Geometry 3.4

Write the equation of a line given information about the graph*

Solve problems by writing equations*

*Algebra 1 Ch. 5

Quiz 3.1-3.2 today

slope

y-intercept

slope intercept form $y = mx + B$

point-slope form $y - y_1 = m(x - x_1)$

parallel $m = m$

perpendicular opp + recip slope $\frac{2}{5} \rightarrow \frac{-5}{2}$

horizontal $y =$

vertical $x =$

whiteboards

What do you need to know to graph a line?

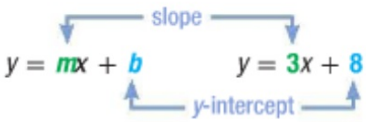
Slope (x, y)

↑

2 (x, y)

KeyConcept Nonvertical Line Equations

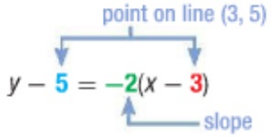
The slope-intercept form of a linear equation is $y = mx + b$, where m is the slope of the line and b is the y-intercept.



$y = mx + B$

slope y-int

The **point-slope form** of a linear equation is $y - y_1 = m(x - x_1)$, where (x_1, y_1) is any point on the line and m is the slope of the line.

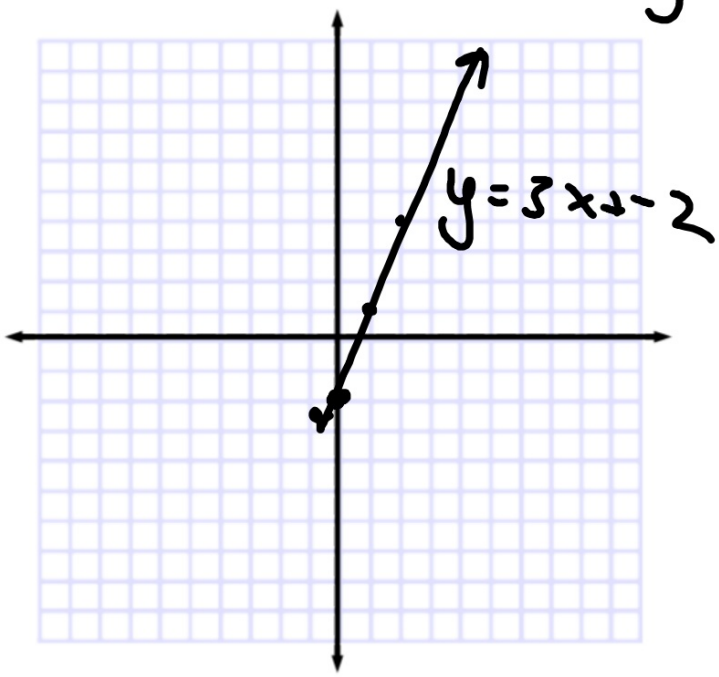


$$y - y_1 = m(x - x_1)$$

Example 1 Slope and *y*-intercept

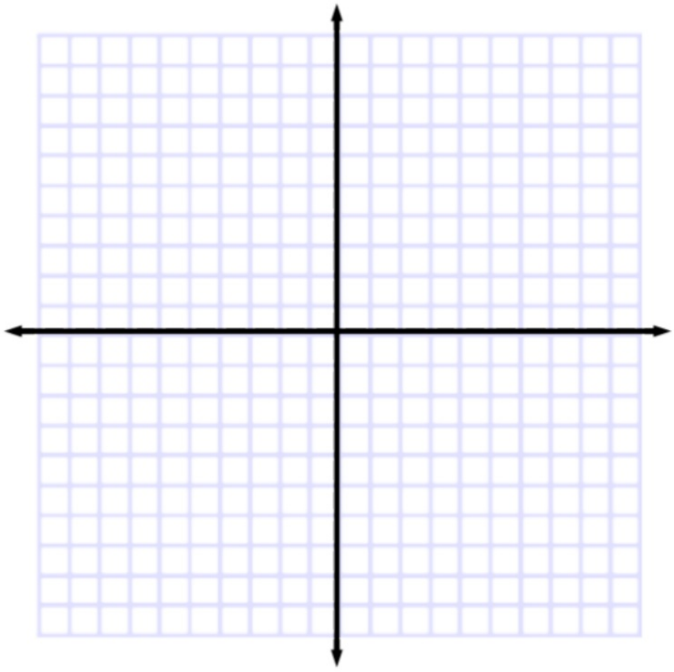
Write an equation in slope-intercept form of the line with slope 3 and *y*-intercept of −2. Then graph the line.

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



GuidedPractice

1. Write an equation in slope-intercept form of the line with slope $\frac{1}{2}$ and y-intercept of 8. Then graph the line.



Example 2 Slope and a Point on the Line

Write an equation in point-slope form of the line with slope $-\frac{3}{4}$ that contains $(-2, 5)$. Then graph the line.

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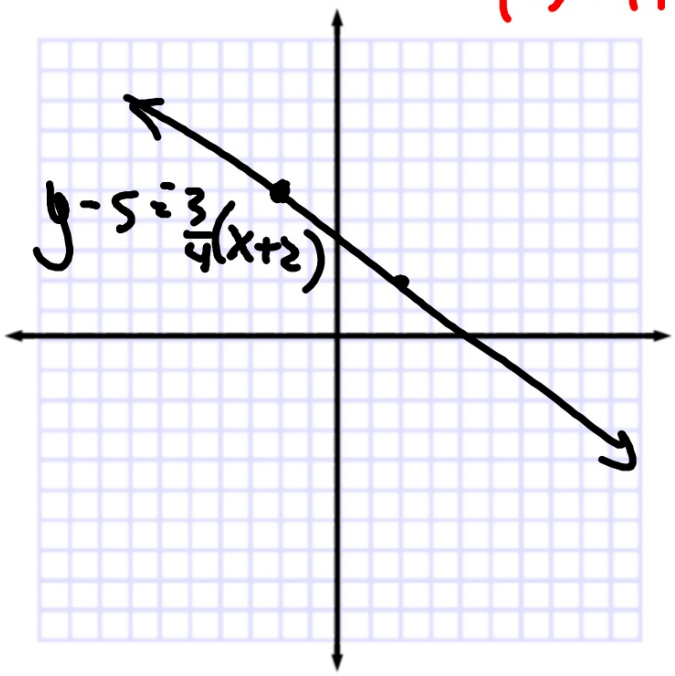
$y - 5 = -\frac{3}{4}(x + 2)$

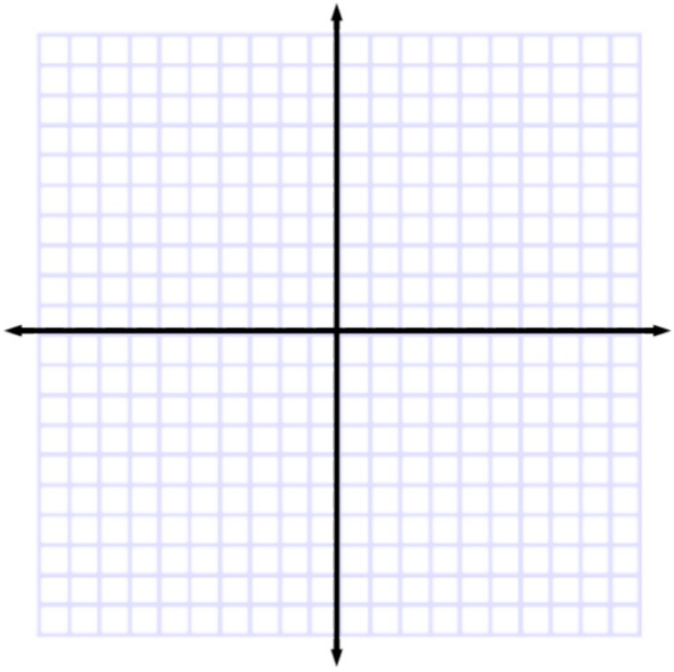
$-\frac{3}{4}$



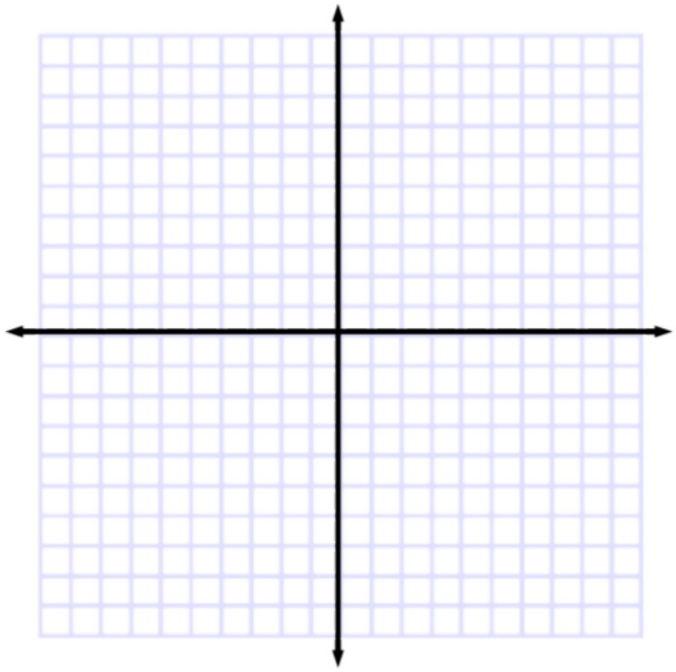
Example 3 Two Points

Write an equation of the line through each pair of points in slope-intercept form.

a. (0, 3) and (−2, −1)



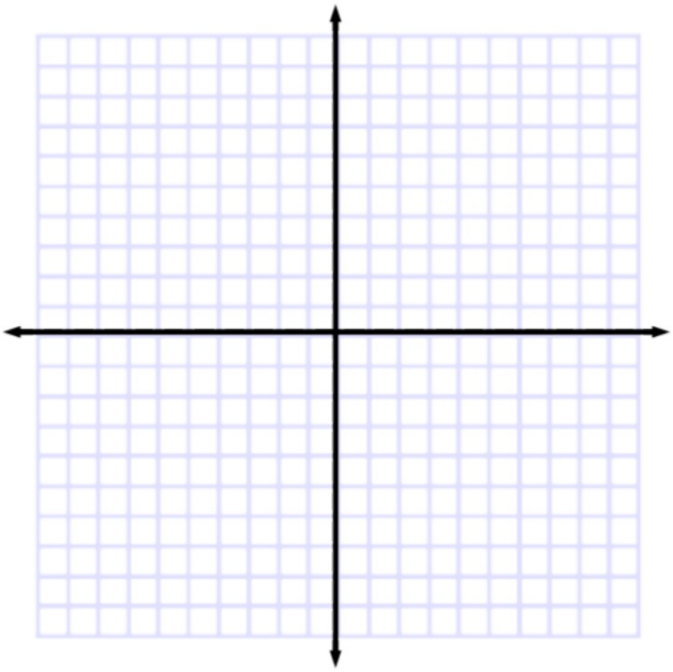
b. **(−7, 4) and (9, −4)**



Guided Practice

3A. $(-2, 4)$ and $(8, 10)$

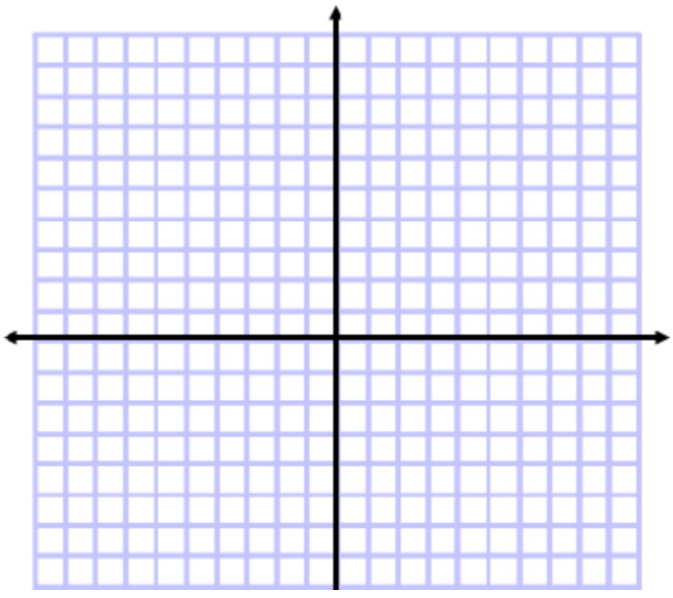
3B. $(-1, 3)$ and $(7, 3)$



Horizontal/vertical lines: special cases

Example 4 Horizontal Line

Write an equation of the line through (−2, 6) and (5, 6) in slope-intercept form.



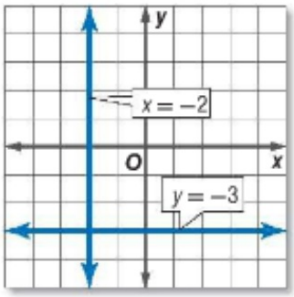
KeyConcepts Horizontal and Vertical Line Equations

The equation of a horizontal line is $y = b$, where b is the y-intercept of the line.

Example $y = -3$

The equation of a vertical line is $x = a$, where a is the x-intercept of the line.

Example $x = -2$



Graph:
y=4
y=-6
x=5
x=-3