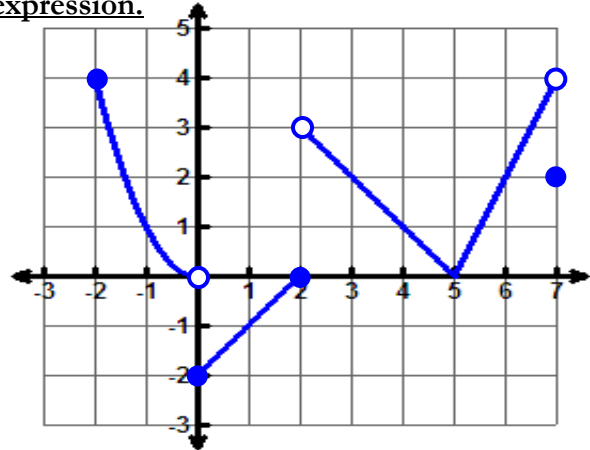


5.6 Exercises

Evaluating Limits Graphically & Numercally

Part I: Use the given graph to evaluate each limit expression.

$$\text{Let } g(x) = \begin{cases} x^2 & x < 0 \\ x+1 & 0 \leq x \leq 2 \\ 5-x & 2 < x \leq 5 \\ 2x-10 & 5 < x < 7 \\ 2 & x = 7 \end{cases}$$



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

2) $\lim_{x \rightarrow 0^-} g(x)$

3) $\lim_{x \rightarrow 0^+} g(x)$

4) $\lim_{x \rightarrow 0} g(x)$

5) $\lim_{x \rightarrow 2^+} g(x)$

6) $\lim_{x \rightarrow 2^-} g(x)$

7) $\lim_{x \rightarrow 2} g(x)$

8) $\lim_{x \rightarrow 4} g(x)$

9) $\lim_{x \rightarrow 5^+} g(x)$

10) $\lim_{x \rightarrow 5^-} g(x)$

11) $\lim_{x \rightarrow 5} g(x)$

12) $\lim_{x \rightarrow 7^-} g(x)$

Part II: Use the given table to evaluate the limit expressions.

13) Find $\lim_{x \rightarrow 0} f(x)$ if $f(x) = \frac{\sin x}{x}$.

x	-0.5	-0.3	-0.05	-0.03	0.03	0.05	0.3	0.5
f(x)	0.9589	0.9851	0.9996	0.9999	0.9999	0.9996	0.9851	0.9589

14) Find $\lim_{x \rightarrow 0} g(x)$ if $g(x) = \frac{\sin 5x}{x}$.

x	-0.3	-0.1	-0.03	-0.01	0.01	0.03	0.1	0.3
f(x)	3.325	4.794	4.981	4.998	4.998	4.981	4.794	3.325

15) Find $\lim_{x \rightarrow 2} g(x)$ if $g(x) = \frac{x-2}{x^2-6x+8}$.

x	1.5	1.9	1.95	1.99	2.01	2.05	2.1	2.5
f(x)	-0.417	-0.476	-0.488	-0.498	-0.503	-0.513	-0.526	-0.667

16) Find $\lim_{x \rightarrow -1} f(x)$ if $f(x) = \frac{x^3 + x^2 + 3x + 3}{x^4 + x^3 + 2x + 2}$.

x	-1.1	-1.01	-1.001	-1.0001	-0.9999	-0.999	-0.99	-0.9
f(x)	6.293	4.196	4.014	4.001	3.999	3.986	3.865	2.998

Part III: Use a graph to evaluate the limit expressions.

17) Let $g(x) = \begin{cases} x & x \leq 0 \\ 1 & x > 0 \end{cases}$.

a) $\lim_{x \rightarrow 0} g(x)$

b) $\lim_{x \rightarrow -3} g(x)$

18) Let $h(x) = \begin{cases} -x-3 & x \leq 1 \\ 2x & x > 1 \end{cases}$.

a) $\lim_{x \rightarrow 1} h(x)$

b) $\lim_{x \rightarrow 4} h(x)$

19) Let $f(x) = \begin{cases} |x-2| & x < 4 \\ 2 & x > 4 \end{cases}$.

a) $\lim_{x \rightarrow 2} f(x)$

b) $\lim_{x \rightarrow 4} f(x)$

c) $\lim_{x \rightarrow 6} f(x)$

20) Let $g(x) = x^2 + 1$. Find $\lim_{x \rightarrow -2} g(x)$.

21) Let $h(x) = \cos x$. Find $\lim_{x \rightarrow \pi/4} h(x)$.

22) Let $f(x) = \ln x$. Find $\lim_{x \rightarrow 1} f(x)$.