

Name: _____

MA1 Exam 1 Review Sheet

Exam 1 will be on Wednesday, October 10, 2007. The exam will cover all topics taught since the beginning of the semester, including limits as $x \rightarrow a$, limits as $x \rightarrow \pm\infty$, limits involving radicals, limits that do not exist, interpreting limits graphically, continuity, piecewise functions, finding asymptotes and holes, and the Intermediate Value Theorem. Calculators are *not* permitted on this exam.

1. Evaluate each limit:

a) $\lim_{x \rightarrow 3} \frac{x^2 - 4}{x^2 - 5x + 6}$

b) $\lim_{x \rightarrow \infty} \frac{x + 3}{x^2 + 5x + 6}$

c) $\lim_{x \rightarrow -\infty} \frac{\sqrt{4x^2 - 7x}}{3x + 8}$

d) $\lim_{x \rightarrow 1} \frac{x - 1}{\sqrt{x^2 + 3} - 2}$

e) $\lim_{x \rightarrow -\infty} \frac{2x^2 + 1}{6 + x - 3x^2}$

f) $\lim_{x \rightarrow 2} \frac{x^2 - 4}{\frac{1}{x} - \frac{1}{2}}$

2. a) $\lim_{x \rightarrow 3^-} f(x) =$ _____

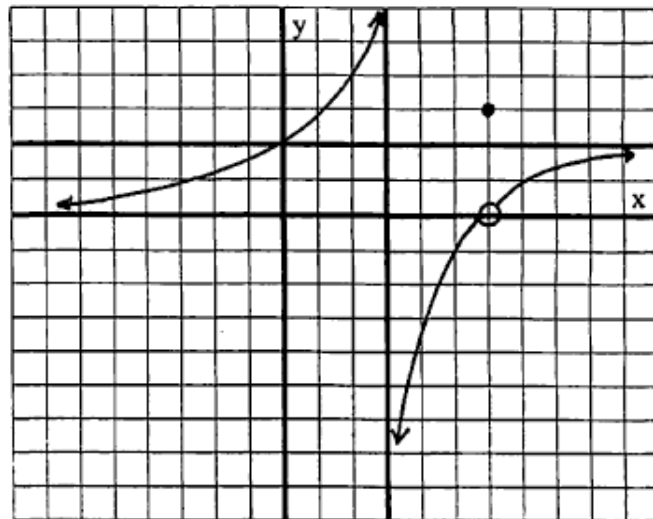
b) $\lim_{x \rightarrow 3^+} f(x) =$ _____

c) $\lim_{x \rightarrow 3} f(x) =$ _____

d) $\lim_{x \rightarrow 6} f(x) =$ _____

e) $\lim_{x \rightarrow -\infty} f(x) =$ _____

f) $f(6) =$ _____



3. Let $f(x) = \begin{cases} \frac{x^2 - 16}{x - 4} & x \neq 4 \\ 10 & x = 4 \end{cases}$

Which of the following statements are true?

I. $\lim_{x \rightarrow 4} f(x)$ exists.

II. $f(4)$ exists.

III. f is continuous at $x = 4$

4. Find $\lim_{x \rightarrow 1} f(x)$, if it exists, if $f(x) = \begin{cases} \frac{1}{x-1} & x < 1 \\ x^3 - 2x + 5 & x \geq 1 \end{cases}$

5. Find all asymptotes and removable points of discontinuity: $f(x) = \frac{4x^2 - 4}{x^2 - 5x - 6}$.

6. Find the coordinates of the removable point of discontinuity for $f(x) = \frac{x^3 - 8}{x^2 + x - 6}$.

7. Using limits, determine the value of a and b for which the function $f(x) = \begin{cases} x^3 & x < -1 \\ ax + b & -1 \leq x < 1 \\ x^2 + 2 & x \geq 1 \end{cases}$ will be continuous for all values of x .

8. Show that the equation has at least one solution in the given interval.

(a) $x^3 - 4x + 1 = 0$; $[1, 2]$

(b) $x^4 - 4x - 8 = 0$; $[2, 3]$

(c) $x^3 + x^2 - 2x = 1$; $[-1, 1]$

(d) $x^4 - 3x^2 + 1 = 0$; $[0, 2]$