

Quiz 2a

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 Score: ____/8

Problem 1: Answer the following questions based on the following piece-wise defined function, f .

$$f(x) = \begin{cases} 3 - x^2, & x < -1 \\ \frac{1}{2}, & x = -1 \\ x + 1, & x > -1 \end{cases}$$

a. $\lim_{x \rightarrow -1^-} f(x) =$

2

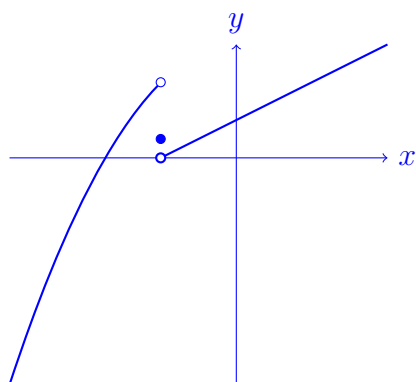
b. $\lim_{x \rightarrow -1^+} f(x) =$

0

c. $f(-1) =$

1/2

d. Is f continuous at $x = -1$? Draw the function.



Not continuous.

Problem 2: Use the definition of the derivative to find $g'(a)$ for $g(x) = \sqrt{x-3}$. Score: /4

$$\begin{aligned} g'(a) &= \lim_{x \rightarrow a} \frac{g(x) - g(a)}{x - a} = \lim_{x \rightarrow a} \frac{\sqrt{x-3} - \sqrt{a-3}}{x - a} \\ &= \lim_{x \rightarrow a} \frac{\sqrt{x-3} - \sqrt{a-3}}{x - a} \cdot \frac{\sqrt{x-3} + \sqrt{a-3}}{\sqrt{x-3} + \sqrt{a-3}} = \lim_{x \rightarrow a} \frac{\sqrt{x-3}^2 - \sqrt{a-3}^2}{(x-a)(\sqrt{x-3} + \sqrt{a-3})} \\ &= \lim_{x \rightarrow a} \frac{(x-3) - (a-3)}{(x-a)(\sqrt{x-3} + \sqrt{a-3})} = \lim_{x \rightarrow a} \frac{x-a}{(x-a)(\sqrt{x-3} + \sqrt{a-3})} \\ &= \lim_{x \rightarrow a} \frac{1}{\sqrt{x-3} + \sqrt{a-3}} = \frac{1}{2\sqrt{a-3}} \end{aligned}$$

Score: /4