Math 112 Written Homework: Transformations   Student Name:_____
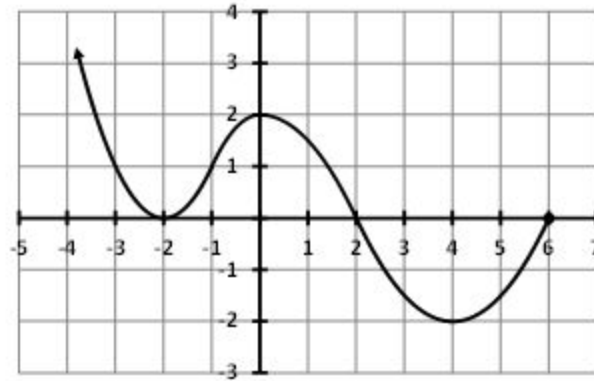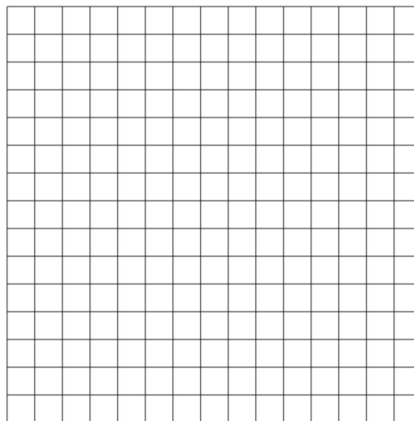
Instructor: Laird

Math 112 Section: 062

Directions: *Show all work, and answer each question that is asked. Explanations should be given in complete sentences. All graphs should be drawn accurately on this sheet, and be fully labeled.*
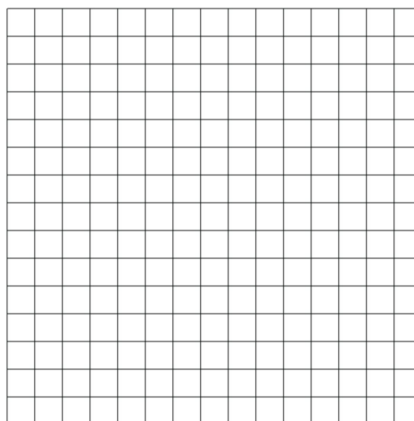
1. Let $y = f(x)$ be given by the graph below.

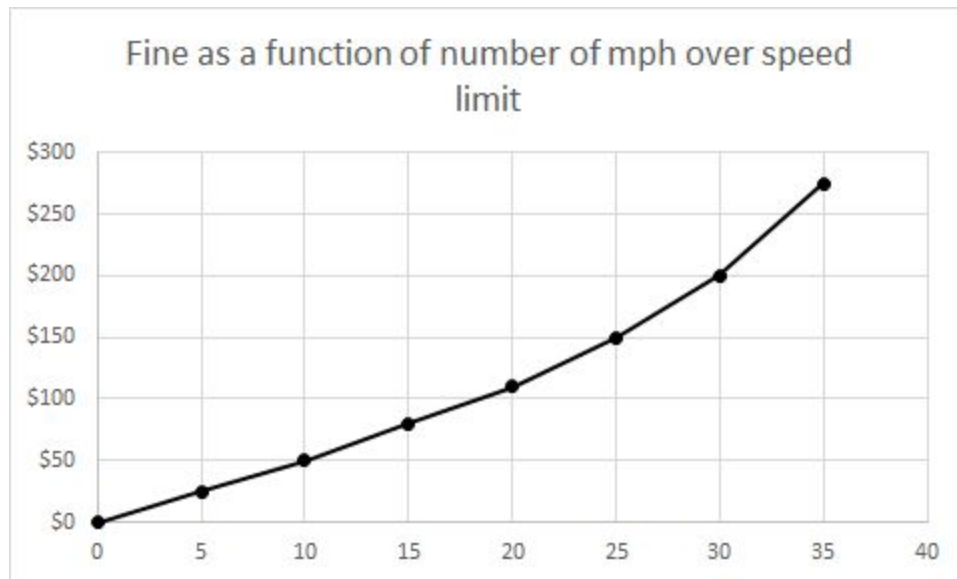Sketch the graph of each of the following. Label at least 3 points on each graph.

a. $y = f(2x) - 1$

b. $y = -f(x-3)$

2. On most state highways, the fine for speeding depends on the speed of the car. In a certain state, suppose the fine as a function of the number of miles per hour over the speed limit is $f(n)$. The graph of this function is shown below.

Fine as a function of number of mph over speed limit

For each of the following situations, write a function, in terms of $f(n)$, that describes the new fine function.

a. The state determines that the fine at every speed should go up by $10.

b. The state determines that the fines at every speed should be doubled in construction zones.

c. The state decides to adjust all fines in such a way as to give a 5 mph "buffer". (For example, the new fine for driving 30 mph over the speed limit will be the same as the current fine for driving 25 mph over the speed limit.)

3. Tridynamic, located in Phoenix, Arizona, produces cellular phone batteries. In 2016, the cost to produce the batteries, in dollars, is modeled by $C(x) = 240\sqrt{x} + 2500$, where x is the number of batches produced, and $2500 is the fixed cost. In 2017, the minimum hourly wage for employees in Arizona increased to $10 per hour, causing both production materials and the price of labor hour to increase. The cost to produce two-thirds batch of batteries is now twice the 2016 cost to produce a single batch.
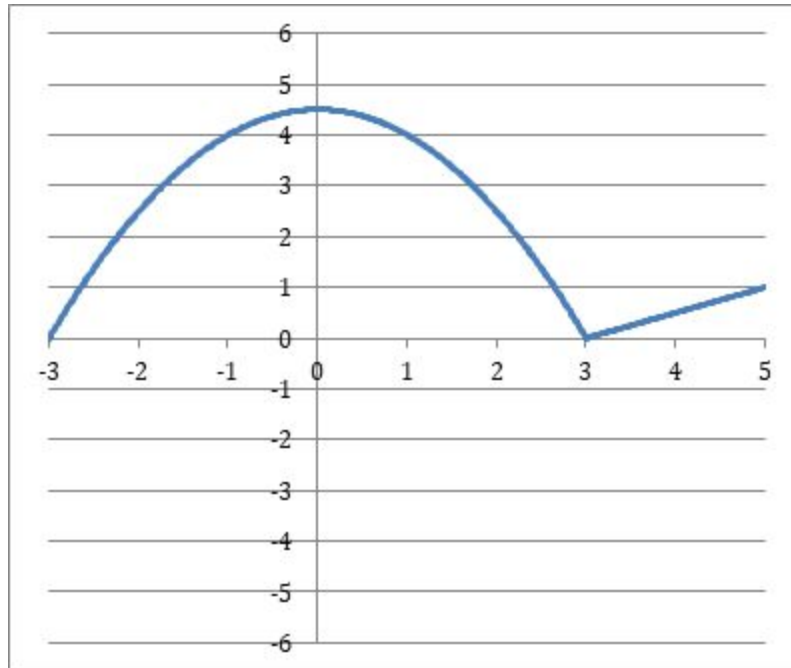
Define the variables:

x :

C :

Make a table of values for the 2016 cost model and the 2017 cost model, with at least 5 x-values each.

Express the 2017 cost model by transforming the 2016 cost model.

4. The graph of $y = g(x)$ is given below.

Sketch an accurate graph of $y = \frac{1}{2}g(x) + 2$ on the above axes. Label at least 4 points on your new graph.

Give the domain and range of the original and the transformed function.