

Quiz 4A, Business Calculus

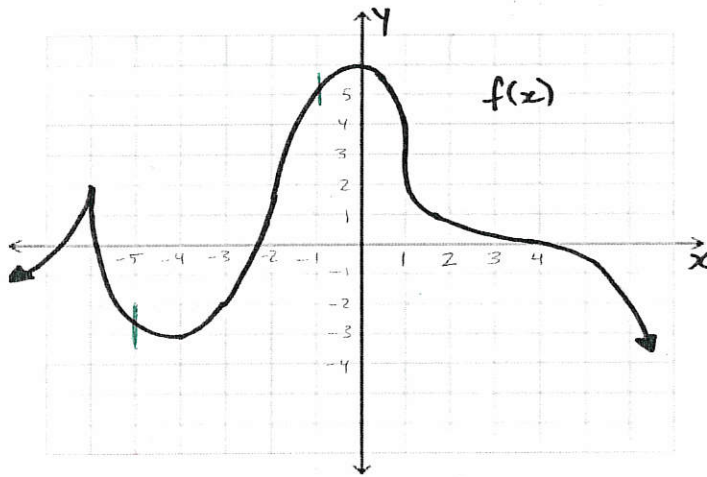
Spring 2017 - Dr. Graham-Squire

6 min

→ give 24

Name: Key

1. (3 points) For the following graph of $f(x)$, answer the questions below. If no such thing exists, write NONE as your answer.



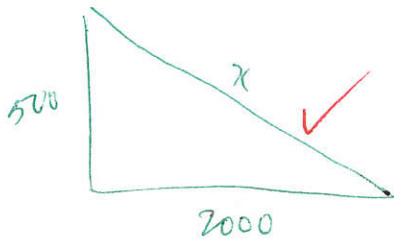
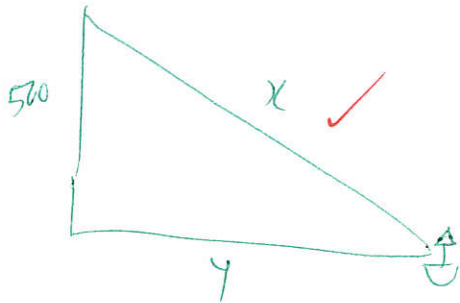
- (a) Find one interval where f is decreasing. $(-6, -4)$, $(0, 1)$, $(1, 4)$, $(4, \infty)$ (0, ∞) okay
- (b) Find one interval where f is concave up. $(-\infty, -6)$, $(-6, -2)$, $(1, 4)$
- (c) Find the (x, y) -coordinates of a local maximum point. $(-6, 2)$ or $(0, 6)$
- (d) Find the (x, y) -coordinates of an inflection point. $(-2, 2)$ or $(1, 3)$ or $(4, 0)$
or $(-2, 1)$ $(1, 4)$ $(1, 2)$
- (e) Find the absolute maximum and absolute minimum on the interval $[-5, -1]$

$$\max = 5$$

$$\min = -3$$

2. (4 points) Helen is at the top of a 500 foot cliff overlooking the ocean, watching a boat on the water coming toward her. Let x be the diagonal distance between Helen and the boat, and y be the distance from the boat to the bottom of the cliff. Suppose the boat is moving at a speed of 100 feet/minute. Calculate the speed at which x is changing at exactly the point when the boat is 2000 feet away from the bottom of the cliff.

$$\frac{dy}{dt} = -100 \text{ ft/min}$$



$$x = \sqrt{2000^2 + 500^2}$$

$$x = 2061.55$$

$$\frac{d}{dt} (500^2 + y^2 = x^2)$$

$$2y \frac{dy}{dt} = 2x \frac{dx}{dt}$$

$$2(2000)(-100) = 2(2061.55) \frac{dx}{dt}$$

$$\frac{-200000}{2061.55} = \frac{dx}{dt}$$

$$-97.01 = \frac{dx}{dt}$$

$\Rightarrow x$ changing @ 97.01 ft/min

WTF: $\frac{dx}{dt}$ when $y = 2000$

3. (3 points) Suppose a given function f has the property that

$$f'(x) = x(x+2)^2(x-3) \quad \text{and} \quad f''(x) = (x-1)^2(x+2)$$

You should not calculate those derivatives, just accept them as correct.

- (a) Find the interval(s) where f is increasing (if any exist).
 (b) Find the interval(s) where f is concave down (if any exist).

