Name _____   Date _____

Math 10250 Activity 1: Functions and Their Geometric Properties[1] (Sections 0.2–0.3)

GOAL: Understand the fundamental concept of function as a relation between variables expressed by a formula, a graph, or a table and use it to model change.

Q1: What is a variable? What is a function?
A1:

Example Assume that you have just deposited \$500 in your bank account at the ND Credit Union that pays annual interest 2% compounded daily, and you want to know what will be your amount at any future day. Use variables and functions to model it.

Exercise 1 Consider the function $f(x) = x^2 + 1$.
  (a) Compute the following table of its values:

x	-3	-2	-1	0	1	2	3
$f(x)$							

  (b) Compute $f(1+h) =$

  (c) Find the (natural) domain of f.

  (d) Find the range of f.

  (e) Sketch the graph of f.

Exercise 2 What is the natural domain of $f(x) = \dfrac{5}{x^2 - 9}$?

Exercise 3 Which of the curves below:

  (a) is the graph of a function?   (b) is the graph of a 1-1 function?
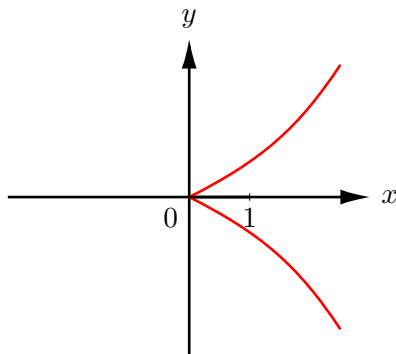

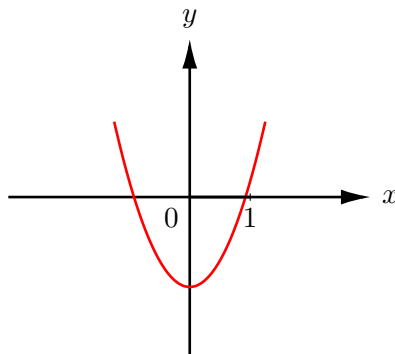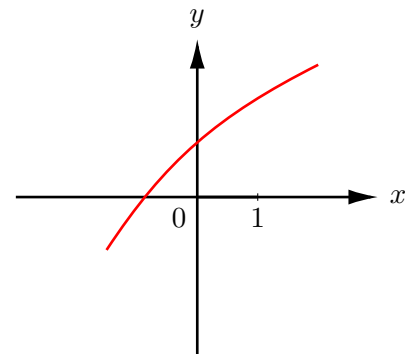Figure 1   Figure 2   Figure 3

[1]Alex Himonas & Alan Howard: Calculus, Ideas and Applications, Wiley 2003 – eBook 2018

Exercise 4 Find the inverse of the function $y = f(x) = 2x + 1$ and sketch its graph.

Exercise 5 For the function shown in Figure 2 determine where it is increasing and where it is decreasing.

Exercise 6 Is the function $f(x) = x^4 - 3x^2$ even or odd? What about $f(x) = x^3 + x$ and $f(x) = x^3 - x^2$?

Exercise 7 For the the function $f(x)$, whose graph is shown in Figure 4, sketch the following vertical and horizontal translations

    (a) $y = f(x) + 3$ (b) $y = f(x) - 1$ (c) $y = f(x - 1)$ (d) $y = f(x + 2)$ (e) $y = f(x + 2) + 3$
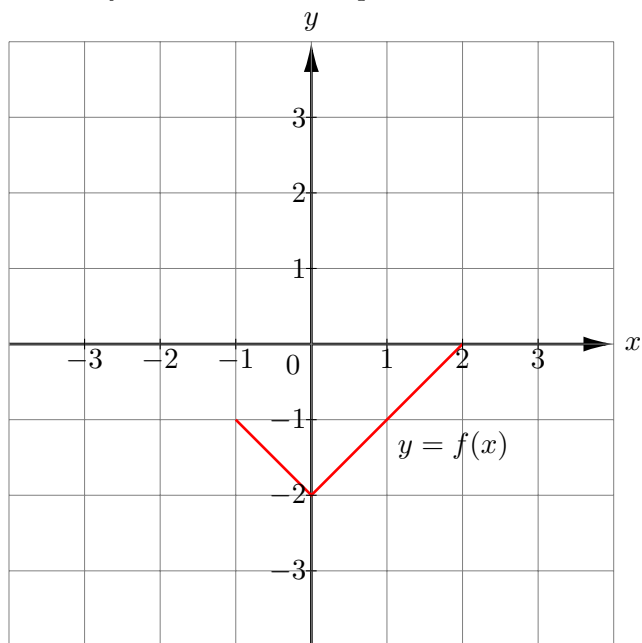
on the same system of Cartesian plane.

Figure 4

Exercise 8 Sketch the graph of the functions $y = x^2$ and $y = (x - 3)^2 + 1$.