

Quiz Two a

Show all your work

Name: _____
Number: _____
Signature: _____
Score: ___/8

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

$$f(x) = \begin{cases} 5 - x^2, & x < -2 \\ \frac{3}{4}, & x = -2 \\ x + 4, & x > -2 \end{cases}$$

a. $\lim_{x \rightarrow -2^-} f(x) =$

1

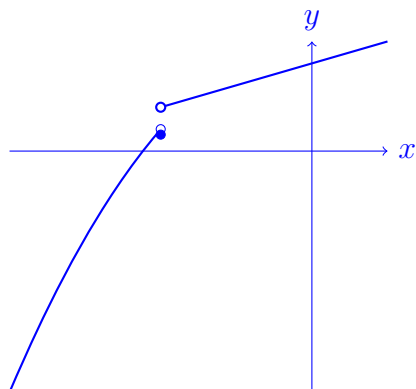
b. $\lim_{x \rightarrow -2^+} f(x) =$

2

c. $f(-2) =$

3/4

d. Is f continuous at $x = -2$? Draw the function.



Not continuous.

Problem 2: Use the definition of the derivative to find $g'(a)$ for $g(x) = \sqrt{x-1}$. Score: /4

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

Score: /4