Quiz 2 Solution
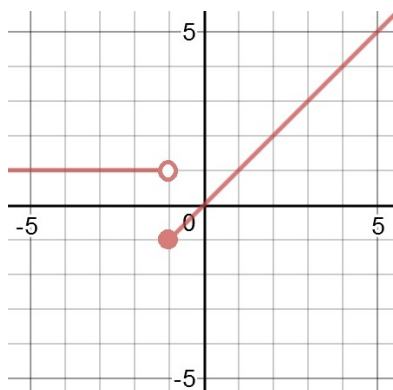
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1. (2 points) Given the following graph, evaluate $\lim\limits_{x \to -1^-} f(x)$.

$$f(x) = \begin{cases} 1 & \text{if } x < -1 \\ x & x \geq -1 \end{cases}$$

Solution:
We ignore the actual value of the function at $x = -1$. Since we're looking for the limit from the left, we use the leftmost piece of the function. We can see that the limit is 1.

Answer: 1

2. (2 points) Evaluate $\lim\limits_{x \to 1} \dfrac{x^2 - 2x + 1}{x^2 - 1}$ analytically.

Solution: We first try direct substitution, but get $\dfrac{0}{0}$, so we should be able to cancel something.

$$\begin{aligned}
\lim_{x \to 1} \frac{x^2 - 2x + 1}{x^2 - 1} &= \lim_{x \to 1} \frac{(x-1)^2}{(x+1)(x-1)} \text{ (by factoring)} \\
&= \lim_{x \to 1} \frac{x-1}{x+1} \text{ (by canceling } x - 1 \text{ from the numerator and denominator)} \\
&= \frac{1-1}{1+1} = 0 \text{ (by direct substitution)}
\end{aligned}$$

Answer: 0

3. (1 point) How many points are quizzes worth?
   Answer: Each quiz is worth 5 points. There are 15 quizzes, and one quiz is dropped, for a total of 70 points.