Homework 1.2 and 1.3

Work these problems on a separate piece of paper.

In 1-2, complete the table and use the result to estimate the limit. Use a graphing utility to graph the function to confirm your result.

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

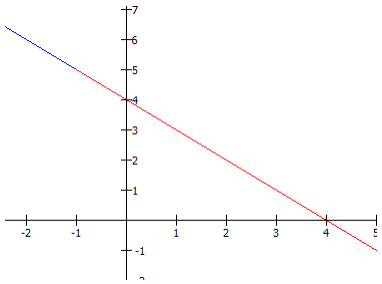
x	1.9	1.99	1.999	2.001	2.01	2.1
f(x)						

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

x	1.9	1.99	1.999	2.001	2.01	2.1
f(x)						

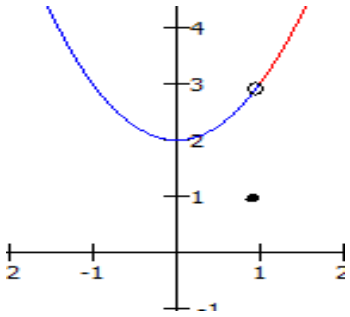
Use the graph to find the limit (if it exists). If the limit does not exist, explain why.

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

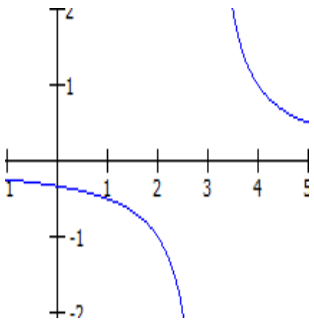


12. $\lim_{x\to 1} f(x)$

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

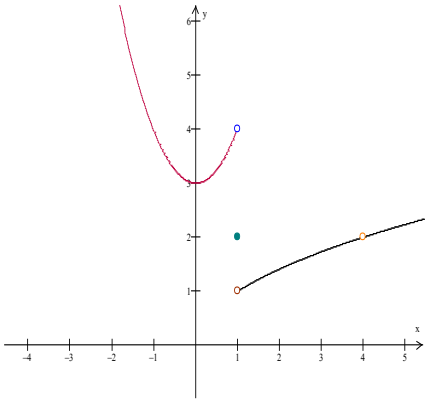


14. $\lim_{x\to 3} \frac{1}{x-3}$



In 19-20, use the graph of the function f to decide whether the value of the given quantity exists. If it does, find it. If it does not, explain why.

19.



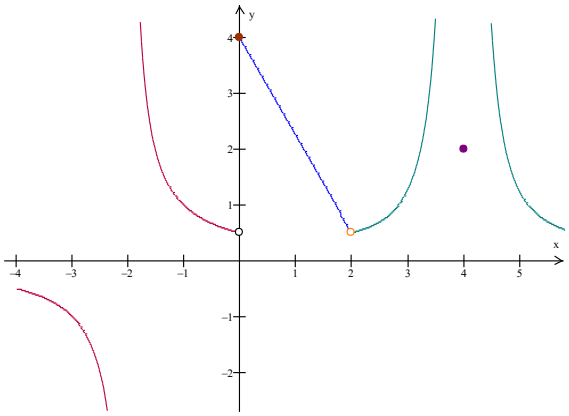
$a)\ f(1)$

$b)\ \lim_{x\to 1} f(x)$

$c)\ f(4)$

$d)\ \lim_{x\to 4} f(x)$

20.



$a)\ f(-2)$

$b)\ \lim_{x\to -2} f(x)$

$c)\ f(0)$

$d)\ \lim_{x\to 0} f(x)$

$e)\ f(2)$

$f)\ \lim_{x\to 2} f(x)$

$g)\ f(4)$

$h)\ \lim_{x\to 4} f(x)$

Section 1.3

Use a graphing utility to graph the function and visually estimate the limits.

3. $f(x) = x\cos x$
   a) $\lim_{x\to 0} f(x)$
   b) $\lim_{x\to \pi/3} f(x)$

Find the limit.

6. $\lim_{x\to -2} x^3$

9. $\lim_{x\to -3} (x^2 + 3x)$

12. $\lim_{x\to 1} (3x^3 - 2x^2 + 4)$

15. $\lim_{x\to 1} \frac{x-3}{x^2+4}$

18. $\lim_{x\to 3} \frac{\sqrt{x+1}}{x-4}$

21. $\lim_{x\to -4} (x + 3)^2$

24. $f(x) = x + 7 \quad g(x) = x^2$

$a)\ \lim_{x\to -3} f(x)$ $b)\ \lim_{x\to 4} g(x)$ $c)\ \lim_{x\to -3} f(g(x))$

Find the limit of the trigonometric functions.

27. $\lim_{x\to \pi/2} \sin x$

30. $\lim_{x\to 1} \sin \frac{\pi x}{2}$

33. $\lim_{x\to 5\pi/6} \sin x$

36. $\lim_{x\to 7} \sec \frac{\pi x}{6}$

Use the information to evaluate the limit.

39. $\lim_{x\to c} f(x) = 4$

$a)\ \lim_{x\to c} [f(x)]^3$
$b)\ \lim_{x\to c} \sqrt{f(x)}$
$c)\ \lim_{x\to c} [3f(x)]$
$a)\ \lim_{x\to c} [f(x)]^{3/2}$

Find the limit (if it exists).

51. $\lim_{x\to -3} \frac{x^2+x-6}{x^2-9}$

54. $\lim_{x\to 0} \frac{\sqrt{2+x}-\sqrt{2}}{x}$

57. $\lim_{x\to 0} \frac{\left[{}^{1}/_{(3+x)}\right]-({}^{1}/_{3})}{x}$

60. $\lim_{\Delta x\to o} \frac{(x+\Delta x)^2-x^2}{\Delta x}$

Determine the limit of the trigonometric function (if it exists).

69. $\lim_{x\to 0} \frac{\sin x(1-\cos x)}{2x^2}$

72. $\lim_{x\to 0} \frac{tan^2 x}{x}$

75. $\lim_{x\to {}^{\pi}/_{2}} \frac{\cos x}{\cot x}$