

EXERCISES 1

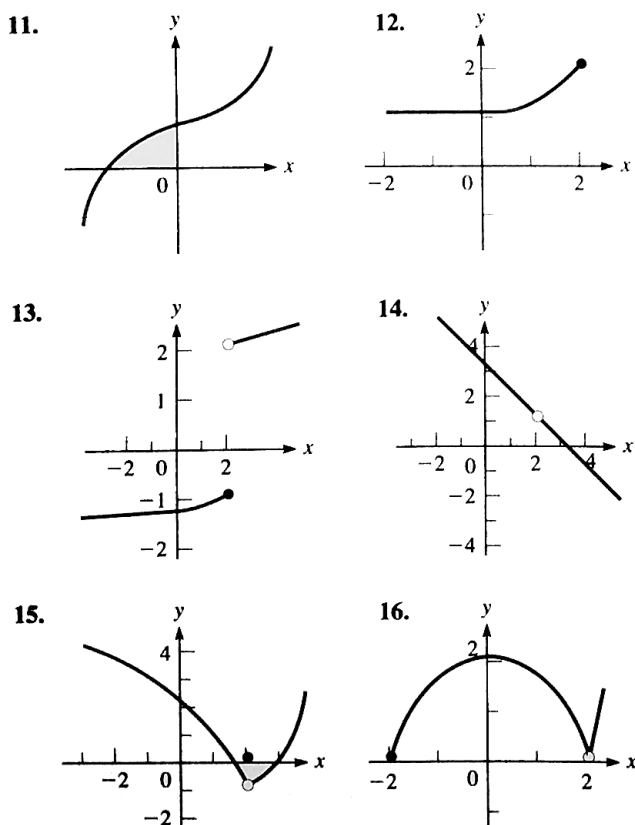
In Exercises 1–4, make the given changes in the indicated examples of this section. Then solve the resulting problems.

- In Example 2, change the denominator to $x + 2$ and then determine the continuity.
- In Example 8, change the numerator to $3x^2 - 5x - 2$ and find the resulting limit. Disregard references to Examples 6 and 7.
- In Example 11, change the denominator to $t + 2$ and then find the limit as $t \rightarrow -2$.
- In Example 14, change the numerator to $4x^2 + 1$ and find the resulting limit.

In Exercises 5–10, determine the values of x for which the function is continuous. If the function is not continuous, determine the reason.

- $f(x) = 3x^2 - 98x$
- $f(x) = \frac{3 - x}{9 + x^2}$
- $f(x) = \frac{x + 4}{x^2 - x}$
- $f(x) = \frac{2}{\sqrt{x + 3}}$
- $f(x) = \sqrt{\frac{x}{x - 2}}$
- $f(x) = \frac{3\sqrt{x + 5}}{x + 8}$

In Exercises 11–16, determine the values of x for which the function, as represented by the graphs in Fig. 12, is continuous. If the function is not continuous, determine the reason.



In Exercises 17–20, for the function shown in the graph for the indicated exercise, find (a) $f(2)$, and (b) $\lim_{x \rightarrow 2} f(x)$.

- Exercise 13
- Exercise 14
- Exercise 15
- Exercise 16

W In Exercises 21–24, graph the function and determine the values of x for which the functions are continuous. Explain.

- $f(x) = \begin{cases} x^2 & \text{for } x < 2 \\ 5 & \text{for } x \geq 2 \end{cases}$
- $f(x) = \begin{cases} \frac{x^3 - x^2}{x - 1} & \text{for } x \neq 1 \\ 1 & \text{for } x = 1 \end{cases}$
- $f(x) = \begin{cases} \frac{2x^2 - 18}{x - 3} & \text{for } x < 3 \text{ or } x > 3 \\ 12 & \text{for } x = 3 \end{cases}$
- $f(x) = \begin{cases} \frac{x + 2}{x^2 - 4} & \text{for } x < -2 \\ \frac{x}{8} & \text{for } x > -2 \end{cases}$

In Exercises 25–30, evaluate the indicated limits by evaluating the function for values shown in the table and observing the values that are obtained. Do not change the form of the function.

25. Find $\lim_{x \rightarrow 1} \frac{x^3 - x}{x - 1}$.

x	0.900	0.990	0.999	1.001	1.010	1.100
$f(x)$						

26. Find $\lim_{x \rightarrow -3} \frac{x^3 + 2x^2 - 2x + 3}{x + 3}$.

x	-3.100	-3.010	-3.001	-2.999	-2.990	-2.900
$f(x)$						

27. Find $\lim_{x \rightarrow 2} \frac{2 - \sqrt{x + 2}}{x - 2}$.

x	1.900	1.990	1.999	2.001	2.010	2.100
$f(x)$						

28. Find $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$.

x	-0.1	-0.01	-0.001	0.001	0.01	.01
$f(x)$						

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

x	10	100	1000
$f(x)$			