

Quiz #2 - Calculus**Limits**

Name: _____

1. Evaluate each limit:

$$a) \lim_{x \rightarrow 2} \frac{2x-1}{3x} = \frac{2(2)-1}{3(2)} = \frac{3}{6} = \boxed{\frac{1}{2}}$$

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$$b) \lim_{x \rightarrow 1} \left(\frac{\frac{1}{\sqrt{x}}-1}{x-1} \cdot \frac{\sqrt{x}}{\sqrt{x}} \right)$$

$$\lim_{x \rightarrow 1} \left(\frac{1-\sqrt{x}}{(x-1)\sqrt{x}} \cdot \frac{1+\sqrt{x}}{1+\sqrt{x}} \right)$$

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$$\lim_{x \rightarrow 1} \frac{1-x}{[\sqrt{x}(x-1)][1+\sqrt{x}]}$$

$$\lim_{x \rightarrow 1} \frac{-(x/1)}{\sqrt{x}(x-1)(1+\sqrt{x})}$$

$$\lim_{x \rightarrow 1} \frac{-1}{\sqrt{x}(1+\sqrt{x})} = \frac{-1}{\sqrt{1}(1+\sqrt{1})} = \frac{-1}{1(2)} = \boxed{\frac{-1}{2}}$$

2. Evaluate the limit: $\lim_{x \rightarrow \infty} \frac{2x^4 - x^2 + 8x}{-5x^4 + 7}$

$$= \boxed{-\frac{2}{5}}$$

/1

/6

3. Evaluate the limit: $\lim_{n \rightarrow 2^+} \frac{4n}{n-2} = \frac{\oplus}{\text{small } \oplus} = \boxed{\infty}$

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4. Is $f(x) = \begin{cases} x^2 - 3, & x < 2 \\ x - 1, & x \geq 2 \end{cases}$ continuous at $x = 2$?

$\lim_{x \rightarrow 2^+} x - 1 = 2 - 1 = 1$

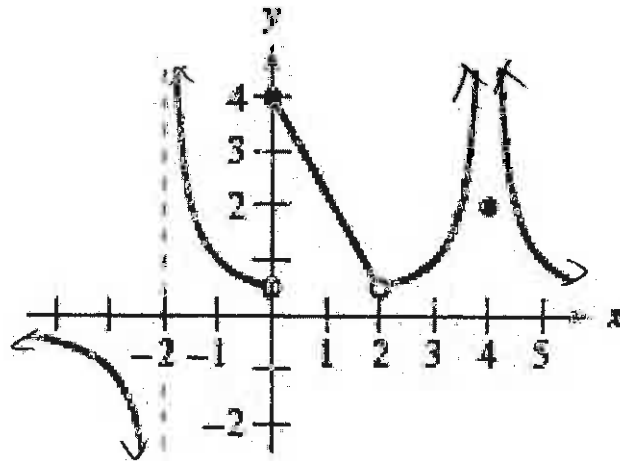
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$\lim_{x \rightarrow 2^-} x^2 - 3 = 2^2 - 3 = 1$

$\therefore \lim_{x \rightarrow 2} f(x) = 1 \quad f(2) = 2 - 1 = 1$

$\Rightarrow \lim_{x \rightarrow 2} f(x) = f(2) \therefore$ yes, $f(x)$ is continuous at $x = 2$.

5. Consider the following graph $y = f(x)$:



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Find each of the following:

a) Domain of $f(x)$: $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

e) $f(2) = \underline{\text{DNE}}$

b) Range of $f(x)$: $(-\infty, 0) \cup (0, \infty)$

f) $\lim_{x \rightarrow -2} f(x) = \underline{\text{DNE}}$

c) $f(4) = \underline{2}$

g) $\lim_{x \rightarrow 4} f(x) = \underline{\infty}$

d) $\lim_{x \rightarrow 0^+} f(x) = \underline{4}$