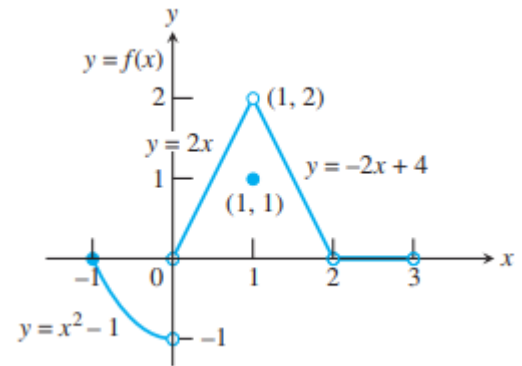


For questions 1-6, use the function f defined by the graph.



1) Does $f(-1)$ exist? If so, find $f(-1)$.

2) $\lim_{x \rightarrow -1^+} f(x) =$

3) $\lim_{x \rightarrow -1^-} f(x) =$

4) Is f continuous at $x = -1$?

5) Using the definition of continuity, explain why the function f is discontinuous at $x = 1$.

6) Is the function f continuous at $x = 2$?

For questions 7-9, use the definition of continuity to determine if the function is continuous at $x = c$. If the function is not continuous, explain why.

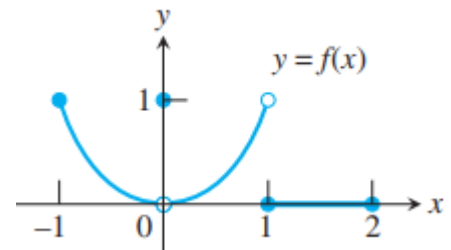
7) $f(x) = \begin{cases} 3-x & x < 2 \\ \frac{1}{2}x+1 & x > 2 \end{cases}$

8) $f(x) = \begin{cases} 3-x & x < 2 \\ 2 & x = 2 \\ \frac{1}{2}x & x > 2 \end{cases}$

9) $f(x) = \begin{cases} 1-x^2 & x \neq 1 \\ 2 & x = 1 \end{cases}$

10) Using the graph of f to the right, find each point of discontinuity.

Which discontinuities are removable? Nonremovable?



For questions 11-14, find the value a so the given function is continuous.

$$11) f(x) = \begin{cases} x^2 - 1 & x \leq 3 \\ 2ax & x > 3 \end{cases}$$

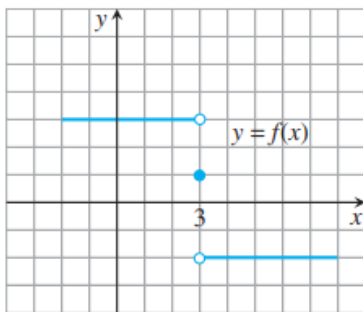
$$12) f(x) = \begin{cases} 2x + 3 & x \leq 2 \\ ax + 1 & x > 2 \end{cases}$$

$$13) f(x) = \begin{cases} 4 - x^2 & x < 1 \\ ax^2 - 1 & x \geq 1 \end{cases}$$

$$14) f(x) = \begin{cases} x^2 + x + a & x > 1 \\ x^3 & x \geq 1 \end{cases}$$

For questions 15-18, use the graph to estimate the limits and values of the function, or explain why the limit does not exist.

15)



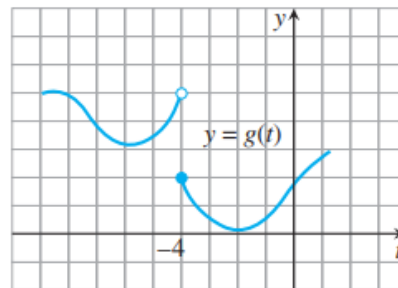
(a) $\lim_{x \rightarrow 3^-} f(x)$

(b) $\lim_{x \rightarrow 3^+} f(x)$

(c) $\lim_{x \rightarrow 3} f(x)$

(d) $f(3)$

16)



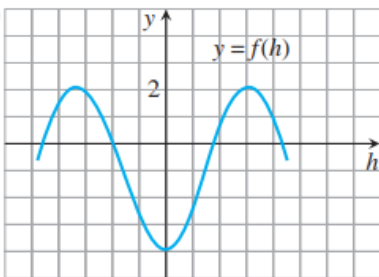
(a) $\lim_{t \rightarrow -4^-} g(t)$

(b) $\lim_{t \rightarrow -4^+} g(t)$

(c) $\lim_{t \rightarrow -4} g(t)$

(d) $g(-4)$

17)



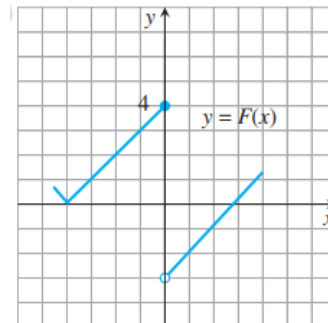
(a) $\lim_{h \rightarrow 0^-} f(h)$

(b) $\lim_{h \rightarrow 0^+} f(h)$

(c) $\lim_{h \rightarrow 0} f(h)$

(d) $f(0)$

18)



(a) $\lim_{x \rightarrow 0^-} F(x)$

(b) $\lim_{x \rightarrow 0^+} F(x)$

(c) $\lim_{x \rightarrow 0} F(x)$

(d) $F(0)$

For questions 19-25, find each limit.

$$19) \lim_{x \rightarrow \infty} \frac{x^2}{x^3} =$$

$$20) \lim_{x \rightarrow \infty} \frac{x^3}{x^2} =$$

$$21) \lim_{x \rightarrow \infty} \frac{2x^2}{3x^2} =$$

$$22) \lim_{x \rightarrow \infty} \frac{(x-1)(2-x)}{(2x+1)(x+4)} =$$

$$23) \lim_{x \rightarrow \infty} \frac{(x+1)^3(x-5)}{(x-2)^4(1-x)} =$$

$$24) \lim_{x \rightarrow \infty} \frac{x^4 - 3x^7}{x^2 + 2x^5 + 5x^7 - 3x^9} =$$

$$25) \lim_{x \rightarrow \infty} \frac{x^4 - 3x^2 + 2}{1 - 2x^4} =$$