MCS21 Homework 9

1. Find $\lim\limits_{x \to -1} f(x)$ if $f(x) = \begin{cases} 2x & x \le -1 \\ x^2 - 3 & x > -1 \end{cases}$.

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

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

    a) $\lim\limits_{x \to 0} f(x)$

    b) $\lim\limits_{x \to -1} f(x)$

    c) $\lim\limits_{x \to 0^+} f(x)$

    d) $\lim\limits_{x \to -1^-} f(x)$

4. Find k such that $\lim\limits_{x \to 2} f(x) = f(2)$ if $f(x) = \begin{cases} \dfrac{x^2 + x - 6}{x^2 - 3x + 2} & x \ne 2 \\ k & x = 2 \end{cases}$.

5. Find k such that $\lim\limits_{x \to 2} f(x)$ exists if $f(x) = \begin{cases} kx^2 & x \le 2 \\ 2x + k & x > 2 \end{cases}$.

6. Find a value of a and b so that $\lim\limits_{x \to -2} f(x)$ exists and $\lim\limits_{x \to 1} f(x)$ exists if $f(x) = \begin{cases} -x - 3 & x \le -2 \\ ax + b & -2 < x < 1 \\ x^2 & x \ge 1 \end{cases}$.