

Name: _____

Section: _____

Key

You have 12 minutes to complete the quiz.

1. (3 points) Evaluate the following limit, showing all work.

$$\begin{aligned} \lim_{x \rightarrow -\infty} \frac{4x^2 + 1}{x^2 - 1} &= \lim_{x \rightarrow -\infty} \frac{x^2(4 + \frac{1}{x^2})}{x^2(1 - \frac{1}{x^2})} && 2 \text{ pts} \\ &= \lim_{x \rightarrow -\infty} \frac{4 + \frac{1}{x^2} \rightarrow 0}{1 - \frac{1}{x^2} \rightarrow 0} \\ &= \frac{4}{1} && 1 \text{ pt} \end{aligned}$$

Answer: 4

2. (3 points) Evaluate the following limit, showing all work.

$$\begin{aligned} \lim_{x \rightarrow 1^-} \frac{x+1}{x^2-1} &= \lim_{x \rightarrow 1^-} \frac{(x+1)}{(x+1)(x-1)} && \text{2 pts to simplify} \\ &= \lim_{x \rightarrow 1^-} \frac{1}{(x-1)} \end{aligned}$$

notice: can't plug in 1, because $\frac{x+1}{x^2-1}$ is discontinuous at ± 1

as $x \rightarrow 1^-$
 $x-1$ is ① negative ② small $\leftarrow \rightarrow$
x 1

so $\frac{1}{x-1}$ is ① negative ② Big

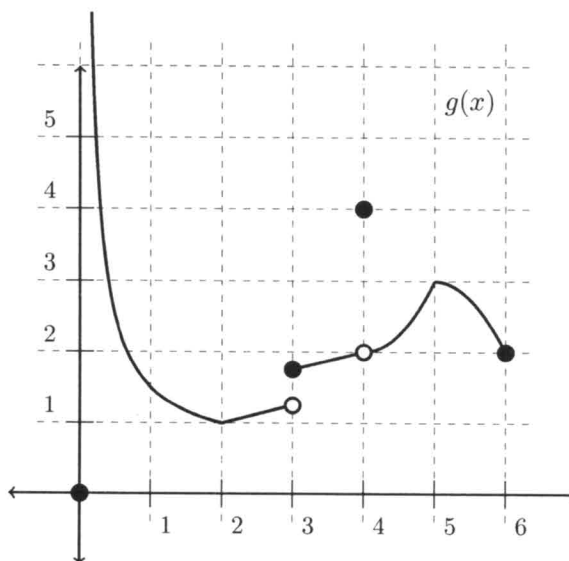
$\frac{1}{2}$ pt to explain

Answer: $= -\infty$ $\frac{1}{2}$ pt for answer

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3. (4 points) The graph of a function g is given below.



(a) Find the set of x where $g(x)$ is continuous. Give your answer in interval notation.

$$(0, 3) \cup (3, 4) \cup (4, 6]$$

1 point for correct parenthesis
 ($\frac{1}{2}$ if all but one is right).

(b) Find values of x where $g(x)$ is discontinuous.

1 point each { g is discontinuous at

- $x=0$ (infinite discontinuity)
- $x=3$ (jump discontinuity)
- $x=4$ (removable discontinuity)