

****Use Calculator on 1-4****

✎ In Exercises 1–8, complete the table and use the result to estimate the limit. Use a graphing utility to graph the function to confirm your result.

1. $\lim_{x \rightarrow 2} \frac{x - 2}{x^2 - x - 2}$

x	1.9	1.99	1.999	2.001	2.01	2.1
$f(x)$						

2. $\lim_{x \rightarrow 2} \frac{x - 2}{x^2 - 4}$

x	1.9	1.99	1.999	2.001	2.01	2.1
$f(x)$						

3. $\lim_{x \rightarrow 0} \frac{\sqrt{x+3} - \sqrt{3}}{x}$

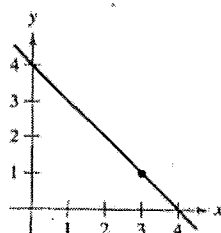
x	-0.1	-0.01	-0.001	0.001	0.01	0.1
$f(x)$						

4. $\lim_{x \rightarrow -3} \frac{\sqrt{1-x} - 2}{x+3}$

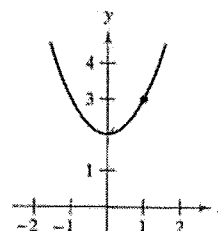
x	-3.1	-3.01	-3.001	-2.999	-2.99	-2.9
$f(x)$						

In Exercises 9–18, use the graph to find the limit (if it exists). If the limit does not exist, explain why.

9. $\lim_{x \rightarrow 3} (4 - x)$

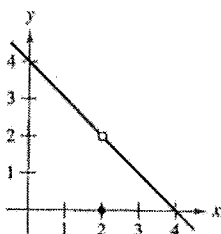


10. $\lim_{x \rightarrow 1} (x^2 + 2)$



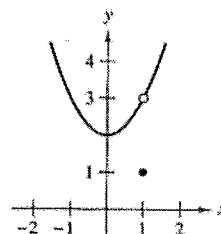
11. $\lim_{x \rightarrow 2} f(x)$

$$f(x) = \begin{cases} 4 - x, & x \neq 2 \\ 0, & x = 2 \end{cases}$$



12. $\lim_{x \rightarrow 1} f(x)$

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



2. The domain of the function $f(x) = \sqrt{4 - x^2}$ is

- (A) $x < -2$ or $x > 2$
- (B) $x \leq -2$ or $x \geq 2$
- (C) $-2 < x < 2$
- (D) $-2 \leq x \leq 2$
- (E) $x \leq 2$

Use Calculator on 1-4

In Exercises 1-8, complete the table and use the result to estimate the limit. Use a graphing utility to graph the function to confirm your result.

1. $\lim_{x \rightarrow 2} \frac{x-2}{x^2-x-2} = \frac{1}{3}$

x	1.9	1.99	1.999	2.001	2.01	2.1
f(x)						

2. $\lim_{x \rightarrow 2} \frac{x-2}{x^2-4} = \frac{1}{4}$

x	1.9	1.99	1.999	2.001	2.01	2.1
f(x)						

3. $\lim_{x \rightarrow 0} \frac{\sqrt{x+3}-\sqrt{3}}{x} = .2887$

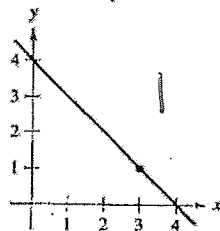
x	-0.1	-0.01	-0.001	0.001	0.01	0.1
f(x)						

4. $\lim_{x \rightarrow -3} \frac{\sqrt{1-x}-2}{x+3} = -\frac{1}{4}$

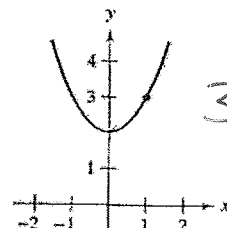
x	-3.1	-3.01	-3.001	-2.999	-2.99	-2.9
f(x)						

In Exercises 9-18, use the graph to find the limit (if it exists). If the limit does not exist, explain why.

9. $\lim_{x \rightarrow 3} (4-x)$

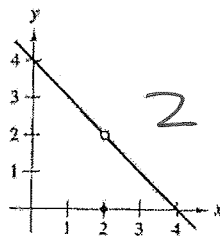


10. $\lim_{x \rightarrow 1} (x^2 + 2)$



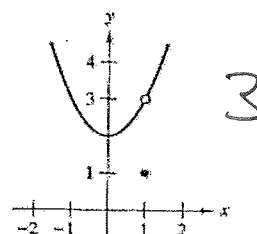
11. $\lim_{x \rightarrow 2} f(x)$

$$f(x) = \begin{cases} 4-x, & x \neq 2 \\ 0, & x = 2 \end{cases}$$



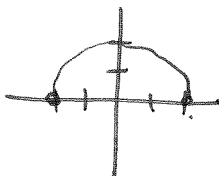
12. $\lim_{x \rightarrow 1} f(x)$

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



2. The domain of the function $f(x) = \sqrt{4-x^2}$ is

- (A) $x < -2$ or $x > 2$
- (B) $x \leq -2$ or $x \geq 2$
- (C) $-2 < x < 2$
- (D) $-2 \leq x \leq 2$
- (E) $x \leq 2$



****Use Calculator on 5-8****

Graphing Utility In Exercises 1-8, complete the table and use the result to estimate the limit. Use a graphing utility to graph the function to confirm your result.

5. $\lim_{x \rightarrow 3} \frac{[1/(x+1)] - (1/4)}{x-3}$

x	2.9	2.99	2.999	3.001	3.01	3.1
f(x)						

6. $\lim_{x \rightarrow 4} \frac{[x/(x+1)] - (4/5)}{x-4}$

x	3.9	3.99	3.999	4.001	4.01	4.1
f(x)						

7. $\lim_{x \rightarrow 0} \frac{\sin x}{x}$

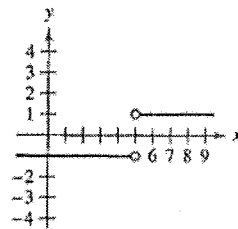
x	-0.1	-0.01	-0.001	0.001	0.01	0.1
f(x)						

8. $\lim_{x \rightarrow 0} \frac{\cos x - 1}{x}$

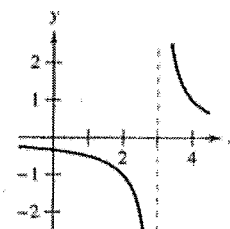
x	-0.1	-0.01	-0.001	0.001	0.01	0.1
f(x)						

In Exercises 9-18, use the graph to find the limit (if it exists). If the limit does not exist, explain why.

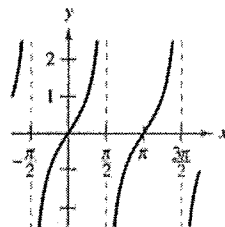
13. $\lim_{x \rightarrow 5} \frac{|x-5|}{x-5}$



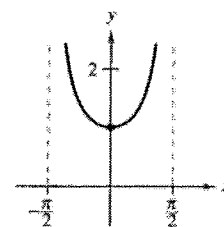
14. $\lim_{x \rightarrow 3} \frac{1}{x-3}$



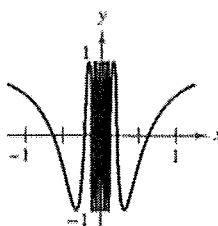
15. $\lim_{x \rightarrow \pi/2} \tan x$



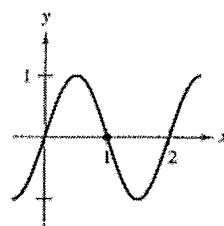
16. $\lim_{x \rightarrow 0} \sec x$



17. $\lim_{x \rightarrow 0} \cos \frac{1}{x}$



18. $\lim_{x \rightarrow 1} \sin \pi x$



****Use Calculator on 39-42****

Writing In Exercises 39-42, use a graphing utility to graph the function and estimate the limit (if it exists). What is the domain of the function? Can you detect a possible error in determining the domain of a function solely by analyzing the graph generated by a graphing utility? Write a short paragraph about the importance of examining a function analytically as well as graphically.

39. $f(x) = \frac{\sqrt{x+5} - 3}{x-4}$

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

40. $f(x) = \frac{x-3}{x^2 - 4x + 3}$

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

41. $f(x) = \frac{x-9}{\sqrt{x}-3}$

$\lim_{x \rightarrow 9} f(x)$

42. $f(x) = \frac{x-3}{x^2 - 9}$

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

Use Calculator on 5-8

7 In Exercises 1-8, complete the table and use the result to estimate the limit. Use a graphing utility to graph the function to confirm your result.

5. $\lim_{x \rightarrow 3} \frac{[1/(x+1)] - (1/4)}{x-3} = -\frac{1}{16}$

x	2.9	2.99	2.999	3.001	3.01	3.1
f(x)						

6. $\lim_{x \rightarrow 4} \frac{[x(x+1)] - (4/5)}{x-4} = \frac{1}{25}$

x	3.9	3.99	3.999	4.001	4.01	4.1
f(x)						

7. $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$

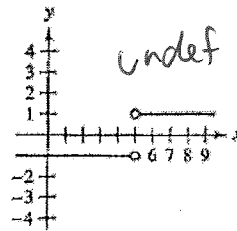
x	-0.1	-0.01	-0.001	0.001	0.01	0.1
f(x)						

8. $\lim_{x \rightarrow 0} \frac{\cos x - 1}{x} = 0$

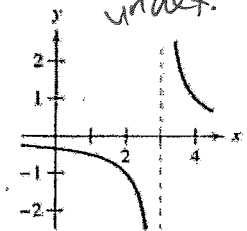
x	-0.1	-0.01	-0.001	0.001	0.01	0.1
f(x)						

In Exercises 9-18, use the graph to find the limit (if it exists). If the limit does not exist, explain why.

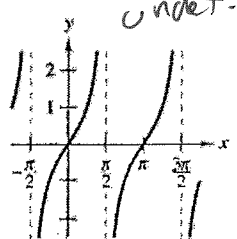
13. $\lim_{x \rightarrow 5} \frac{|x-5|}{x-5}$



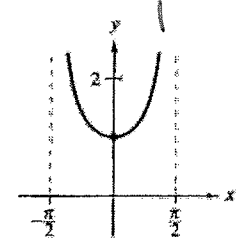
14. $\lim_{x \rightarrow 3} \frac{1}{x-3}$



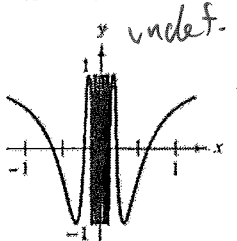
15. $\lim_{x \rightarrow \pi/2} \tan x$



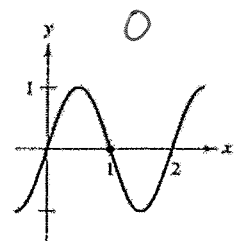
16. $\lim_{x \rightarrow 0} \sec x$



17. $\lim_{x \rightarrow 0} \cos \frac{1}{x}$



18. $\lim_{x \rightarrow 1} \sin \pi x$



Use Calculator on 39-42

7 **Writing** In Exercises 39-42, use a graphing utility to graph the function and estimate the limit (if it exists). What is the domain of the function? Can you detect a possible error in determining the domain of a function solely by analyzing the graph generated by a graphing utility? Write a short paragraph about the importance of examining a function analytically as well as graphically.

39. $f(x) = \frac{\sqrt{x+5} - 3}{x-4}$
 $\lim_{x \rightarrow 4} f(x) = \frac{1}{6}$

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

41. $f(x) = \frac{x-9}{\sqrt{x}-3}$
 $\lim_{x \rightarrow 9} f(x) = 6$

42. $f(x) = \frac{x-3}{x^2 - 9}$
 $\lim_{x \rightarrow 3} f(x) = \frac{1}{6}$