

L'HOPITAL'S RULE (4.7)

NAME _____

In each problem determine if L'Hopital's Rule applies. If so, use the rule to find the limit. If not, find the limit numerically. Express your final answers in exact form.

1. $\lim_{x \rightarrow \pi} \frac{\sin(3x)}{x - \pi}$

2. $\lim_{t \rightarrow 0} \frac{e^{2t} - 1}{e^t}$

3. $\lim_{\theta \rightarrow 0} \frac{\arctan \theta}{2\theta}$

4. $\lim_{z \rightarrow \pi^+} \cos\left(\frac{1}{z - \pi}\right)$

5. $\lim_{\alpha \rightarrow 0} \alpha \cdot \cot(2\alpha)$

6. $\lim_{y \rightarrow \infty} y \cdot \ln\left(\frac{y+1}{y-1}\right)$

$$7. \lim_{x \rightarrow 0^-} x^3 \cdot e^{1/x}$$

$$8. \lim_{x \rightarrow 0} \frac{x^2 + 3x}{\sinh x}$$

$$9. \lim_{x \rightarrow 1^+} \left(\frac{1}{\ln(1+x)} - \frac{1}{x} \right)$$

$$10. \lim_{x \rightarrow \infty} (\ln|2x-4| - \ln|x+3|)$$

$$11. \lim_{\theta \rightarrow \infty} \theta \sin\left(\frac{1}{\theta}\right)$$

$$12. \lim_{y \rightarrow 0} \frac{2^y}{y^2}$$