Name: _____

Math 1311
Test 1
Fall 2004

1. Apply the limit laws to evaluate the following limits or show how the indicated limit does not exist.

   (a) $\lim_{x \to 7} \dfrac{\sqrt{x+2} - 3}{x - 7}$

   (b) $\lim_{x \to 1^+} \dfrac{1 - x}{|1 - x|}$

2. Apply the limit laws to evaluate the following limits or show how the indicated limit does not exist.

   (a) $\lim_{x \to 0} \dfrac{\tan 2x}{\tan 3x}$

(b) $\lim_{x \to 0} \dfrac{1 - \cos 3x}{2x^2}$

3. Apply the definition of the derivative to find $f'(x)$ for

   (a) $f(x) = 3 - 2x^2$

   (b) $f(x) = \dfrac{1}{3 - x}$

4. A population of chipmunks moves into a new region at time $t = 0$. At time t (in months), the population numbers

$$P(t) = 100[1 + (0.3)t + (0.04)t^2].$$

(a) How long does it take for this population to double its initial size $P(0)$?

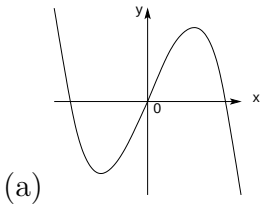
(b) What is the rate of growth of the population when $P = 200$?

5. Find the derivative $f'(x)$ by applying the differentian rules.

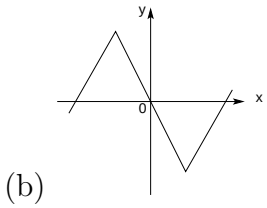
(a) $f(x) = \dfrac{2x^3 - 3x^2 + 4x - 5}{x^2}$

(b) $f(x) = \dfrac{x^3 - 4x + 5}{x^2 + 9}$

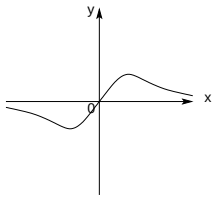
6. Match the graph of each function in (a)-(d) with the graph of its derivative in I-IV. Give reasons for your choice.



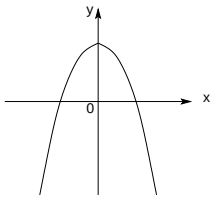
(a)



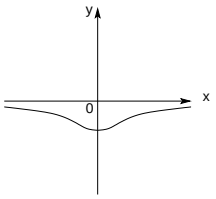
(b)



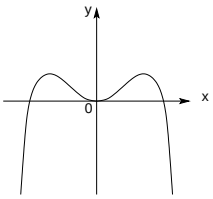
I



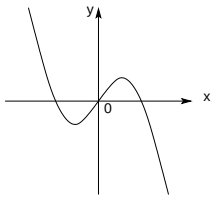
II



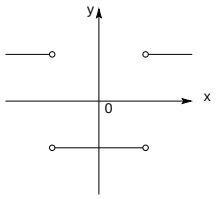
(c)



(d)



III



IV