

### AP Calculus: Homework 9

1. Find  $\lim_{x \rightarrow -1} f(x)$  if  $f(x) = \begin{cases} 2x & x \leq -1 \\ x^2 - 3 & x > -1 \end{cases}$ .

2. Find  $\lim_{x \rightarrow 2} f(x)$  if  $f(x) = \begin{cases} 3-x & x < 2 \\ 2 & x = 2 \\ \frac{x}{2} & x > 2 \end{cases}$ .

3. If  $f(x) = \begin{cases} x & x \geq 0 \\ 1 & -1 < x < 0 \\ x-2 & x \leq -1 \end{cases}$ , find:

a)  $\lim_{x \rightarrow 0} f(x)$

b)  $\lim_{x \rightarrow -1} f(x)$

c)  $\lim_{x \rightarrow 0^+} f(x)$

d)  $\lim_{x \rightarrow -1^-} f(x)$

4. Find  $k$  such that  $\lim_{x \rightarrow 2} f(x) = f(2)$  if  $f(x) = \begin{cases} \frac{x^2 + x - 6}{x^2 - 3x + 2} & x \neq 2 \\ k & x = 2 \end{cases}$ .

5. Find  $k$  such that  $\lim_{x \rightarrow 2} f(x)$  exists if  $f(x) = \begin{cases} kx^2 & x \leq 2 \\ 2x + k & x > 2 \end{cases}$ .

6. Find a value of  $a$  and  $b$  so that  $\lim_{x \rightarrow -2} f(x)$  exists and  $\lim_{x \rightarrow 1} f(x)$  exists if  $f(x) = \begin{cases} -x - 3 & x \leq -2 \\ ax + b & -2 < x < 1 \\ x^2 & x \geq 1 \end{cases}$ .