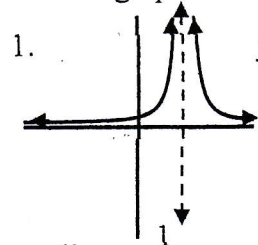


Assignment 1-3

Use the graphs to find these limits (answer ∞ or $-\infty$).

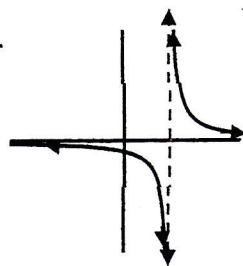


$$y = \frac{1}{(x-2)^2}$$

a. $\lim_{x \rightarrow 2^-} \frac{1}{(x-2)^2}$

b. $\lim_{x \rightarrow 2^+} \frac{1}{(x-2)^2}$

2.



$$y = \frac{1}{x-2}$$

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

b. $\lim_{x \rightarrow 2^+} \frac{1}{x-2}$

Find the vertical asymptotes, if any, without using a calculator, and classify each of them as even or odd.

3. $f(x) = \frac{1}{x^2}$

4. $f(x) = \frac{x}{x(x-1)^2}$

5. $f(x) = \frac{x}{x^2-4}$

6. $f(x) = \frac{x}{x^2-x-2}$

7. $g(x) = \frac{x^3-1}{x-1}$

8. $g(x) = \csc(\pi x)$

Find these limits without using a calculator. Whenever appropriate answer ∞ or $-\infty$.

9. $\lim_{x \rightarrow 3^-} \frac{x}{x-3}$

10. $\lim_{x \rightarrow 3} \frac{x}{x-3}$

11. $\lim_{x \rightarrow 1^+} \frac{x}{x^2-x}$

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

13. $\lim_{x \rightarrow 3} \frac{x+3}{x^2-6x+9}$

14. $\lim_{x \rightarrow 3} \frac{x-3}{x^2-6x+9}$

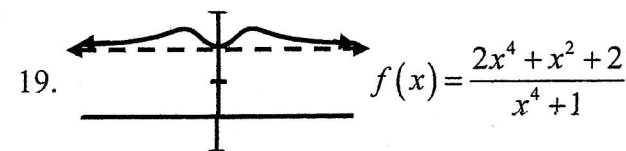
15. $\lim_{x \rightarrow 0} \frac{x^2-2x}{x^3}$

16. $\lim_{x \rightarrow 0^+} \left(\frac{1}{x} - 10 \right)$

17. $\lim_{x \rightarrow \frac{\pi}{2}^+} \frac{3}{\cos x}$

18. $\lim_{x \rightarrow \pi} \frac{x}{\csc x}$

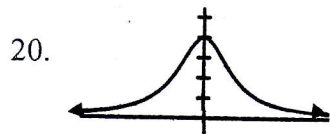
Find these limits without using a calculator.



$$f(x) = \frac{2x^4 + x^2 + 2}{x^4 + 1}$$

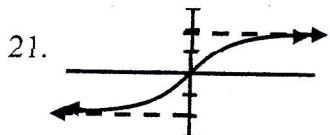
a. $\lim_{x \rightarrow \infty} f(x)$ b. $\lim_{x \rightarrow -\infty} f(x)$

Find these limits without using a calculator.



$$f(x) = \frac{4}{x^2 + 1}$$

a. $\lim_{x \rightarrow \infty} f(x)$ b. $\lim_{x \rightarrow -\infty} f(x)$



$$f(x) = \frac{2x}{\sqrt{x^2 + 2}}$$

a. $\lim_{x \rightarrow \infty} f(x)$ b. $\lim_{x \rightarrow -\infty} f(x)$

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

23. $\lim_{x \rightarrow -\infty} \frac{1-5x^3}{10x^3-x^2}$

24. $\lim_{x \rightarrow \infty} \frac{x(2x-1)^2}{3x(x-3)^2}$

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

26. $\lim_{x \rightarrow -\infty} \frac{x}{\sqrt{x^2+x}}$

27. $\lim_{x \rightarrow \infty} \frac{x}{\sqrt{x^2+x}}$

28. $\lim_{x \rightarrow -\infty} \frac{2-x}{\sqrt{x^2-3}}$

29. $\lim_{x \rightarrow -\infty} \frac{2x^2-2}{\sqrt{x^4}}$

30. $\lim_{x \rightarrow \infty} \frac{\sin x}{x+1}$

Use a calculator to find the following limits.

31. $\lim_{x \rightarrow \infty} (x^5 e^{-x} + 2)$

32. $\lim_{x \rightarrow -\infty} \frac{|2x+5|}{x-7}$

Follow the **Curve Sketching Recipe** to graph each function without using a calculator. List intercepts, asymptotes, holes, end behavior, etc. Show accurate graphs.

33. $f(x) = (x+2)(x-1)^2$

34. $f(x) = \frac{x-2}{x+2}$

35. $f(x) = \frac{x(x-1)^3}{x^2(x-1)}$

36. $f(x) = \frac{1}{\sqrt{x}}$

37. $f(x) = \frac{-x}{\sqrt{x^2-1}}$

38. If $f(x) = \begin{cases} 2ax-6, & x \leq 2 \\ x^2+a, & x > 2 \end{cases}$ is a continuous function, find the value of a .

Use a calculator to find all discontinuities.

39. $f(x) = \begin{cases} \frac{\cos x - 1}{x}, & x < 0 \\ 5x, & x > 0 \end{cases}$

40. $f(x) = \frac{x^2 - 4}{x^3 - 2x^2 - 2x + 4}$

Does the Intermediate Value Theorem guarantee a value of c in the given interval? If so, find the c -value. If not, explain why not.

41. $f(x) = \frac{x^2 - x}{x}, f(c) = -1$ on $[-2, 2]$

42. $f(x) = x^2 - x, f(c) = -1$ on $[-2, 2]$

43. $f(x) = x^2 - x, f(c) = 5$ on $[-2, 2]$

44. Use the parent graph of $y = x^2$ to determine an equation for each graph.

