AP Calculus - Chapter 2 Test 1 –Review 2

The test will be a "mini test" worth 50 points.

It will all be NO CALCULATOR.

Section 1 will be 7 multiple choice questions. Know how to estimate speed; how to set up the definition of a derivative; know how to find limits using a table or graph; know how to find limits involving sine or cosine; know your limit laws; know how to apply the squeeze theorem; know how to find finite and infinite limits in general using the steps we discussed.

Section 2 will be free response, no calc.

Know how to solve limits given a piecewise function; know how to solve limits given a graph of f and g and applying limit laws; know how to find limits given a graph and a table along with limit laws; be able to find the average rate of change given a table or function; know how to find the instantaneous rate of change and average rate of change given a table or function; know how the find the slope of a tangent given a function and a point; be able to find the normal line to a curve.

All No Calculator!!!

1. Find each limit:

$$\lim_{x \to \infty} \frac{20}{10 + 3e^{-.04x}} =$$

$$\lim_{x \to 0} \frac{cosx}{sinx - 5e^x} =$$

2. $\lim_{x \to 3} f(x) = 3$ and $\lim_{x \to 3} \frac{g(x)}{f(x)} = 8$. What is the $\lim_{x \to 3} g(x)$?

3. Suppose $f(x) \le g(x) \le h(x)$ and $\lim_{x \to -2} f(x) = \lim_{x \to -2} h(x) = -7$. Find $\lim_{x \to -2} g(x)$.

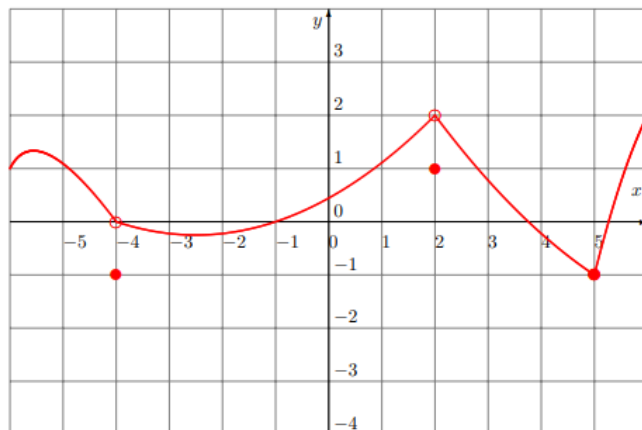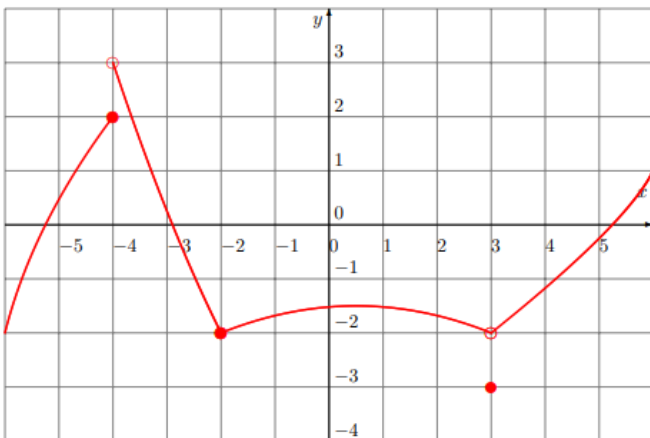4. $f(x) = \begin{cases} x + 2 & for\ x > 3 \\ -5x + 3 & for\ x < 3 \end{cases}$ Find: a) $\lim_{x \to 3^-} f(x)$ b) $\lim_{x \to 3^+} f(x)$ c) $\lim_{x \to 3} f(x)$

5. Use the graph of f(x) and g(x) to find each:

Graph of f(x)

Find the following limits:

a) $\lim_{x \to -2^-} f(x)$ b) $\lim_{x \to -2^+} f(x)$ c) $\lim_{x \to -2} f(x)$ d) $\lim_{x \to -4} f(x)$ e) $\lim_{x \to 3} f(x)$

Graph of g(x)

f) f(3)   g) $\lim_{x \to 2} \frac{f(x)}{g(x)} =$ h) $\lim_{x \to 1} \frac{f(x)+1}{g(x)} =$ j) $\lim_{x \to -4^-}[3f(x) + 2g(x)] =$

6. Selected values of a function f(x) are shown in the table. What is the average rate of change of f over the interval [-2, 5]?

x	-4	-2	0	1	2	4	5	10
f(x)	10	5	-3	0	15	5	12	8

7. Suppose you have the following:

$$g(x) = \begin{cases} x^2 + 2x + 1 & for\ 0 \le x < 6 \\ f(x) & for\ 6 \le x \le 12 \end{cases}$$

x	6	8	10	12
f(x)	100	120	141	202

a) According to the model g, what is the average rate of change over the time interval $6 \le x \le 12$?

b) Use the data in the table to approximate the instantaneous rate of change at x = 11.

c) Find the instantaneous rate of change at x = 2.

8. Let $f(x) = 4x^2 - 6x$ and P the point (1, -2).

      a) Find the slope of the curve $y = f(x)$ at P.

      b) The equation of the tangent at P.

      c) The equation of the normal at P.