

MATH 6: ASSIGNMENT 18. FUNCTIONS CONTINUED

March 3, 2024

$$y = ax + b;$$

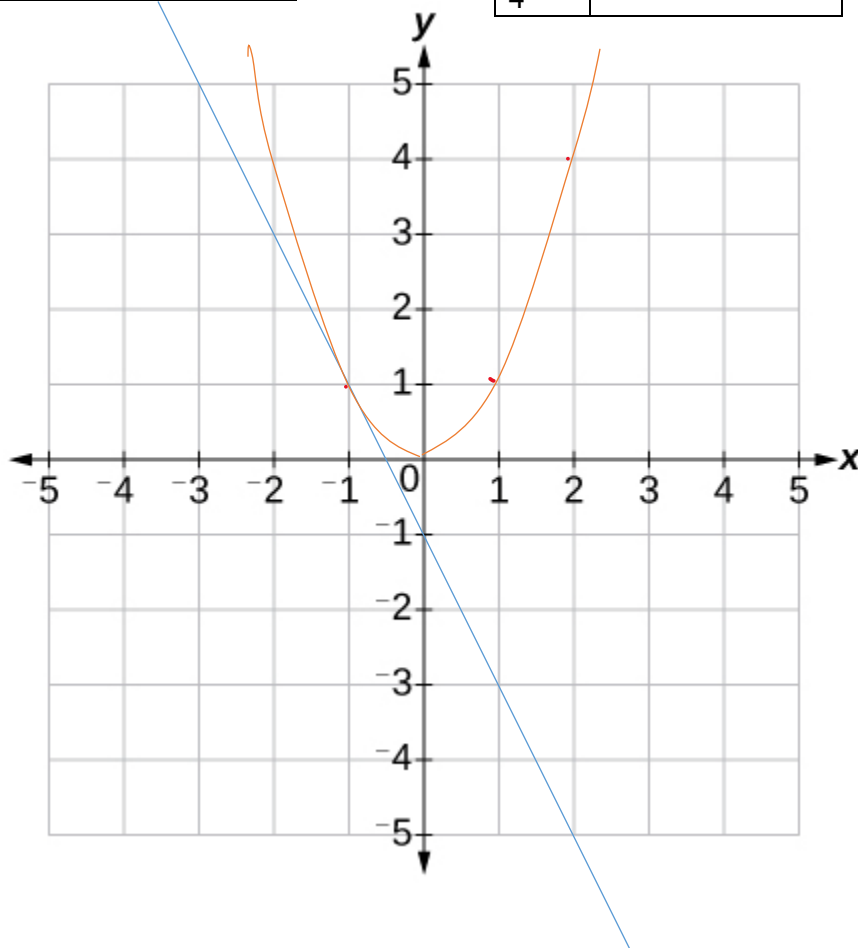
$$y = |ax + b|$$

$$y = x^2 \text{ parabola}$$

$y = kx + b$ 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

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

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?

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

- Find the distance between the following pairs of points in the plane (hint: do you remember the Pythagorean theorem?)
 - $(0, 0)$ and $(1, 1)$
 - $(0, 0)$ and $(3, 4)$
 - $(0, 0)$ and $(-1, 2)$
 - $(2, 2)$ and $(0, 6)$
- Find the equation of the line through $(1, 1)$ with slope 2.
- Find the equation of the line through points $(1, 1)$ and $(3, 7)$. [*Hint: what is the slope? What is the shift?*]
- 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?