Practice Exam 9-2011

no Calc.

Chapter 2 Exam
A. P. Calculus
Mr. Lemay
September 13, 2002

Section I, Part A
Time-16 minutes Number of questions – 8
A CALCULATOR MAY NOT BE USED ON THIS PART OF THE EXAMINATION
(Worth 25% of Exam)

Directions: Solve each of the following problems, using the available space for scratch work. After examining the form of the choices, decide which is the best of the choices given. Clearly mark your selection.

1. Determine $\lim_{x \to 5} (2x^2 - 4x + 7)$ by substitution

(A) 7 (B) 12 (C) 37 (D) 47 (E) 57

$2(25) - 20 + 7$

$50 - 20 + 7$

$30 + 7$

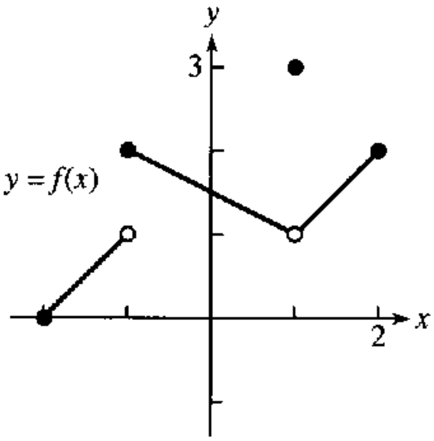
2. Find $\lim_{x \to 2} \frac{x^2 + x - 6}{x - 2}$, if it exists.

(A) 0 (B) 3 (C) 5 (D) 6 (E) Does not exist

$\frac{4+2-6}{2-2}$ $\frac{0}{0}$ Needs more work

$\lim_{x \to 2} \frac{(x+3)\cancel{(x-2)}}{\cancel{x-2}}$ $\lim_{x \to 2} x+3$

3. For the function $y = f(x)$ whose graph is shown below, which statement is false:



(A) $\lim_{x\to 1} f(x) = 1$

(B) $\lim_{x\to 2^-} f(x) = 2$

(C) $\lim_{x\to 0^+} f(x) = \lim_{x\to 0^-} f(x)$

(D) $\lim_{x\to -1} f(x) = 2$

(E) $\lim_{x\to -1^-} f(x) = 1$

$\lim_{x\to -1^-} = 1$

$\lim_{x\to -1^+} = 2$

4. Let $f(x) = \begin{cases} x^2 - 2, x < 1 \\ -\frac{1}{2}x + 1, x \geq 1 \end{cases}$. What is $\lim_{x\to 1^+} f(x)$?

(A) -1 a. ½ (C) 1 (D) 1.73 (E) Does not exist

Rt use $-\frac{1}{2}x + 1$

$x \to 1$ $-\frac{1}{2}(1) + 1 = \frac{1}{2}$

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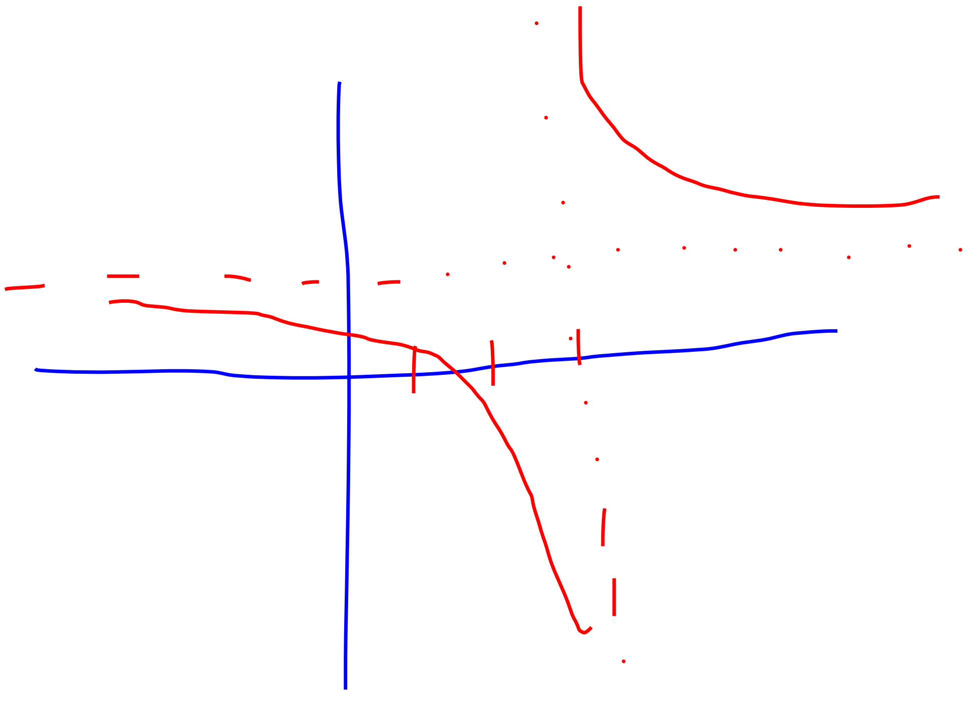
5) Find $\lim\limits_{x \to 3^+} \dfrac{x+3}{x-3}$

(A) 0 (B) 6 (C) -6 (D) $-\infty$ (E) ∞

$$x-3\,\overline{)\,x+3}\quad 1$$
$$\underline{-x+3}$$
$$6$$

$$1+\frac{6}{x-3}$$



6 Which of the following is a horizontal asymptote for $f(x)=\dfrac{6x^2+2x-4}{2x^2+3x+2}$?

(A) y = -3 (B) y = -2 (C) y = 2 (D) y = 3 (e) y = 4

Same exponent

$y = \frac{6}{2}$ or 3

7. Find $\lim_{x \to -\infty} \frac{|8x+6|}{4x-2}$

(A) -3 (B) -2 (C) 2 (D) 3 (E) 4

$$\frac{+}{-} \quad \frac{8}{-4} = -2$$

8. Which of the following is the right end behavior for $y = x^3 - e^{-x}$?

(A) x^3 (B) $-e^{-x}$ (C) e^{-x} (D) e^x (E) $-x^3$

$x \to \infty$

$$x^3 - \frac{1}{e^x}$$

gets big gets small

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Section I, Part B
Time-9 minutes Number of questions – 3
A GRAPHING CALCULATOR IS REQUIRED FOR SOME QUESTIONS ON THIS PART OF THE EXAMINATION
(Worth 25% of Exam)

Directions: Solve each of the following problems, using the available space for scratch work. After examining the form of the choices, decide which is the best of the choices given. Clearly mark your selection.

1. Find the average rate of change of the function $f(x) = 2x^2$ over the interval [1, 3].

(A) 4 (B) 8 (C) 12 (D) 15 (E) 16

$f(3) = 18$

$f(1) = 2$

$\frac{18-2}{3-1}$ $\frac{16}{2}$

2. Find the slope of the curve $y = x^2 + x$ at x = 3.

(A) 7 (B) 8 (C) 9 (D) 10 (E) 11

$$\lim_{h \to 0} \frac{(3+h)^2 + (3+h) - [9+3]}{h}$$

$$\frac{9+6h+h^2+3+h-12}{h}$$

$$\frac{7h + h^2}{h}$$

$$\lim_{h \to 0} 7 + h = \boxed{7}$$

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3. Let $f(x)=\begin{cases} x^2-2, & x\le 1 \\ 1.5x-2.5, & x>1 \end{cases}$ Determine whether the curve $y=f(x)$ has a tangent at x = 1. If it does, give its slope.

(A) 1.5 (B) 2 (C) 2.5 (D) 3 (E) No tangent

$f(1)=-1$

$\lim_{x\to 1^-} = -1 \quad \lim_{x\to 1^+} = -1$

Slope on left

$\lim_{h\to 0} \frac{(1+h)^2-2 - [-1]}{h} \to \frac{1+2h+h^2-2+1}{h}$

$\lim_{h\to 0} 2+h = 2$

Slope on RT

line so slope = 1.5

Diff. Slopes so no Tangent.

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AP Calculus
Section II

Time 15 minutes Number of problems 2
Percent of total grade-50

A GRAPHING CALCULATOR IS REQUIRED FOR SOME PROBLEMS OR PARTS OF PROBLEMS ON THIS SECTION OF THE EXAMINATION.

REMEMBER TO SHOW YOUR SETUPS AS DESCRIBED IN THE GENERAL INSTRUCTIONS

1. Find a value m so that the function $g(x)=\begin{cases} mx+4, x \le -3 \\ x^2-11, x > -3 \end{cases}$ is continuous.

$$m(-3)+4 = 9-11$$

$$-3m+4 = -2$$

$$-3m = -6$$

$$\boxed{m = 2}$$

2. For the function $f(x) = 3x^2$ at the point (4, 48), find:

(a) the slope of the curve

$$\lim_{h \to 0} \frac{3(4+h)^2 - 48}{h} \to \frac{3(16+8h+h^2)-48}{h}$$

$$\frac{48 + 24h + 3h^2 - 48}{h} \quad \lim_{h \to 0} 24 + 3h$$

$$24$$

(b) an equation of the tangent line

$$y - 48 = 24(x-4)$$

(c) an equation of the normal line

$$y - 48 = -\frac{1}{24}(x-4)$$

The beauty of point slope form of the equation of a line !