

Notes Linear Functions

SLOPE:

Given 2 points (x_1, y_1) and (x_2, y_2) the slope m between these 2 points can be found by the formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Find the slope of the line that passes through the following points:

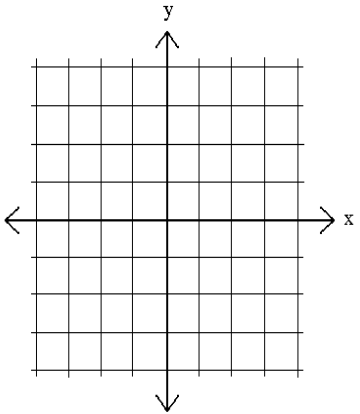
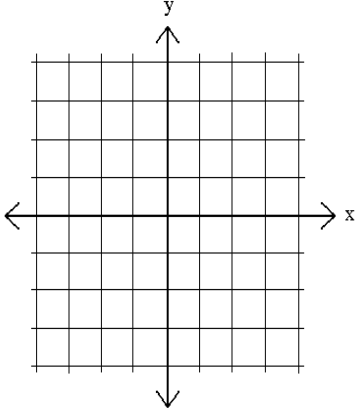
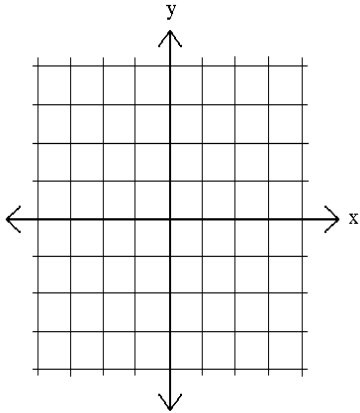
Ex1: $(-3, 4)$ $(9, 1)$	Ex2: $(-2, 3)$ $(-2, 1)$	Ex3: $(-5, 2)$ $(0, 2)$

Graphing Lines:

When you graph a line given slope and a point:

1. Plot the given point.
2. Use the slope to find the next point (think rise over run).
3. Connect the 2 points with a straight line and make sure your line has arrows on its ends.

Graph the following lines:

<p>Ex4: $m = \frac{3}{2}$ through $(1, -2)$</p> 	<p>Ex5: $m = 0$ through $(1, -2)$</p> 	<p>Ex6: m und through $(1, -2)$</p> 
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Finding Equations of Lines:

- Slope intercept form of a line is represented by the formula $y = mx + b$, where m = slope & b = y-intercept
- Point-slope form of a line is represented by the formula $y - y_1 = m(x - x_1)$, where m = slope & (x_1, y_1) is a point on the graph.
- In order to obtain the equation of a line you need to know the slope of the line and a point on the line.
 - Once we have this information, we substitute it into point-slope form and solve the equation for y if possible (this gets our equation in slope intercept form).

Find the equation of the following lines; write your answers in slope intercept form if possible:

EX7: $m = \frac{3}{5}$ through $(1, -2)$

EX8: $m = 0$ through $(1, -2)$

EX9: m undefined through $(1, -2)$

EX10: $(-3, 4)$ $(9, 1)$

EX11: $f(6) = 3$ $f(-2) = 4$

Parallel and Perpendicular Lines:

- Two lines are said to be **parallel** if they have the same slope (graphically they will never intersect).
 - To find the equation of a line that is parallel to another line:
 1. Find the slope of the given line.
 2. Use the given point and the slope obtained in step 1 to find the equation of the line by substituting the information into point-slope form and then solving for y if possible.
- Two lines are said to be **perpendicular** if they have the opposite reciprocal slopes (graphically the lines intersect at a 90 degree angle).
 - To find the equation of a line that is perpendicular to another line:
 1. Find the slope of the given line.
 2. Find the perpendicular slope (opposite reciprocal of the slope in step 1)
 3. Use the given point and the slope obtained in step 2 to find the equation of the line by substituting the information into point-slope form and then solving for y if possible.

Find the equation of the following lines:

Ex12: *Through $(-3, -5)$ parallel to $5x - 2y = 13$*

Ex13: *Through $(-3, -5)$ perpendicular to $5x - 2y = 13$*

Ex14. *Through $(-3, -5)$ parallel to $x = 5$*

Ex 15. *Through $(-3, -5)$ perpendicular to $x = 5$*