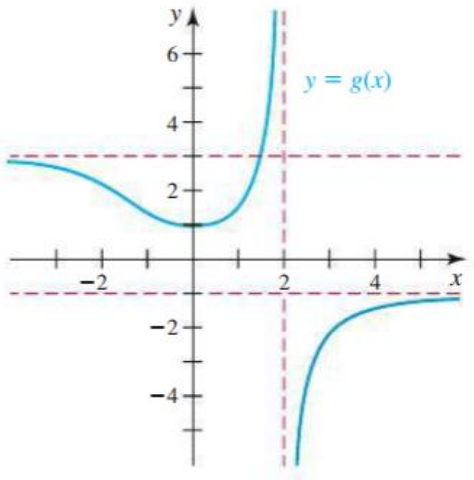
2.5 Group Activity Problems

29. $\lim_{w \to \infty} \dfrac{15w^2 + 3w + 1}{\sqrt{9w^4 + w^3}}$

30. $\lim_{x \to -\infty} \dfrac{40x^4 + x^2 + 5x}{\sqrt{64x^8 + x^6}}$

15. Suppose the function g satisfies the inequality $3 - \frac{1}{x^2} \leq g(x) \leq 3 + \frac{1}{x^2}$, for all nonzero values of x. Evaluate $\lim_{x \to \infty} g(x)$ and $\lim_{x \to -\infty} g(x)$.

16. The graph of g has a vertical asymptote at $x = 2$ and horizontal asymptotes at $y = -1$ and $y = 3$ (see figure). Determine the following limits: $\lim_{x \to -\infty} g(x)$, $\lim_{x \to \infty} g(x)$, $\lim_{x \to 2^-} g(x)$, and $\lim_{x \to 2^+} g(x)$.



Determine the following limits.

24. $\lim_{x \to -\infty} (2x^{-8} + 4x^3)$

26. $\lim_{x \to \infty} \dfrac{9x^3 + x^2 - 5}{3x^4 + 4x^2}$

28. $\lim_{x \to \infty} \dfrac{x^4 + 7}{x^5 + x^2 - x}$

32. $\lim_{x \to \infty} \dfrac{6x^2}{4x^2 + \sqrt{16x^4 + x^2}}$

37–50. Horizontal asymptotes *Determine* $\lim_{x\to\infty} f(x)$ *and* $\lim_{x\to-\infty} f(x)$ *for the following functions. Then give the horizontal asymptotes of* f *(if any).*

44. $f(x) = \dfrac{6x^2 + 1}{\sqrt{4x^4 + 3x + 1}}$

46. $f(x) = \dfrac{\sqrt{x^2 + 1}}{2x + 1}$

47. $f(x) = \dfrac{4x^3 + 1}{2x^3 + \sqrt{16x^6 + 1}}$

94. End behavior of exponentials Use the following instructions to determine the end behavior of $f(x) = \dfrac{4e^x + 2e^{2x}}{8e^x + e^{2x}}$.

a. Evaluate $\lim_{x \to \infty} f(x)$ by first dividing the numerator and denominator by e^{2x}.

b. Evaluate $\lim_{x \to -\infty} f(x)$ by first dividing the numerator and denominator by e^x.

c. Give the horizontal asymptote(s).