

Calculus 2

L'Hospital's Rule

Perform the following limits

1. $\lim_{x \rightarrow 2} \frac{x^3 - 8}{x^4 + 2x - 20}$

2. $\lim_{x \rightarrow \pi/2} \frac{\cos^2(x)}{1 - \sin(x)}$

3. $\lim_{x \rightarrow 0} \frac{e^x - x - 1}{\cos(x) - 1}$

4. $\lim_{x \rightarrow -5} \frac{x^2 - 25}{5 - 4x - x^2}$

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

6. $\lim_{x \rightarrow 3} \frac{\sqrt{x+1} - 2}{x^3 - 7x - 6}$

7. $\lim_{x \rightarrow 9} \frac{x^{1/2} + x - 6}{x^{3/2} - 27}$

8. $\lim_{x \rightarrow \infty} \frac{x}{e^x}$

9. $\lim_{x \rightarrow \infty} \frac{x^2}{e^x}$

10. $\lim_{x \rightarrow \infty} \frac{\ln(x)}{\sqrt{x}}$

11. $\lim_{x \rightarrow -\infty} \frac{\ln(x^4 + 1)}{x}$

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

13. $\lim_{x \rightarrow 0} \frac{\tan(x)}{x}$

14. $\lim_{x \rightarrow 0} \frac{\sin(x) - x \cos(x)}{x - \sin(x)}$

15. $\lim_{x \rightarrow 0^+} x \ln(x)$

16. $\lim_{x \rightarrow \pi/2} \left(x - \frac{\pi}{2}\right) \tan(x)$

17. $\lim_{x \rightarrow 1} \tan\left(\frac{\pi x}{2}\right) \ln(x)$

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

19. $\lim_{x \rightarrow \infty} e^{-x} (x^3 - x^2 + 9)$

20. $\lim_{x \rightarrow -\infty} x \sin\left(\frac{1}{x}\right)$

21. $\lim_{x \rightarrow \infty} \frac{e^{2x} - 1 - x}{x^2}$

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

23. $\lim_{x \rightarrow 4} \left(\frac{1}{\sqrt{x-2}} - \frac{4}{x-4}\right)$

24. $\lim_{x \rightarrow 0} \left(\frac{1}{x^2} - \csc^2(x)\right)$

25. $\lim_{x \rightarrow 0} \left(\frac{1}{\sin(x)} - \frac{1}{x}\right)$

26. $\lim_{x \rightarrow \pi/2} (\sec(x) - \tan(x))$

27. $\lim_{x \rightarrow 0^+} x^x$

28. $\lim_{x \rightarrow 0} (1 + x)^{1/x}$

$$29. \lim_{x \rightarrow \infty} x^{1/x^2}$$

$$30. \lim_{x \rightarrow 0^+} x^{\sin(x)}$$

$$31. \lim_{x \rightarrow 0} (\cos(x))^{3/x^2}$$

$$32. \lim_{x \rightarrow \infty} \left(\frac{x}{x+1}\right)^x$$