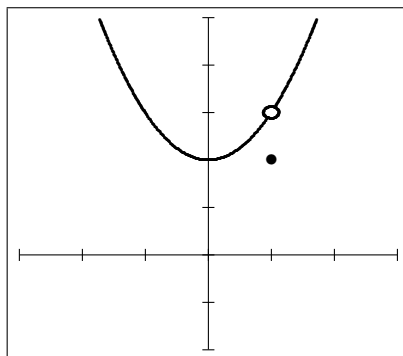
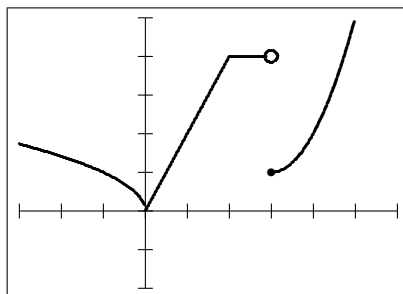


1. Evaluate each of the following if it exists. If it does not exist, explain why not.



- (a)  $\lim_{x \rightarrow 0} f(x) = \underline{\hspace{2cm}}$                       (d)  $\lim_{x \rightarrow 1^-} f(x) = \underline{\hspace{2cm}}$   
 (b)  $\lim_{x \rightarrow 1} f(x) = \underline{\hspace{2cm}}$                       (e)  $f(1) = \underline{\hspace{2cm}}$

2. Evaluate each of the following if it exists. If it does not exist, explain why not.



- (a)  $\lim_{x \rightarrow 0} f(x) = \underline{\hspace{2cm}}$                       (d)  $\lim_{x \rightarrow 3} f(x) = \underline{\hspace{2cm}}$   
 (b)  $\lim_{x \rightarrow 3^-} f(x) = \underline{\hspace{2cm}}$                       (e)  $\lim_{x \rightarrow 2} f(x) = \underline{\hspace{2cm}}$   
 (c)  $\lim_{x \rightarrow 3^+} f(x) = \underline{\hspace{2cm}}$                       (f)  $f(2) = \underline{\hspace{2cm}}$

3. Given that  $\lim_{x \rightarrow c} f(x) = 27$  find the following:

(a)  $\lim_{x \rightarrow c} \sqrt[3]{f(x)} = \underline{\hspace{2cm}}$

(d)  $\lim_{x \rightarrow c} 3f(x) = \underline{\hspace{2cm}}$

(b)  $\lim_{x \rightarrow c} \frac{f(x)}{18} = \underline{\hspace{2cm}}$

(e)  $\lim_{x \rightarrow c} [f(x)]^{\frac{2}{3}} = \underline{\hspace{2cm}}$

(c)  $\lim_{x \rightarrow c} [f(x)]^2 = \underline{\hspace{2cm}}$

4. Evaluate the limit if it exists.

(a)  $\lim_{x \rightarrow 1} \frac{x-3}{x^2+4}$

(d)  $\lim_{x \rightarrow 7} \frac{5x}{\sqrt{x+2}}$

(b)  $\lim_{x \rightarrow -4} (x+3)^2$

(e)  $\lim_{x \rightarrow 1} \sin\left(\frac{\pi x}{2}\right)$

(c)  $\lim_{x \rightarrow 0} \frac{\sin(5x)}{3x}$

5. Evaluate  $\lim_{x \rightarrow 0} \frac{\sqrt{2+x} - \sqrt{2}}{x}$ .

6. Simplify the difference quotient  $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$  for the function

$$f(x) = \frac{4}{x}.$$

7. Find the  $x$ -values, if any, at which  $f$  is not continuous. Which of the discontinuities are removable?

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

(b)  $f(x) = \begin{cases} -2x & x \leq 2 \\ x^2 - 4x + 1 & x > 2 \end{cases}$

8. Sketch a graph of a function  $f(x)$  satisfying all of the following:

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

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

(c)  $f(-1) = 4$

(d)  $\lim_{x \rightarrow 0^-} f(x) = 0$

(e)  $\lim_{x \rightarrow 0} f(x)$  DNE

(f)  $f(x)$  is left-continuous at  $x = 2$

(g)  $f(2) = -3$

(h)  $\lim_{x \rightarrow 2^+} f(x) = 3$