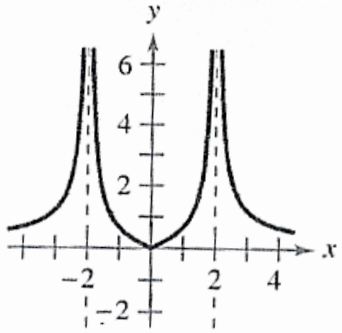
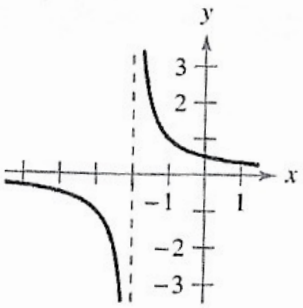
1.5 Infinite Limits Homework

Determine whether *f(x)* approaches ∞ or $-\infty$ as x approaches -2 from the left and from the right.

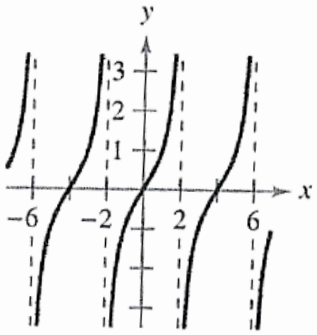
1. $f(x) = 2\left|\frac{x}{x^2 - 4}\right|$



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



3. $f(x) = \tan\frac{\pi x}{4}$



Find the vertical asymptotes (if any) of the graph of the function.

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

12. $g(x) = \frac{2 + x}{x^2(1 - x)}$

15. $g(t) = \frac{t - 1}{t^2 + 1}$

16. $h(x) = \frac{2x - 3}{x^2 - 25}$

18. $f(x) = \sec \pi x$

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

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

27. $s(t) = \frac{t}{\sin t}$

Determine whether the graph of the function has a vertical asymptote or a removable discontinuity at $x = -1$. Graph the function using a graphing calculator to confirm your answer.

1.5 Infinite Limits Homework

29. $f(x)=\dfrac{x^2-1}{x+1}$ 30. $f(x)=\dfrac{x^2-6x-7}{x+1}$ 32. $f(x)=\dfrac{\sin(x+1)}{x+1}$

Find the limit.

33. $\lim\limits_{x\to 1^+}\dfrac{x-3}{x-2}$ 36. $\lim\limits_{x\to 4^-}\dfrac{x^2}{x^2+16}$ 39. $\lim\limits_{x\to 1}\dfrac{x^2-x}{\left(x^2+1\right)(x-1)}$ 42. $\lim\limits_{x\to 0^-}\left(x^2-\dfrac{1}{x}\right)$

Find the limit.

45. $\lim\limits_{x\to \pi}\dfrac{\sqrt{x}}{\csc x}$ 48. $\lim\limits_{x\to \frac{1}{2}} x^2\tan \pi x$

Use a graphing calculator to graph the function and determine the one-sided limit.

49. $f(x)=\dfrac{x^2+x+1}{x^3-1}$
$\lim\limits_{x\to 1^+} f(x)$

50. $f(x)=\dfrac{x^3-1}{x^2+x+1}$
$\lim\limits_{x\to 1^-} f(x)$

52. $f(x)=\sec\dfrac{\pi x}{6}$
$\lim\limits_{x\to 3^+} f(x)$

Determine whether the statement is true or false. If it is false, explain why or give an example that shows it is false.

67. If $p(x)$ is a polynomial, then the graph of the function given by $f(x)=\dfrac{p(x)}{x-1}$ has a vertical asymptote at $x=1$.

68. The graph of a rational function has at least one vertical asymptote.

69. The graphs of polynomial functions have no vertical asymptotes.

70. If *f* has a vertical asymptote at x=0, then *f* is undefined at x=0.