

1. Find $\lim_{x \rightarrow 0} \frac{\sec x}{2x}$

2. Find $\lim_{x \rightarrow -1^+} \sqrt{x^2 - x - 2}$

3. Find $\lim_{x \rightarrow -8} \frac{x + 8}{x^3 - 4}$

4. Find $\lim_{x \rightarrow (\frac{-\pi}{6})^+} \frac{\csc(3x)}{\cot(3x)}$

5. Find $\lim_{x \rightarrow -\infty} \frac{3x + 5x + 2}{\sqrt{9x^2 + x - 1}}$

6. Find $\lim_{x \rightarrow 3.99^+} \frac{\lfloor \frac{x}{2} \rfloor}{x}$

7. Find $\lim_{x \rightarrow 0^-} \frac{(\sin(3x))^2}{x^2}$

8. Find $\lim_{x \rightarrow -\infty} \frac{8^x}{16^x x^4}$

9. Find the slope of the curve $y = x^2 - 5x + 3$ at the point $(2, -3)$, and do not use any shortcuts.

10. Find the average rate of change of the function $f(x) = \sec x$ on the interval $\left[-\frac{\pi}{3}, \frac{\pi}{6}\right]$

11. Find the equation of the tangent line for the function $f(x) = |3x + 1|$ at $(-2, 5)$ and you may use shortcuts.

12. Find the intervals where $f(x)$ is continuous if $f(x) = \frac{x^2 + 13x + 40}{\sqrt{-x - 7}}$

13. For the function $y = 4^x + \frac{6x^4 + 5x^2 + 1}{3x^3 + 2x - 2} + \log_3 |2x - 3|$, find

(a) a simple basic function right end behavior model

(b) a simple basic function left end behavior model

14. Give an example of a function with a jump discontinuity at $x = -2$ and a removable discontinuity at $x = 1$

(provide a definition of the function).

15. Find $\lim_{x \rightarrow -\sqrt{3}} \frac{\arctan(x)}{\operatorname{arccot}(x)}$

16. Sketch a graph for a function that satisfies the following conditions

$$\lim_{x \rightarrow \infty} f(x) = 2$$

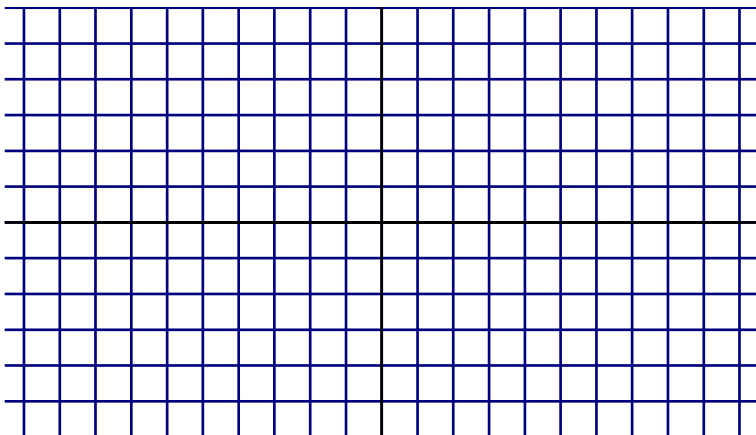
$$\lim_{x \rightarrow -1} f(x) = \infty$$

$$\lim_{x \rightarrow -\infty} f(x) = 1$$

$$\lim_{x \rightarrow 2^+} f(x) = -1$$

$$f(-1) = -2$$

$$\lim_{x \rightarrow 2^-} f(x) = -\infty$$



17. Find $\lim_{x \rightarrow 5} \frac{x^2 - 10x + 25}{x^2 - 5x}$

18. Find $\lim_{x \rightarrow -1^-} \frac{x^2 + 6x + 5}{x^3 + 3x^2 + 3x + 1}$

19. Determine whether or not $f(x) = -2x + 3$ is continuous at $x = 4$, using the definition for continuity.

20. The graph of $f(x)$ is shown. Draw the graph of $-f\left(\frac{x}{2} + 3\right)$, clearly showing the scale on each of the axes.

