Math 113: Quiz 2

Instructions: Answer all questions. Show all of your work. Partial credit may be given. The use of calculators is not allowed. Please turn off and put away all mobile electronic devices - accessing these devices between the time you receive your quiz and the time you turn in your quiz constitutes an honor code violation.

1. (3 pts) Evaluate the limit or explain why it does not exist

$$\lim_{x \to 1^-} \frac{x^2 + 9x - 10}{x - 1} = \lim_{x \to 1^-} \frac{(x+10)(x-1)}{(x-1)} = \lim_{x \to 1^-} x+10 = 11$$

2. (2 pts) Evaluate the limit or explain why it does not exist

$$\lim_{x \to -1} \frac{x^2 - x - 2}{x^2 - 2x - 3} = \lim_{x \to -1} \frac{(x-2)(x+1)}{(x-3)(x+1)} = \lim_{x \to -1} \frac{x-2}{x-3} = -\frac{1-2}{-1-3} = \frac{3}{4}$$

3. (3 pts) Is the function

$$f(x) = \frac{x^2 - 4}{x - 2} = \frac{(x-2)(x+2)}{(x-2)}$$

continuous at $x = 1$? Is it continuous at $x = 2$?

$f$ is continuous at $x = 1$

$f$ is not continuous at $x = 2$ (removable discontinuity)

4. (2 pts) Identify the values of $x$ where the piecewise-defined function is not continuous

$$f(x) = \begin{cases} 
\sin x & x \leq 0 \\
2 & 0 < x < 1 \\
\sqrt{x+1} & x \geq 1 
\end{cases}$$

$$\lim_{x \to 1^-} f(x) = 2$$

$$\lim_{x \to 0^-} f(x) = 0$$

$$\lim_{x \to 0^+} f(x) = 2$$

$f$ is not continuous at $x = 0$

$f$ is continuous at $x = 1$. 

$f(1) = 2$