

MCS21 – Calculus
Exam 1 Review Sheet

Topics:

- Limits as $x \rightarrow a$
- Limits as $x \rightarrow \pm\infty$
- Limits Involving Radicals
- Limits That Do Not Exist
- Interpreting Limits Graphically

Practice:

1. Evaluate each limit. (The only acceptable answer to a limit problem is one of the following four choices: a specific real number, DNE ($+\infty$), DNE ($-\infty$), or DNE.)

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

(e) $\lim_{x \rightarrow 3} \frac{3 - \sqrt{x}}{x - 3}$

(f) $\lim_{y \rightarrow 0} \frac{y^3 - 7y}{y^3}$

(g) $\lim_{x \rightarrow 8} \frac{3 - \sqrt{x+1}}{x - 2}$

(h) $\lim_{t \rightarrow 4} \frac{t - \sqrt{3t+4}}{4 - t}$

(i) $\lim_{x \rightarrow 2^+} \frac{-4}{2 - x}$

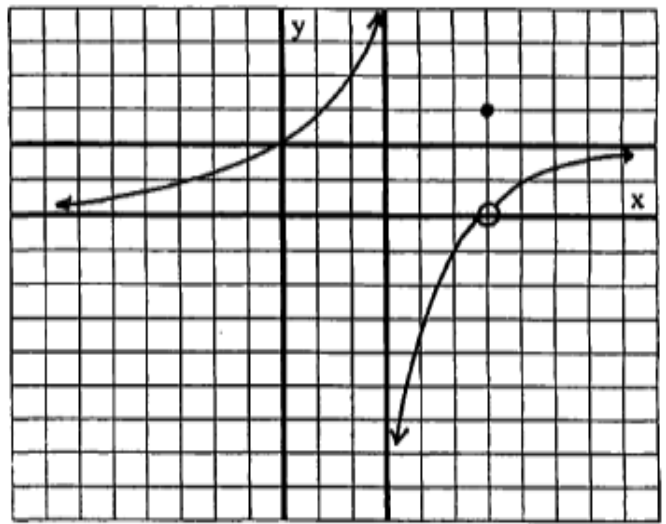
(j) $\lim_{x \rightarrow -\infty} \frac{\sqrt{4x^8 - 8x}}{10 - 3x}$

(k) $\lim_{z \rightarrow \infty} \frac{4z^2 + z^6}{1 - 5z^3}$

(l) $\lim_{x \rightarrow -2} \frac{\frac{1}{x} + \frac{1}{2}}{x^3 + 8}$

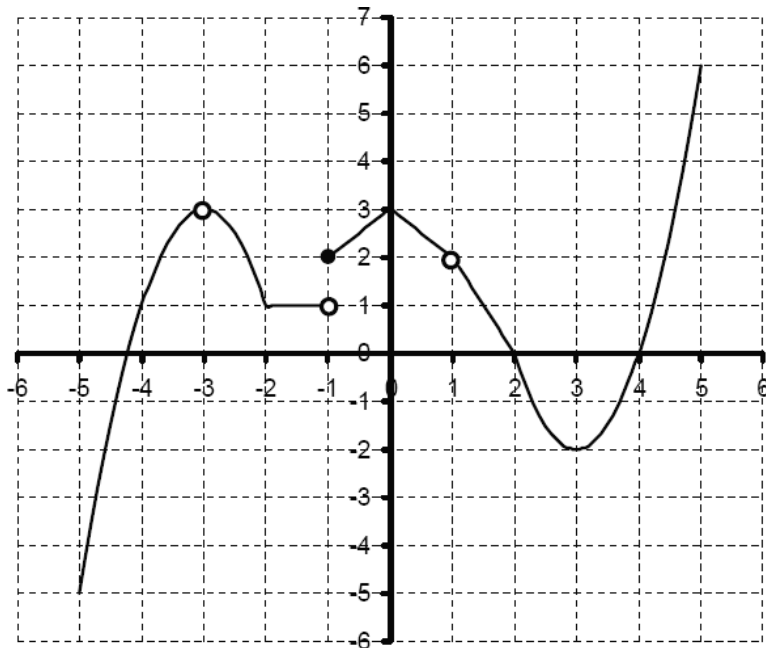
(m) $\lim_{x \rightarrow 1} \frac{x^3 - 7x + 6}{x^3 - 4x^2 - x + 4}$

2. The graph of $f(x)$ is shown to the right.



- (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. The graph of $f(x)$ is shown below.



- (a) $\lim_{x \rightarrow -3^-} f(x)$
- (b) $\lim_{x \rightarrow -3^+} f(x)$
- (c) $\lim_{x \rightarrow -1} f(x)$
- (d) $\lim_{x \rightarrow 1} f(x)$
- (e) $f(-1)$
- (f) $f(1)$
- (g) $\lim_{x \rightarrow -\infty} f(x)$
- (h) $\lim_{x \rightarrow \infty} f(x)$