercept — b

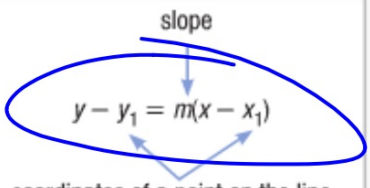
Model



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



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

$\frac{1}{2}$ $(3, 5)$

$y - y_1 = m(x - x_1)$

$y - 5 = \frac{1}{2}(x - 3)$

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.

$y = mx + b$

$-2 = -4 \cdot 6 + B$

$-2 = -24 + B$

$+24 \quad +24$

$22 = B$

$y = -4x + 22$

$y - y_1 = m(x - x_1)$

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

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

$y + 2 = -4x + 24$

$-2 \quad -2$

$y = -4x + 22$

GuidedPractice

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

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

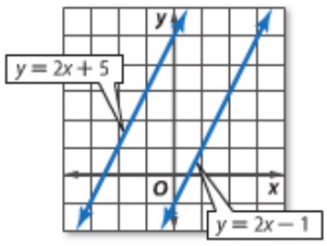
2B. passes through $(-2, -1)$; $m = -3$

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

KeyConcept Parallel and Perpendicular Lines

Parallel Lines

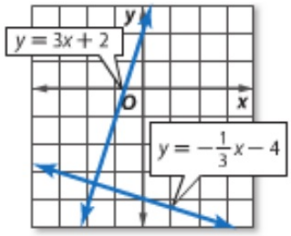
Two nonvertical lines are parallel if and only if they have the same slope. All vertical lines are parallel.



$y = 2x + 5$ 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.



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

opp + recip

GuidedPractice

$y = mx + B$

$x \quad y$

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

$m = \frac{3}{4}$ $(3, 7)$

$y = mx + B$

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

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

$B = 4\frac{3}{4}$

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

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

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

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

$x \quad y$

$m = \frac{3}{5}$

$y = mx + B$

$-3 = \frac{3}{5} \cdot -9 + B$

$-3 = -\frac{27}{5} + B$

$2\frac{2}{5} = B$

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

$y = \frac{3}{5}x + \frac{12}{5}$

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

2.4 9-25 odd