

Instructions: Show all work. Use exact answers unless otherwise asked to round.

1. Evaluate the limits.

$$\text{a. } \lim_{x \rightarrow \infty} \frac{x^3}{e^{x/2}} \quad \frac{\infty}{\infty} \rightarrow \lim_{x \rightarrow \infty} \frac{3x^2}{\frac{1}{2}e^{x/2}} \quad \frac{\infty}{\infty} \rightarrow \lim_{x \rightarrow \infty} \frac{6x}{\frac{1}{4}e^{x/2}} \quad \frac{\infty}{\infty} \rightarrow$$

$$\lim_{x \rightarrow \infty} \frac{6}{\frac{e^{x/2}}{8}} = 0$$

$$\text{b. } \lim_{x \rightarrow \infty} x \tan \frac{1}{x} = \lim_{x \rightarrow \infty} \frac{\tan(\frac{1}{x})}{\frac{1}{x}} \quad \frac{0}{0} \rightarrow \lim_{x \rightarrow \infty} \frac{\sec^2(\frac{1}{x}) \cdot (-\frac{1}{x^2})}{-\frac{1}{x^2}} = \lim_{x \rightarrow \infty} \sec^2(\frac{1}{x}) = 1$$