MATH 6: ASSIGNMENT 16. FUNCTIONS CONTINUED
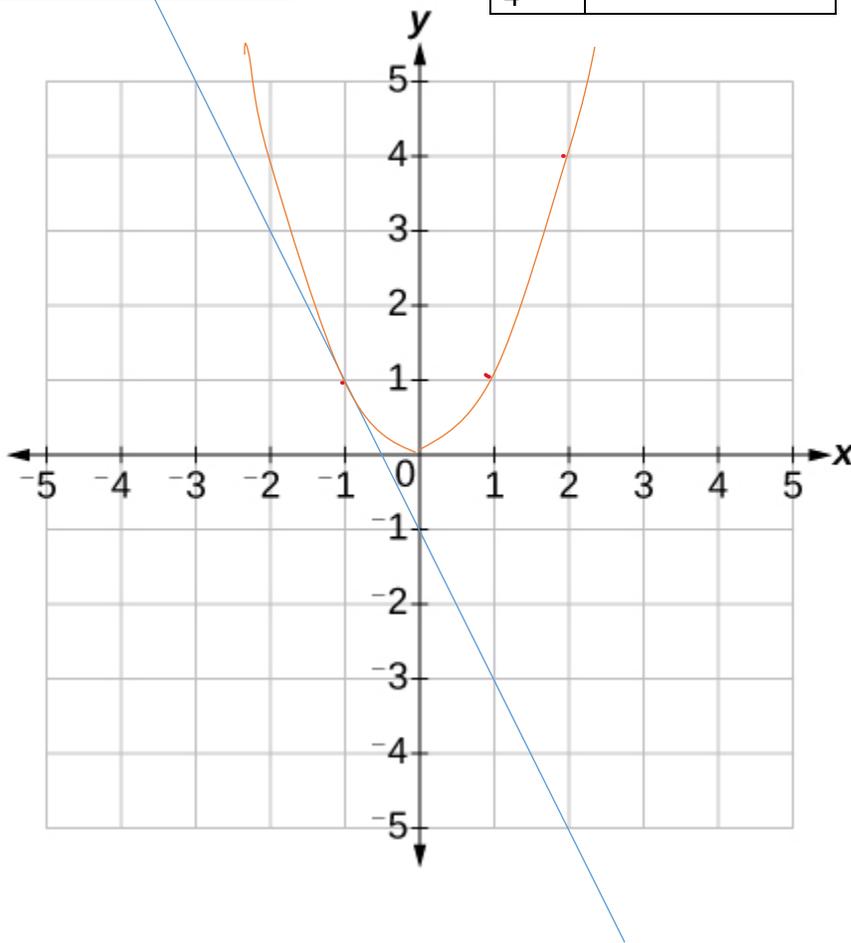
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$y = x^2$ parabola *(quadratic function, good guess!)*

$y = kx + b$ is called linear function *because y changes linearly, e.g. proportionally to x.*

-2	2
-1	1
x	$y = -2x - 1$
0	-1
1	-3
2	
3	
4	

-3	9
-2	4
-1	1
x	$y = x^2$
0	0
1	1
2	4
3	9
4	

Homework

1. For each of the equations below, draw the graph, then draw the perpendicular line (going through the point (0, 0)) and then write the equation of the perpendicular line
   a. $y = 2x$
   b. $y = 3x$
   c. $y = -x$
   d. $y = -\frac{1}{2}x$

Did you notice a pattern? Can you determine the general rule: if the slope of a line is k, what is the slope of the perpendicular line?

2. Draw the graphs of the following functions:
   a. $y = 2|x|$
   b. $y = |x + 1|$

3. Sketch the graphs of functions y = |x + 1| and y = −x + 0.25.
   How many solutions do you think this equation has?

$$|x + 1| = -x + 0.25$$

Note: you are not asked to find the solutions just answer **how many are there**.

4. Find the distance between the following pairs of points in the plane (hint: do you remember the Pythagorean theorem?)
   a. (0, 0) and (1, 1)
   b. (0, 0) and (3, 4)
   c. (0, 0) and (−1, 2)
   d. (2, 2) and (0, 6)

5. Find the equation of the line through (1, 1) with slope 2.

6. Find the equation of the line through points (1, 1) and (3, 7). [*Hint: what is the slope? What is the shift?*]

7. Find **graphically** solution to this equation:

$$x^2 = -2x - 1$$

To do this, plot two graphs on the same Cartesian plain
$$y = x^2 \text{ and } y = -2x - 1$$
Find intersection points.

Can you solve this equation analytically, i.e. using algebra we have learned so far?