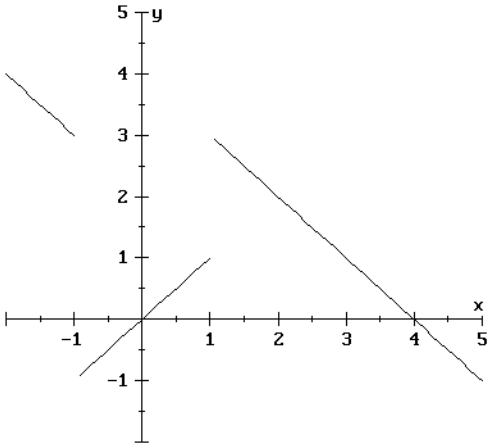
NAME_____

MATH 2401 PRACTICE QUIZ 2

1. For the function f whose graph is given, state the value of the given quantity, if it exists.



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

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

(3) $\lim_{x \to 1^+} f(x) =$

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

2. Show that $\lim_{x \to 4} \dfrac{|x-4|}{x-4}$ dose not exist without using a graph.

3. Let $f(x) = \begin{cases} x^2 - 2x + 2 & \text{if } x \neq 1 \\ -3 & \text{if } x = 1 \end{cases}$

(1) Find $f(1)$.

(2) Find $\lim_{x \to 1} f(x)$.

(3) Is the function continuous at $x = 1$? Justify you answer without using a graph.

Click here for the answers

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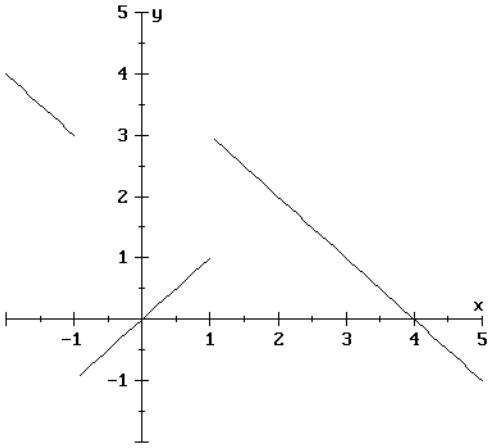
1. For the function f whose graph is given, state the value of the given quantity, if it exists.



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

(2) $\lim_{x\to -1} f(x) = does\ not\ exist$

(3) $\lim_{x\to 1^+} f(x) = 3$

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

2. Show that $\lim_{x\to 4} \dfrac{|x-4|}{x-4}$ dose not exist without using a graph.

$$\lim_{x\to 4^-} \frac{|x-4|}{x-4} = \lim_{x\to 4^-} \frac{-(x-4)}{x-4} = \lim_{x\to 4^-} (-1) = -1$$

$$Also,\ \lim_{x\to 4^+} \frac{|x-4|}{x-4} = \lim_{x\to 4^+} \frac{x-4}{x-4} = \lim_{x\to 4^+} 1 = 1$$

$$Since\ \lim_{x\to 4^-} \frac{|x-4|}{x-4} = -1 \neq 1 = \lim_{x\to 4^+} \frac{|x-4|}{x-4},$$

$$\lim_{x\to 4} \frac{|x-4|}{x-4}\ does\ not\ exist.$$

3. Let $f(x) = \begin{cases} x^2 - 2x + 2 & \text{if } x \neq 1 \\ -3 & \text{if } x = 1 \end{cases}$

(1) Find $f(1)$.

$f(1) = -3$

(2) Find $\lim_{x \to 1} f(x)$.

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

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

$Thus,\ \lim_{x \to 1^-} f(x) = 1 = \lim_{x \to 1^+} f(x),\ and\ so\ \lim_{x \to 1} f(x) = 1$

(3) Is the function continuous at $x = 1$? Justify you answer without using a graph.

$Since\ f(1) = -3 \neq 1 \underset{x \to 1}{=} f(x),\ the\ function\ is\ not\ continuous\ at\ x = 1.$