

Math 115
Exam I

Name: _____

1. A car is driven at an increasing speed. Sketch a graph of the distance the car travels as a function of time.

2. A ball is tossed in the air from a bridge, and its height, y (in feet), above the ground t seconds after it is tossed is given by $f(t) = -16t^2 + 50t + 36$.

a) What is the average velocity of the ball during the first second?

b) Approximate the velocity of the ball at $t = 1$ second?

c) At what time does the ball hit the ground?

3. Draw a possible graph of $y = f(x)$ given the following information about its derivative.

- i) $f'(x) > 0$ for $x < 0$
- ii) $f'(x) = 0$ for $x = 0$
- iii) $f'(x) > 0$ for $0 < x < 3$
- iv) $f'(x) = 0$ for $x = 3$
- v) $f'(x) < 0$ for $x > 3$

4. Let $C(q)$ represent the total cost of producing q items. Assume that $C(15) = 2300$ and $C'(15) = 108$.

a) Estimate the total cost of producing 16 items.

b) Estimate the total cost of producing 14 items.

5. Sketch the graph of $f'(x)$

a)

b)

6. Let $C(q)$ represent the cost and $R(q)$ represent the revenue of producing q items. If $C'(50) = 75$ and $R'(50) = 84$, approximately how much profit will be earned by the 51st item?

7. The graph of a function $f(x)$ is given below

a) Graph $f(x - 3)$

b) Graph $-f(x) + 2$

8. Draw a possible graph of a function $y = f(x)$ given the following information

- i) $f'(x) < 0$ and $f''(x)$ is decreasing for $x < 2$
- ii) $f'(x) < 0$ and $f''(x)$ is increasing for $2 < x < 5$
- iii) $f'(5) = 0$
- iv) $f'(x) < 0$ and $f''(x)$ is decreasing for $x > 5$

9. Solve for t .

$$100(2^t) = 12(3^t)$$

10. The half-life of a certain radioactive substance is 12 days. There are 10.32 grams initially. When will the substance be reduced to 1 gram?