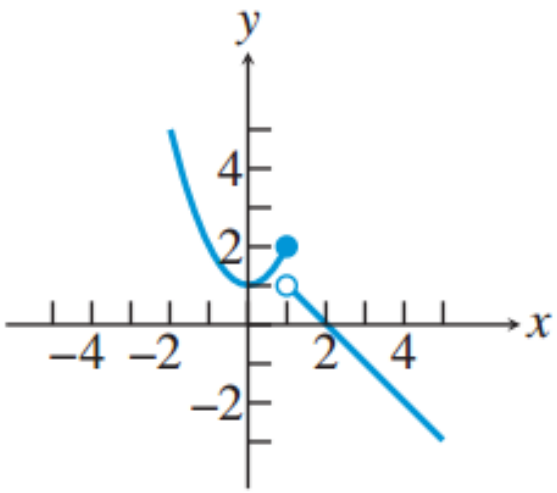
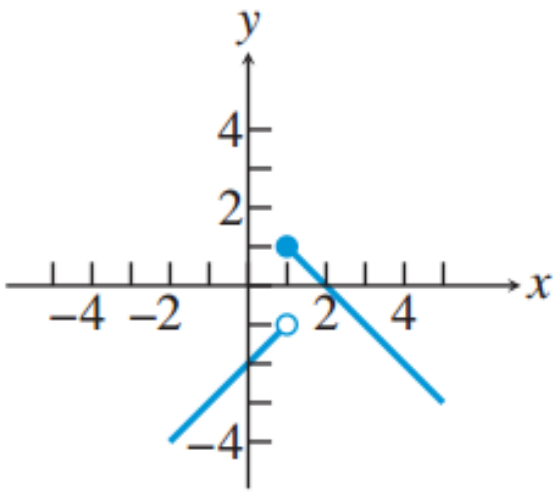
In Exercises 1–4, use the graph of the function $y = f(x)$ to find **(a)** $\lim_{x \to 1^-} f(x)$ and **(b)** $\lim_{x \to 1} f(x)$.

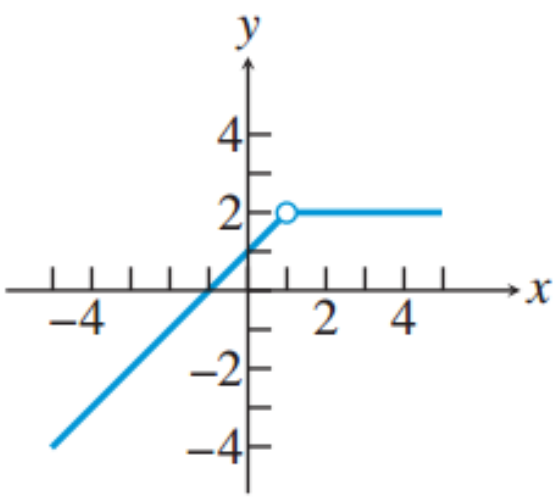
1.



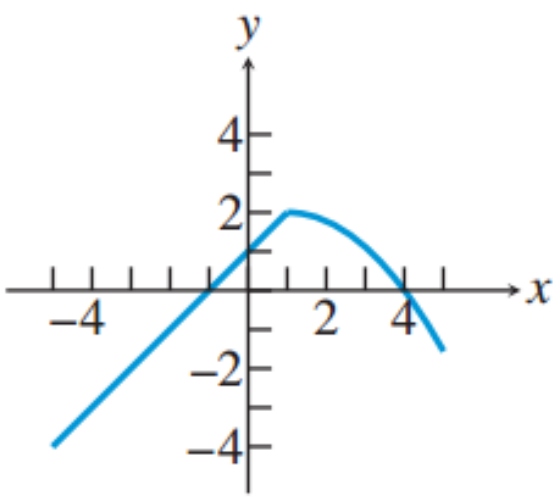
2.



3.



4.



In Exercises 5–10, find the limit at the indicated point, if it exists. Support your answer graphically.

5. $f(x) = \dfrac{x - 1}{x^2 + 1}, x = -1$

6. $f(x) = \dfrac{\sin 5x}{x}, x = 0$

7. $f(x) = \dfrac{x^2 - 3x - 10}{x + 2}, x = -2$

8. $f(x) = |x - 1|, x = 1$

In Exercises 11–14, find the limit. Support your answer with an appropriate table.

11. $\lim_{x \to -\infty} \frac{-1}{(x+2)^2}$

12. $\lim_{x \to \infty} \frac{x+5}{x-3}$

13. $\lim_{x \to \infty} \frac{2-x^2}{x}$

14. $\lim_{x \to -\infty} \frac{x^2}{x-2}$

In Exercises 15–18, find the limit.

15. $\lim_{x \to 2^+} \frac{1}{x - 2}$

16. $\lim_{x \to 2^-} \frac{1}{x^2 - 4}$

17. $\lim_{x \to 0} \frac{1/(2 + x) - 1/2}{x}$

18. $\lim_{x \to 0} \frac{(2 + x)^3 - 8}{x}$

In Exercises 19–20, find the vertical and horizontal asymptotes, if any.

19. $f(x) = \dfrac{x - 5}{x^2 + 6x + 5}$

20. $f(x) = \dfrac{x^2 + 1}{2x - 4}$

In Exercises 21–26, find the limit algebraically.

21. $\lim_{x \to 3} \dfrac{x^2 + 2x - 15}{3 - x}$

22. $\lim_{x \to 1} \dfrac{x^2 - 4x + 3}{x - 1}$

23. $\lim_{x \to 0} \dfrac{1/(-3 + x) + 1/3}{x}$

24. $\lim_{x \to 2} \dfrac{\tan(3x - 6)}{x - 2}$

25. $\lim_{x \to 2} \dfrac{x^2 - 5x + 6}{x^2 - 3x + 2}$

26. $\lim_{x \to 3} \dfrac{(x - 3)^2}{x - 3}$