L'HÔPITAL'S RULE

BLAKE FARMAN

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Name: _____

1. Compute

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

in two ways: with and without using L'Hôpital's Rule.

Evaluate the following limits.

2. $\lim_{x\to\pi} \dfrac{\sin(3x)}{x-\pi}$

3. $\lim_{t\to 0} \dfrac{e^{2t}-1}{e^t}$

4. $\lim_{\theta\to 0} \dfrac{\arctan(\theta)}{2\theta}$

5. $\lim_{x\to\infty} \dfrac{e^{-x}}{1+\ln(x)}$

6. $\lim_{x\to\infty} \dfrac{\big(\ln(x)\big)^2}{x}$

7. $\lim_{u\to\infty} \dfrac{\sqrt{u^2+1}}{u}$

8. $\lim_{x\to\infty} \big(x - \ln(x)\big)$

9. $\lim_{x\to 1} \left(\dfrac{x}{x-1} - \dfrac{1}{\ln(x)}\right)$

10. $\lim_{x\to 1^+} \big[\ln(x^7 - 1) - \ln(x^5 - 1)\big]$

11. $\lim_{x\to 0^+} x^{\sqrt{x}}$

12. $\lim_{x\to 0} (1-2x)^{1/x}$

13. $\lim_{x\to \infty} x^{1/x}$