

Study with a Math Professor: L'Hopitals Rule

Do each problem on your own set of paper. Write out the problem as if you were doing it for an exam. Show all of your steps so that you can compare to the videos if you need to.

Find the limits.

$$1. \lim_{x \rightarrow 5} \frac{x-5}{x^2-25}$$

$$2. \lim_{x \rightarrow \infty} \frac{7x^2-4x}{3x^2+5x}$$

$$3. \lim_{x \rightarrow 0} \frac{\sin x}{x}$$

$$4. \lim_{x \rightarrow \infty} x^{\frac{1}{\ln x}}$$

$$5. \lim_{x \rightarrow 0} \frac{6^x-1}{3^x-1}$$

$$6. \lim_{x \rightarrow 1} \frac{x-1}{\sin \pi x - \ln x}$$

$$7. \lim_{x \rightarrow -\infty} \frac{3^x+5^x}{2^x-3^x}$$

$$8. \lim_{x \rightarrow 0^+} x^3 \ln x$$

$$9. \lim_{x \rightarrow 0} \frac{5^x-1}{x}$$

$$10. \lim_{x \rightarrow 0^+} (\ln x - \ln \sin x)$$

$$11. \lim_{x \rightarrow 0^+} \left(1 + \frac{2}{x}\right)^x$$

$$12. \lim_{x \rightarrow 0^+} \left(\frac{5x+1}{x} - \frac{1}{\sin x}\right)$$

$$13. \lim_{x \rightarrow \infty} \frac{\sqrt{4x+1}}{\sqrt{x}-1}$$

$$14. \lim_{x \rightarrow 0^+} (\cos x - \cot x + \csc x)$$

$$15. \lim_{x \rightarrow \infty} \frac{\log_5(x+4)}{\log_3 x}$$

$$16. \lim_{x \rightarrow \infty} \frac{(e^x-x)}{x+e^x}$$

Answers and suggested other videos on the next page

Answers

1) $\frac{1}{10}$ 2) $\frac{7}{3}$ 3) 1 4) e 5) $\frac{\ln 6}{\ln 3}$ 6) $\frac{1}{-\pi-1}$ 7) 0 8) 0 9) $\ln 5$ 10) 0 11) 1 12) 5 13) 2 14) 1 15) $\frac{\ln 3}{\ln 5}$ 16) 1

Other Videos to Watch if You Got The Problem Wrong

I have an entire series of videos that breaks down how to use L'Hopital's Rule in all the different techniques.

- If you want to see a summary of L'Hopitals rule, watch this:
- If you want to see more examples of any type of L'Hopitals Rule, watch this: <https://youtu.be/e2luR85-3qs>
- If you need to review properties of logarithms, check this out: <https://youtu.be/FjelKzwUvus>

If you got this problem number wrong ...	Then watch this video:
1, 3, 5, 6, 9, 12, 14	https://youtu.be/GGR_peaDJ70
2, 8, 10, 15, 16	https://youtu.be/J2H2V60KjYM
4, 11	https://youtu.be/9GhZVjsUx5s
7, 13	https://youtu.be/wvNL5qR2mzc

This video was only on L'Hopitals Rule. If you are looking for more study materials check out my series on ...

- Derivative Rules (Basic Derivatives)
 - Summary of Everything with Derivative Rules: <https://youtu.be/UMB3tY0UxTI>
 - Basic Level of Difficulty Problems: <https://youtu.be/LXF8etoTa9U>
 - Medium Level of Difficulty Problems: https://youtu.be/B_ge4sjqJKo
 - Difficult Problems: <https://youtu.be/o6piy5uhmEw>
 - Mixed Levels of Difficulty Problems: <https://youtu.be/aXv3Slca3kE>
- Graphing and Max/Min/Concavity
 - Summary of Derivative Theorems about Max/Min/Concavity: <https://youtu.be/j7OFTxunTs4>
 - Mixed Levels of Problems on Max/Min/Concavity: https://youtu.be/C_DDT3zoPU4