Calculus 1 Unit 1 quiz 1: What a limit is: graphs and tables

Name _____ Date _____ Period _____

4 questions, 11 points

1. Let $f(x) = \dfrac{4 \cdot 2^x + 3}{2^x + 1}$. Find $\lim_{x \to \infty} f(x)$ and $\lim_{x \to -\infty} f(x)$, and show your reasoning. (2 points)

2. Let $f(x) = x^x$ for $x > 0$. Use a calculator. (3 points)

(a) Find $f(x)$ at $x = 0.1$, 0.01, 0.001 and 0.0001, to five decimal places, and estimate $\lim_{x \to 0^+} f(x)$.

(b) Explain why the question asks for $\lim_{x \to 0^+} f(x)$ and not for $\lim_{x \to 0} f(x)$.

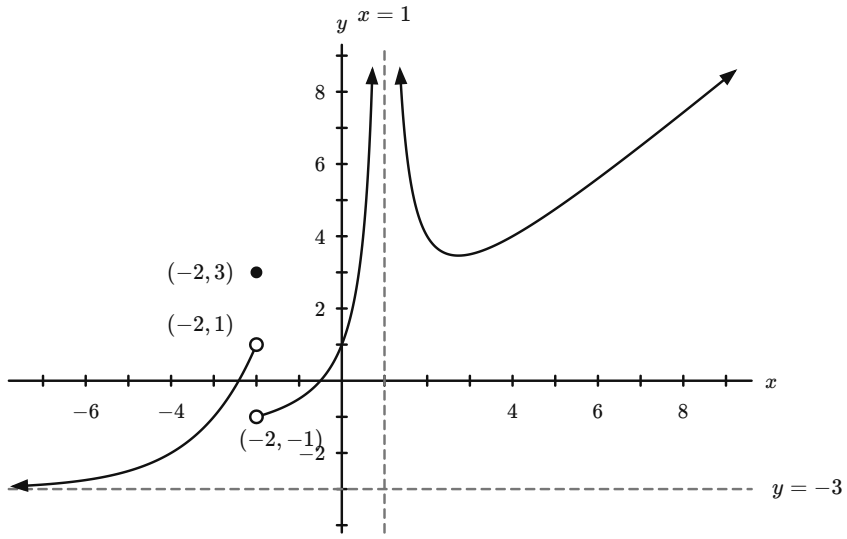
3. Let $f(x) = \dfrac{x^2 - 9}{|x - 3|}$. (3 points)

(a) Write $f(x)$ without absolute value bars, once for $x < 3$ and once for $x > 3$.

(b) Find $\lim_{x \to 3^-} f(x)$, $\lim_{x \to 3^+} f(x)$ and $\lim_{x \to 3} f(x)$, and give $f(3)$.

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4. The graph of f is drawn below. The tick marks are 1 unit apart, and the dashed lines are $x = 1$ and $y = -3$.
(3 points)



(a) Find $\lim_{x \to -2^-} f(x)$, $\lim_{x \to -2^+} f(x)$, $\lim_{x \to -2} f(x)$ and $f(-2)$.

(b) Describe $f(x)$ as $x \to 1^-$ and as $x \to 1^+$, in limit notation, and give $f(1)$.

(c) Find $\lim_{x \to -\infty} f(x)$, and describe $f(x)$ as $x \to \infty$.

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