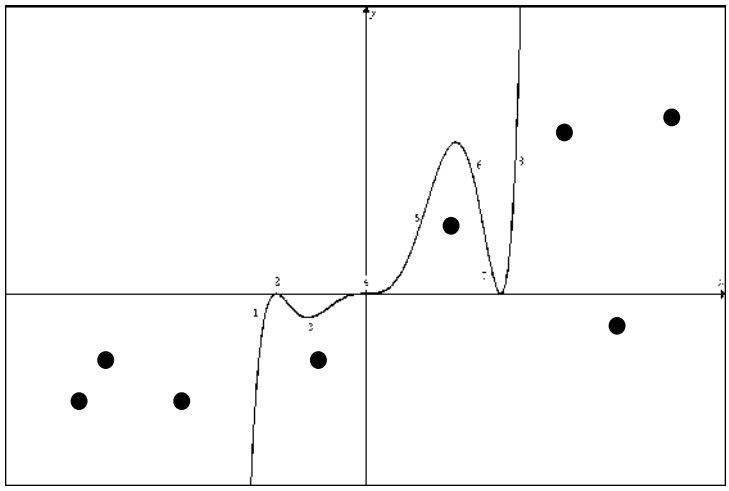
Name_____ **quiz PRACTICE Meaning of Derivatives**

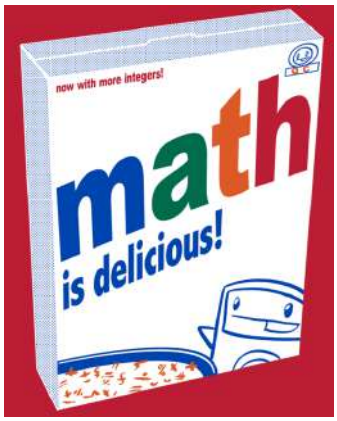
1) Given the function f(x) below indicate if f(x), f′(x), and f″(x) are positive, negative or zero at each point.

Point	f(x)	f′(x)	f″(x)
1			
2			
3			
4			
5			
6			
7			
8			



2) Mr. Haas eats his "Math Cereal" each morning and notices that there is a relationship between the temperature of the milk he puts on the cereal and the time for the cereal to get soggy. The time to get soggy (in minutes) is a function of the milk temperature (in Degrees Celsius).

Explain the meaning of the following.
(Include Units!!!)



a) f(4)=5

b) f′(4)=-0.5

c) Mr. Haas finds that warmer milk temperatures make the cereal soggier faster. However, the amount of time it takes to get soggy decreases at a slower rate as the milk gets warmer. (That is - an increase in milk temperature has a greater effect on the time to get soggy at lower temperatures than at higher temperatures.)

Sketch a graph of this relationship.

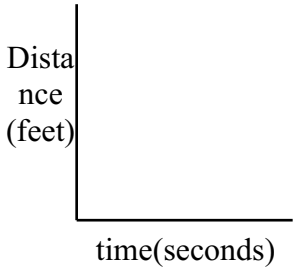
What must be true about the sign of f″(x)?

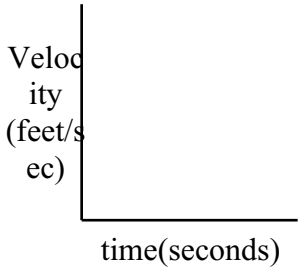
3) The acceleration of a Ferrari F430 is tested on a track.

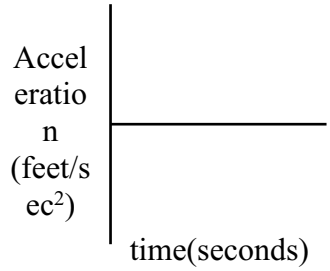
Time (seconds)	Total Distance (feet)
0.0	0
1.0	12
2.0	48
3.0	108

The total distance (in feet) traveled by the Ferrari was recorded each second for a 3 second interval.

a) Make a rough sketch (do NOT plot the exact points) of time vs. distance, velocity, and acceleration graphs below. You MUST label the axis.







b) Determine the acceleration of the car as a function of time.

4) For equally high quality diamonds the **cost** (in thousands of dollars) is a function of **weight** (in carats). **c=f(w)**.

a) A 2 carat costs $6,000 is best expressed as:

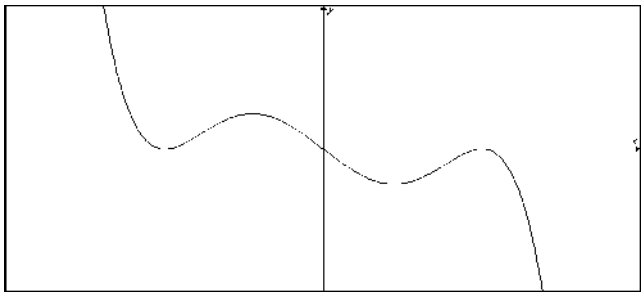
(1) f(6)=2 (2) f(2)=6 (3) f′(2)=6 (4) f′(6)=2

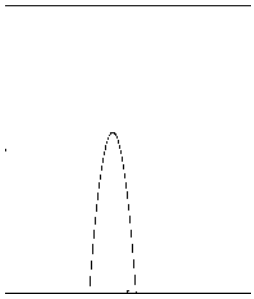
b) Since large diamonds are more rare, the larger a diamond is the greater the cost per carat. Which of the following must be true?

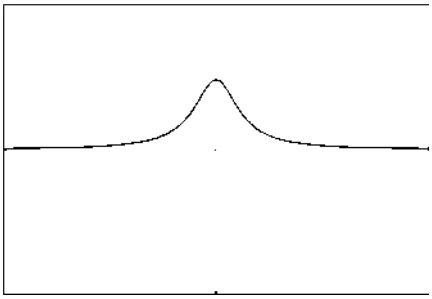
(1) f′(x)>0 (2) f′(x)<0 (3) f′(x)=0

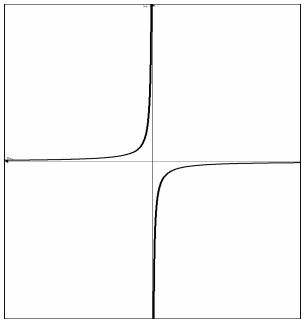
(4) f″(x)>0 (5) f″(x)<0 (6) f″(x)=0

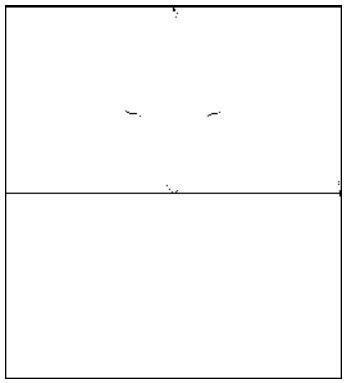
5) Sketch the first derivatives of the functions below.

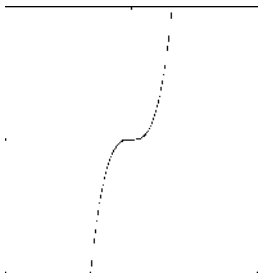


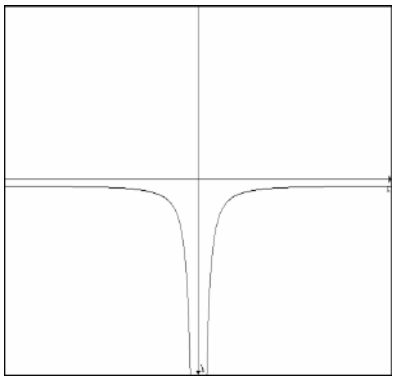












6) Sketch a function given the following information about its first and second derivative.

f′(x) < 0 for all x in the domain
f″(x) > 0 for x < 0
f″(x) < 0 for x > 0

f′(x) > 0 for x < 0
f′(x) < 0 for x > 0
f″(x) < 0 for all x in the domain