Name: _____ **TC**

Classwork 51

1. In economics, demand is usually more hyperbolic. When the student council decides to have a bake sale to raise money for the senior prom, the calculus class decides that a more reasonable model of the relationship between **sales (y)** and **price (x)** would be $y = 25/x^2$

a) Sketch the graph of the relationship between sales and price in the first quadrant. Label your axes.

b) What is the **limit** of the sales function as the **price** of cake goes to ∞?

c) What is the **limit** of the sales function as the **price** of cake goes to 0 ?

d) Fill out the chart showing the sales that this equation predicts for each price.

PRICE	# of slices SOLD	Revenue	Costs	Profit
$0.10				
$0.25				
$0.50				
$1.00				
$2.00				
x				

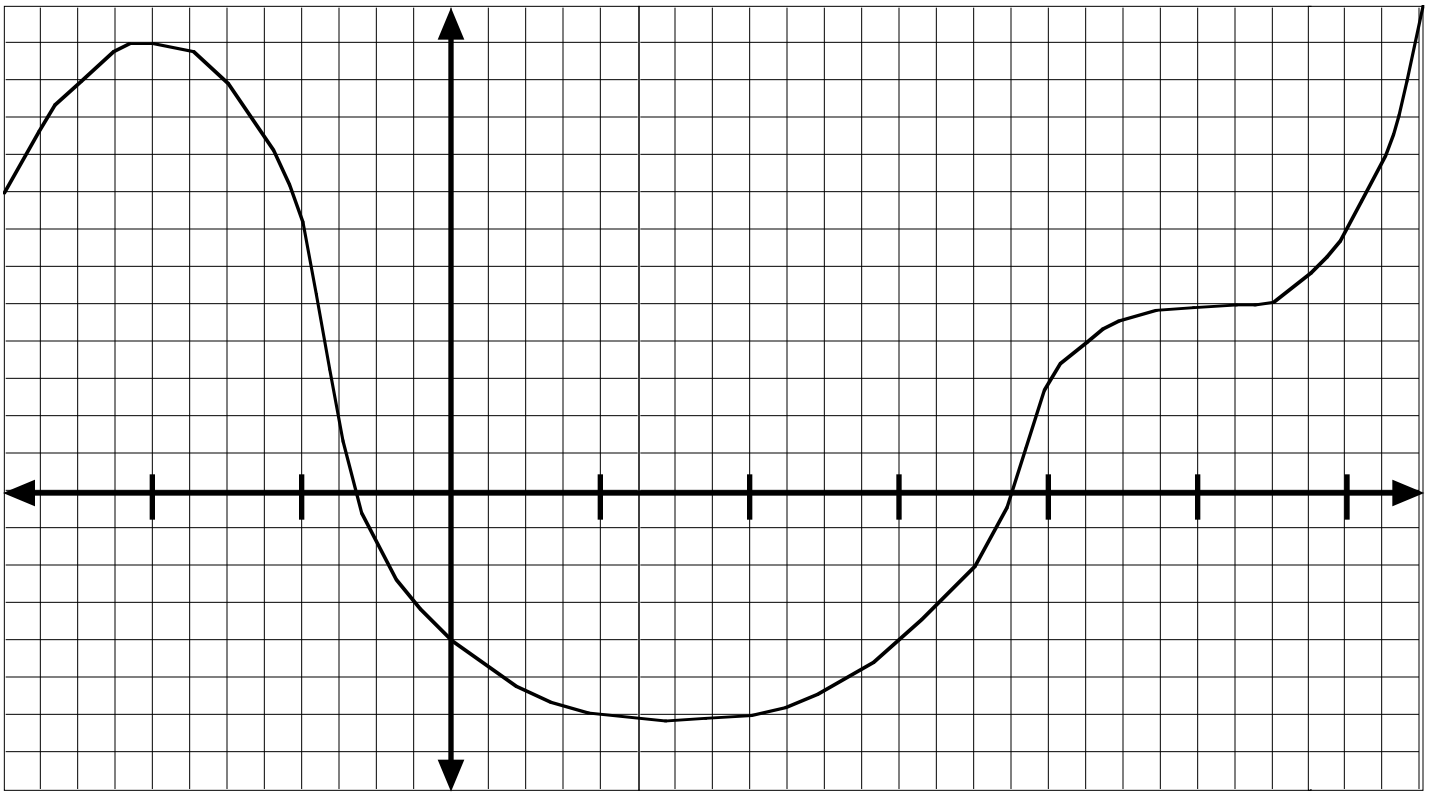
e) What price will give the maximum **sales?**

f) What price will give the maximum **revenue?**

g) Let's say each piece of cake costs the senior class $0.20 to make. Fill out the chart showing the cost & profit that would be expected at any given price. What price do you predict will maximize profits?

h) Given the equation relating price to profit, use calculus to find exactly what price the senior class should set in order to maximize profits.

Answer the following questions using the function below.



2. Where is the derivative equal to zero?	3. Where is the derivative positive?	4. Where is the derivative negative?

5. Estimate the derivative at these points:

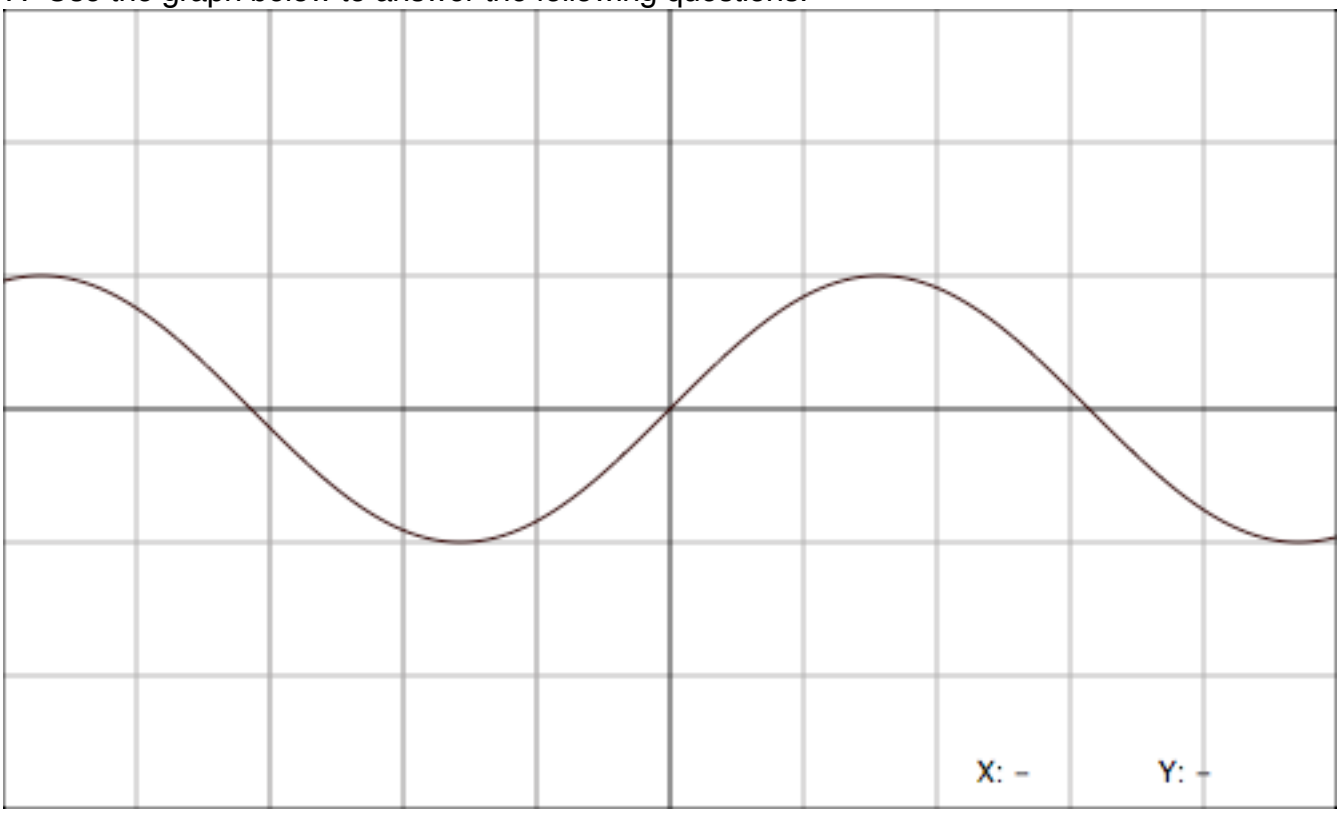
a) x = -12 b) x = -4 c) x = 13 d) x = 14 e) x = 25

6. Using your answers from questions 1 - 4, **graph** the derivative on the same axes as the original function.

6. Where is the **derivative of the derivative** ...

a) zero b) positive c) negative

7. Use the graph below to answer the following questions.



a) What function is this?

b) Label the points on the function where the derivative would equal zero. (A dark dot is sufficient)

c) Draw x's on the function where the derivative is the most negative and the most positive.

d) What is the highest the derivative gets? e) What is the lowest the derivative gets?

f) Use your answers to letters (b) through (e) to **graph the derivative on the same axes.**

g) What do you think the **function** for this derivative might be?

h) How can we use the calculator to see if we might be correct?

Take some notes on the steps:

i) Graph the **derivative of the derivative** on the same axes. What function might this be?