Task: Graphing Damped Trigonometric Functions **Name _____**

PER _____ **Date _____**

When you multiply a trigonometric function by another function, the trigonometric function is said to be *damped* by the properties of the second function. Damping a trigonometric function causes its graph to take on the properties of the damping function while retaining its own properties/patterns.

The damping function is called the **damping factor**.

1. Graph $f(x) = x\sin x$

   a. Complete the table below for $y = x$ and $y = \sin x$ (you may use decimal approximations as needed for graphing purposes).

   b. Multiply the values obtained from the table in (a) to find the values for $f(x)$.

x	**-2π**	**- 7π/4**	**-3π/2**	**- 5π/4**	**- π**	**- 3π/4**	**- π/2**	**- π/4**	**0**	**π/4**	**π/2**	**3π/4**	**π**	**5π/4**	**3π/2**	**7π/4**	**2π**
(a) y=x																	
(b) y=sinx																	

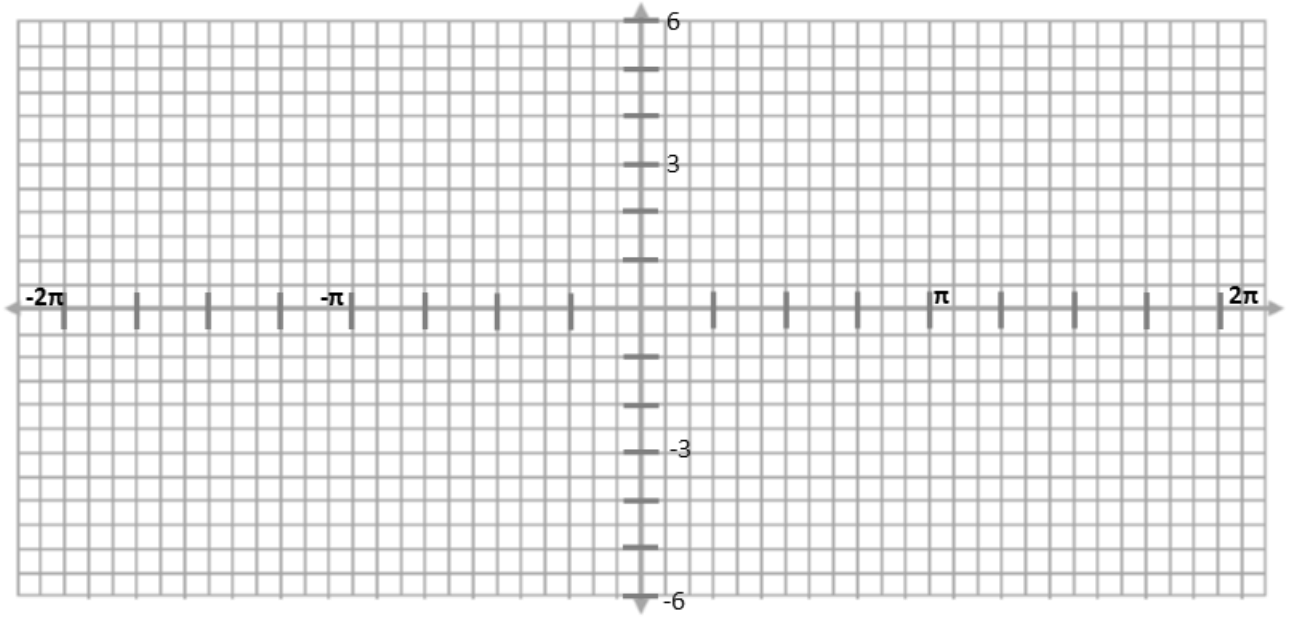
f(x)=xsinx																	

Now, on the coordinate plane below,

c. Graph the lines $y = x$ and $y = -x$. (*Be careful, while the slopes are one, the scales for x and y are different!*)

d. Plot the points $(x, f(x))$ using your table.

e. Finally, sketch a smooth curve that connects the points (remember that the graph maintains the basic shape of the trigonometric function).



Questions

2. Describe the graph of f(x). _____

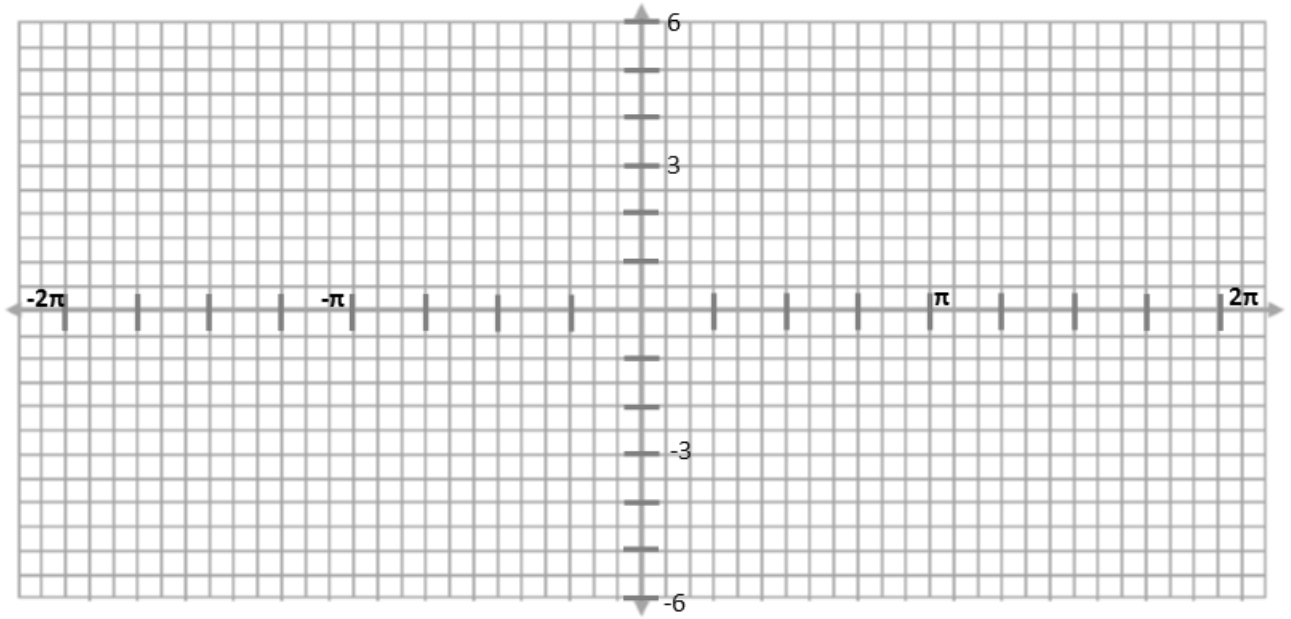
3. What do you notice about the location of the ***zeros*** of the f(x) as compared to the original functions? _____

4. Examine the x-values where the original function, **y = sin*x*,** has maximum and minimum values. What do you notice about the points on the damped function f(x) for these same x-values? _____

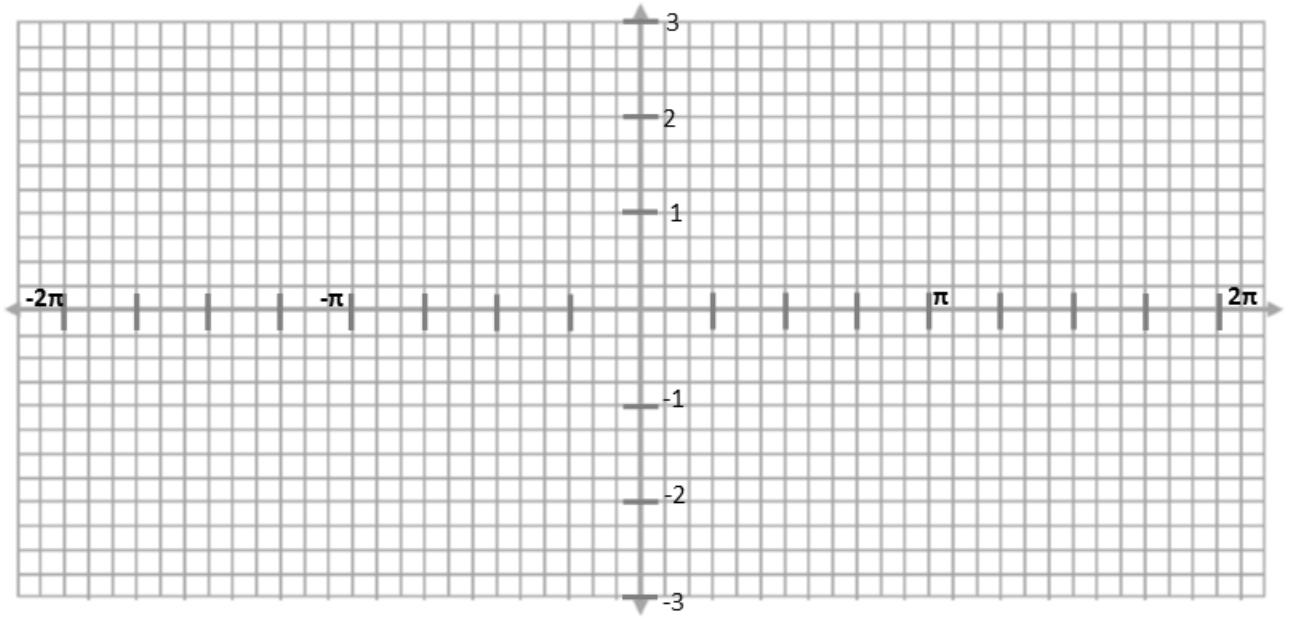
5. Use your observations regarding the graph of f(x) and the graphs of $y = \pm x$ to describe a method that you could use to sketch the graph without having to make a table and plot points.

Try and use the process that you came up with in number 5 to graph the following. Make adjustments as you need to. Check your answers by graphing them in the calculator. Be sure to change to radians and set your window to the window shown on the coordinate planes for each function.

6. $y = x\cos x$



7. $y = \sqrt{x}\sin x$



8. $y = (x^2 + 3)\sin(2x)$