

# AP Calculus: Exam 1 Review Sheet

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)  $\lim_{x \rightarrow 3^-} f(x) =$  \_\_\_\_\_

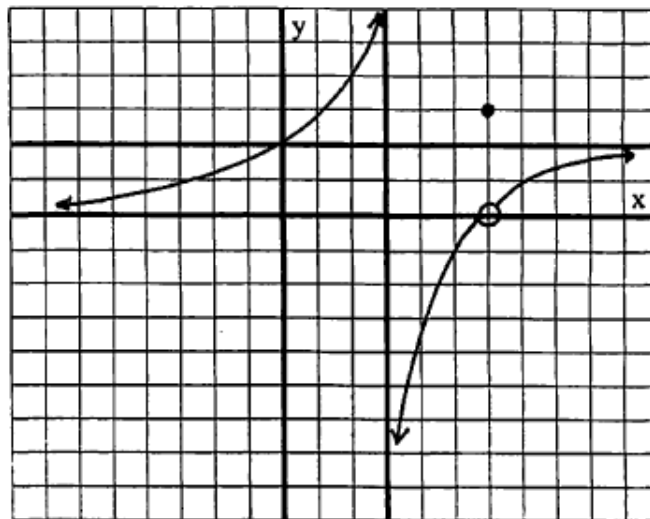
b)  $\lim_{x \rightarrow 3^+} f(x) =$  \_\_\_\_\_

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  $f(x) = \begin{cases} \frac{x^3 - 64}{x - 4} & x \neq 4 \\ k & x = 4 \end{cases}$ . Find  $k$  so that  $f(4) = \lim_{x \rightarrow 4} f(x)$ .

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. Let  $f(x) = \begin{cases} x^3 & x < -1 \\ ax + b & -1 \leq x < 1 \\ x^2 + 2 & x \geq 1 \end{cases}$ .

Using limits, determine the value of  $a$  and  $b$  so that  $\lim_{x \rightarrow 1} f(x)$  exists and  $\lim_{x \rightarrow -1} f(x)$  exists.