Name: ______________________________ Per: _____

Writing Linear Equations from Graphs

In order to write the equation of a line, you need two things: the slope and a point. Then, you just plug that information into one of your two standard forms of a line (depending on what point you picked).

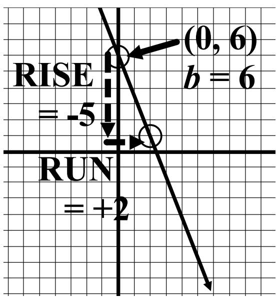
Slope-Intercept Form

If you pick the point on the y-axis (0, b), then you'll use:

$$y = mx + b$$

where the slope is $m = \frac{RISE}{RUN}$, & the y-intercept is b.

EXAMPLE:



*The graph crosses the y-axis at (0, 6), so **b = 6**.*

Then, the graph moves down 5 units (RISE = -5) and right 2 units (RUN = 2) to the next perfect crossing.

So, the slope is $\boldsymbol{m} = \frac{RISE}{RUN} = \frac{-5}{2}$

Now, just plug them in!

$y = mx + b$

$y = -\frac{5}{2}x + 6$

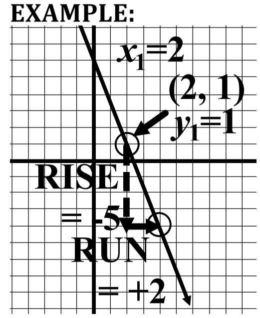
Point-Slope Form

If you pick any other point (perfect crossing on the grid) THAT ISN'T ON THE Y-AXIS, then you'll use:

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

where the slope is $m = \frac{RISE}{RUN}$, & the point is (x_1, y_1).

EXAMPLE:



The graph crosses perfectly at (2, 1), so (x_1, y_1) could be (2, 1). It could be any point you want.

Then, the graph moves down 5 units (RISE = -5) and right 2 units (RUN = 2) to the next perfect crossing.

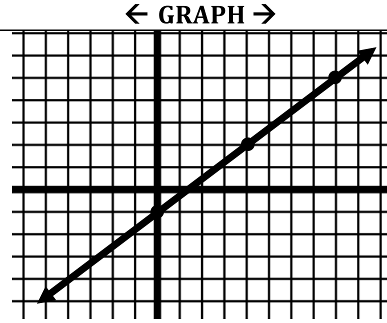
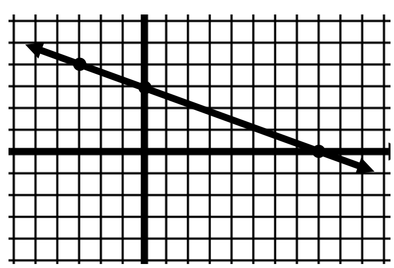
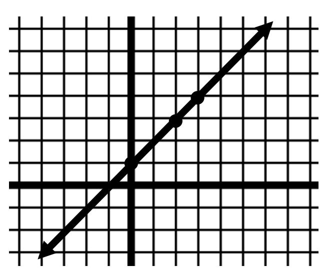
So, the slope is $\boldsymbol{m} = \frac{RISE}{RUN} = \frac{-5}{2}$

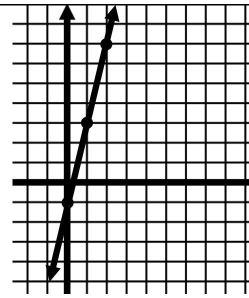
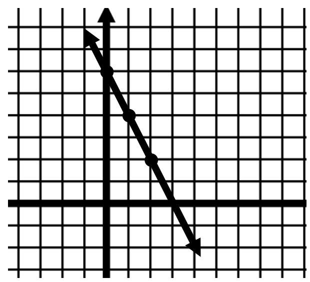
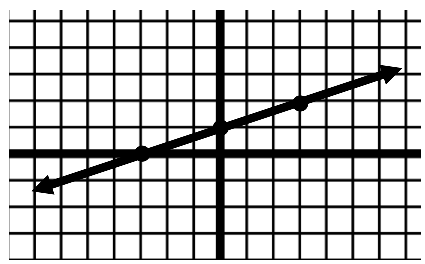
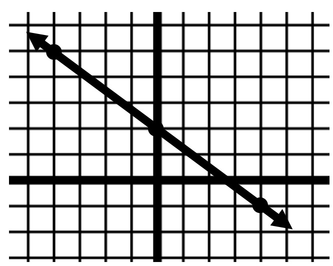
Now, just plug them in!

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

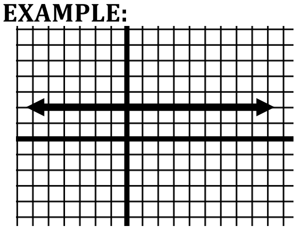
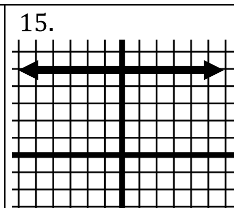
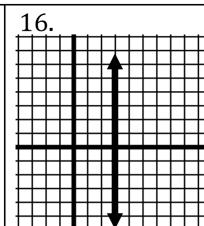
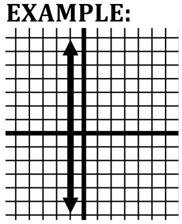
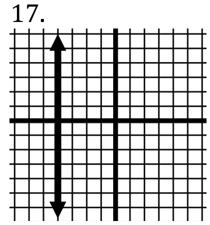
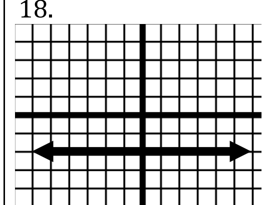
$y - 1 = -\frac{5}{2}(x - 2)$

Write the equation of each graph in **slope-intercept form** to the left, and in **point-slope form** to the right.

SLOPE-INTERCEPT FORM	← GRAPH →	POINT-SLOPE FORM
1. $y = mx + b$ $b =$ ______ $m = \frac{RISE}{RUN} =$ ______ Equation: ________________		2. $y - y_1 = m(x - x_1)$ $(x_1, y_1) =$ ______ $m = \frac{RISE}{RUN} =$ ______ Equation: ________________
3. $y = mx + b$ $b =$ ______ $m = \frac{RISE}{RUN} =$ ______ Equation: ________________		4. $y - y_1 = m(x - x_1)$ $(x_1, y_1) =$ ______ $m = \frac{RISE}{RUN} =$ ______ Equation: ________________
5. $y = mx + b$ $b =$ ______ $m = \frac{RISE}{RUN} =$ ______ Equation: ________________		6. $y - y_1 = m(x - x_1)$ $(x_1, y_1) =$ ______ $m = \frac{RISE}{RUN} =$ ______ Equation: ________________

7. $y = mx + b$ $b =$ _______ $m = \frac{RISE}{RUN} =$ _______ Equation: __________________		8. $y - y_1 = m(x - x_1)$ $(x_1, y_1) =$ _______ $m = \frac{RISE}{RUN} =$ _______ Equation: __________________
9. $y = mx + b$ $b =$ _______ $m = \frac{RISE}{RUN} =$ _______ Equation: __________________		10. $y - y_1 = m(x - x_1)$ $(x_1, y_1) =$ _______ $m = \frac{RISE}{RUN} =$ _______ Equation: __________________
11. $y = mx + b$ $b =$ _______ $m = \frac{RISE}{RUN} =$ _______ Equation: __________________		12. $y - y_1 = m(x - x_1)$ $(x_1, y_1) =$ _______ $m = \frac{RISE}{RUN} =$ _______ Equation: __________________
13. $y = mx + b$ $b =$ _______ $m = \frac{RISE}{RUN} =$ _______ Equation: __________________		14. $y - y_1 = m(x - x_1)$ $(x_1, y_1) =$ _______ $m = \frac{RISE}{RUN} =$ _______ Equation: __________________

Sometimes, you'll be working with horizontal (y =) or vertical (x =) lines, where either x or y is *constantly* one number. In that case, the line is either ↔ y = <u>that number</u> or ↕ x = <u>that number</u>.

EXAMPLE:  It's ↔ at 2, so… <u>y = 2</u>	15.  ____ = _____	16.  ____ = _____
EXAMPLE:  It's ↕ at -1, so… <u>x = -1</u>	17.  ____ = _____	18.  ____ = _____