

# MTH 251 Lab

## Limits Involving Infinity

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### Prompts

1. Evaluate the limit  $\lim_{t \rightarrow \infty} \frac{4t^2}{4t^2 + t^3}$
2. Evaluate the limit  $\lim_{t \rightarrow \infty} \frac{6e^t + 10e^{2t}}{2e^{2t}}$
3. Evaluate the limit  $\lim_{y \rightarrow \infty} \sqrt{\frac{4y + 5}{5 + 9y}}$
4. Graph a single function that satisfies each of the following conditions.
  - i.  $\lim_{x \rightarrow 3^-} f(x) = -\infty$
  - ii.  $\lim_{x \rightarrow \infty} f(x) = 0$
  - iii.  $\lim_{x \rightarrow 3^+} f(x) = \infty$
  - iv.  $\lim_{x \rightarrow -\infty} f(x) = 2$
5. Let  $z(x) = \frac{7 - 3x^2}{(x - 2)^2}$ .
  - a. Write a limit equation that describes a vertical asymptote of this function (you do not need to evaluate this limit properly).
  - b. Write a limit equation that describes a horizontal asymptote of this function (you do not need to evaluate this limit properly).
6. Determine if the statement is True or False. If the statement is True, please write "True". If the statement is False, please write "False". (Do not write "T" or "F"; please write the full word)

I.  $\lim_{x \rightarrow 1} \frac{e^x}{\ln x} = \frac{\lim_{x \rightarrow 1} e^x}{\lim_{x \rightarrow 1} \ln x}$

II.  $\lim_{x \rightarrow 1} \frac{\ln x}{e^x} = \frac{\lim_{x \rightarrow 1} \ln x}{\lim_{x \rightarrow 1} e^x}$