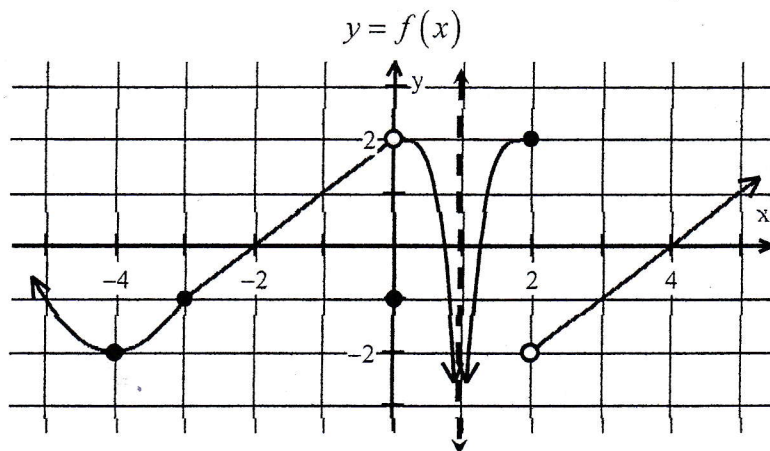


### Assignment 1-1

Use the appearance of the graph shown at the right to find the following limit and function values.



1.  $\lim_{x \rightarrow -4} f(x)$
2.  $\lim_{x \rightarrow -1} f(x)$
3.  $\lim_{x \rightarrow 0} f(x)$
4.  $f(0)$
5.  $\lim_{x \rightarrow 0^-} f(x)$
6.  $\lim_{x \rightarrow 1} f(x)$
7.  $f(1)$
8.  $\lim_{x \rightarrow 2} f(x)$
9.  $\lim_{x \rightarrow 2^-} f(x)$
10.  $\lim_{x \rightarrow 2^+} f(x)$
11.  $f(2)$
12.  $\lim_{x \rightarrow 4} f(x)$
13.  $\lim_{x \rightarrow 4^-} f(x)$

Use the function  $g(x) = \begin{cases} 2x-3, & x \leq 0 \\ -x-3, & 0 < x \leq 2 \\ 3x, & x > 2 \end{cases}$  for problems 14-20.

14. Sketch an accurate graph without using a calculator.

15.  $\lim_{x \rightarrow 0} g(x) =$
16.  $\lim_{x \rightarrow 2} g(x) =$
17.  $\lim_{x \rightarrow 2^-} g(x) =$
18.  $\lim_{x \rightarrow 2^+} g(x) =$
19.  $g(2) =$
20.  $\lim_{x \rightarrow -2} g(x) =$

Find each of the following limits without using a calculator. Simplify your answers.

21.  $\lim_{x \rightarrow 0} (2x - 5)$
22.  $\lim_{x \rightarrow -3} (x^2 - 5x + 4)$
23.  $\lim_{x \rightarrow 2} \frac{2x-5}{\sqrt{x+7}}$
24.  $\lim_{x \rightarrow -2} |3x + 5|$
25.  $\lim_{x \rightarrow 2} \frac{3x-6}{\sqrt{x+6}}$
26.  $\lim_{x \rightarrow \pi} \sin x$
27.  $\lim_{x \rightarrow \frac{\pi}{2}} \cos x$
28.  $\lim_{x \rightarrow \pi} \tan x$
29.  $\lim_{x \rightarrow \frac{\pi}{2}} \cos(2x)$
30.  $\lim_{x \rightarrow 2} \cos \frac{\pi x}{3}$
31.  $\lim_{x \rightarrow 3} \sec \frac{\pi x}{4}$
32.  $\lim_{x \rightarrow 7} \csc \frac{\pi x}{6}$
33.  $\lim_{x \rightarrow \pi} \cot \frac{x}{6}$
34.  $\lim_{x \rightarrow 5\pi} \cos \frac{x}{3}$

Use the function  $f(x) = \begin{cases} 6x-3x^3, & x \leq 2 \\ 4x-x^4, & x > 2 \end{cases}$  for problems 35, 36.

35.  $\lim_{x \rightarrow 2^-} f(x)$
36.  $\lim_{x \rightarrow 2} f(x)$

Use the function  $g(x) = \begin{cases} 2 \sin \frac{3x}{2}, & x \leq \pi \\ \sec \frac{11x}{6}, & x > \pi \end{cases}$  for problems 37-39.

37.  $\lim_{x \rightarrow \pi^+} g(x)$       38.  $\lim_{x \rightarrow \pi^-} g(x)$       39.  $\lim_{x \rightarrow \pi} g(x)$

Use the functions  $g(x) = 3x^2 - 5x$  and  $f(x) = \sqrt[3]{3x+5}$  for problems 40-42.

40.  $\lim_{x \rightarrow 2} g(x)$       41.  $\lim_{x \rightarrow 1} f(x)$       42.  $\lim_{x \rightarrow 3} f(g(x))$

If  $\lim_{x \rightarrow 3} h(x) = 5$  and  $\lim_{x \rightarrow 3} k(x) = 3$  find the following limits.

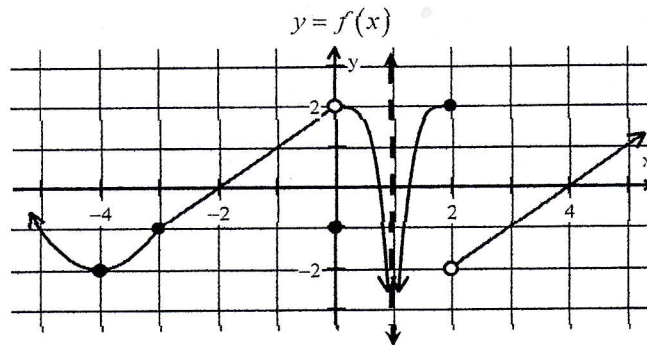
43.  $\lim_{x \rightarrow 3} (h(x) + k(x))$       44.  $\lim_{x \rightarrow 3} (h(x)k(x))$       45.  $\lim_{x \rightarrow 3} \frac{h(x)}{k(x)}$

The symbol  $\lfloor \ \rfloor$  is used to represent the Greatest Integer Function in the following problems.

Find these limits without using a calculator or state that the limit does not exist.

46.  $\lim_{x \rightarrow 3^-} \lfloor x-1 \rfloor$       47.  $\lim_{x \rightarrow 3^+} \lfloor x-1 \rfloor$       48.  $\lim_{x \rightarrow 3} \lfloor x-1 \rfloor$       49.  $\lim_{x \rightarrow 3} \lfloor \frac{x}{2} - 1 \rfloor$       50.  $\lim_{x \rightarrow 3^-} \lfloor 4x-1 \rfloor$

51. Identify each  $x$ -value at which the function shown appears to be discontinuous and classify each as removable or nonremovable.



Find all discontinuities for the following functions and classify each as removable or nonremovable. Do not use a calculator.

52.  $f(x) = \begin{cases} 3x^3 + 4x, & x \leq -2 \\ x^4 + 16, & x > -2 \end{cases}$       53.  $f(x) = \begin{cases} 3x^3 + 4x, & x \leq 2 \\ x^4 + 16, & x > 2 \end{cases}$

54.  $g(x) = \begin{cases} 2 \sin \frac{\pi x}{2}, & x \leq 1 \\ \cos \frac{\pi x}{3}, & x > 1 \end{cases}$       55.  $g(x) = \begin{cases} \cos x, & x \leq 0 \\ -x+1, & 0 < x \leq 2 \\ \sin \frac{\pi x}{2}, & x > 2 \end{cases}$

56.  $f(x) = \lfloor x+5 \rfloor$       57.  $h(x) = \lfloor \frac{x}{3} \rfloor$