

Name: _____

Directions: Complete all question and **show all applicable work.** Partial credit will be given. All questions are equally weighted.

1.) Draw a sketch of a function $f(x)$ that satisfies the following properties:

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

2.) Solve for x:

$$\log_2(x + 2) + \log_2(x) = 3$$

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3.) Find the inverse of the following equation. Also, state the domain and range.

$$f(x) = e^{x+2} - 4$$

4.) What three transformations (in order) are necessary to graph $g(x) = -2(x - 4)^2 + 1$ given $f(x) = x^2$ as a starting function?

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5.) Compute the following limits:

$$\lim_{x \rightarrow 1} e^x - 1$$

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

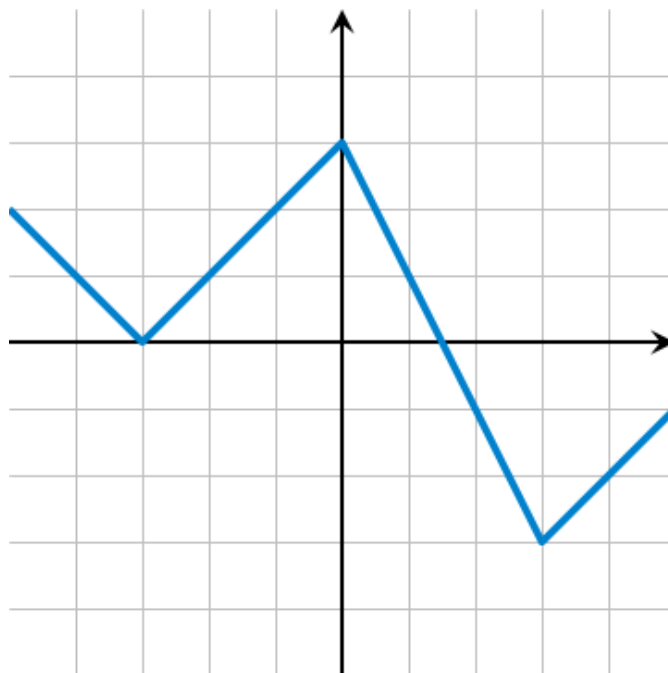
$$\lim_{x \rightarrow \infty} \frac{3x^2 - 4x + 7}{2x^2 - 3x - 3}$$

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6.) Use the definition of the derivative to compute $f'(x)$ given $f(x) = 2x^2 - 3$.

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7.)



Using the graph above of $f(x)$, create a new axis and sketch $f'(x)$.

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8.) Let $x = \cos(t)$ and $y = 3\sin(t)$, sketch a graph of this parametric curve for $0 \leq t \leq 2\pi$. Indicate the direction of motion with an arrow.