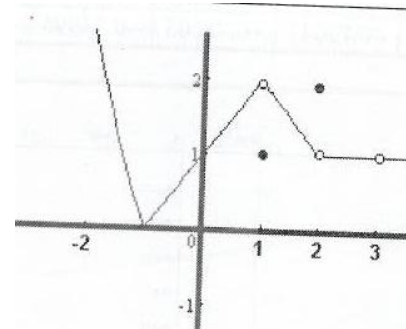


Complete the table of values and use the table to estimate the value of:

1.  $\lim_{x \rightarrow 9} \frac{3 - \sqrt{x}}{9 - x}$   $x = 8.9, 8.99, 8.999, 9.001, 9.01, 9.1$
2.  $\lim_{x \rightarrow 0} \frac{4^x + 2^x - 2}{x}$   $x = -0.1, -0.01, -0.001, 0.001, 0.01, 0.1$

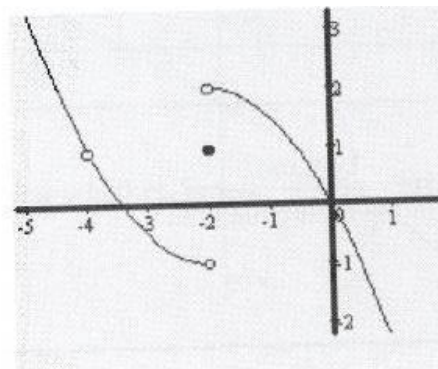
3. State the value of the given quantity using the picture:

- a)  $\lim_{x \rightarrow 1^-} f(x)$    b)  $\lim_{x \rightarrow 1^+} f(x)$    c)  $\lim_{x \rightarrow 1} f(x)$   
 d)  $f(1)$    e)  $f(2)$    f)  $\lim_{x \rightarrow 2} f(x)$    g)  $f(3)$



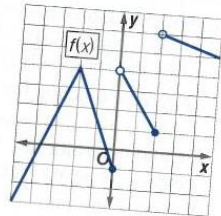
4. State the value of the given quantity using the picture:

- a)  $\lim_{x \rightarrow -2^-} f(x)$    b)  $\lim_{x \rightarrow -2^+} f(x)$    c)  $\lim_{x \rightarrow -2} f(x)$   
 d)  $f(-2)$    e)  $\lim_{x \rightarrow -4} f(x)$



For the function below, estimate each limit if it exists.

- a.  $\lim_{x \rightarrow 0^-} f(x)$
5. b.  $\lim_{x \rightarrow 0^+} f(x)$
- c.  $\lim_{x \rightarrow 0} f(x)$
- d.  $\lim_{x \rightarrow 2^-} f(x)$
- e.  $\lim_{x \rightarrow 2^+} f(x)$
- f.  $\lim_{x \rightarrow 1} f(x)$



Graph and find the given information:

6.  $f(x) = \begin{cases} x^3 + 2 & \text{if } x < 1 \\ 2x + 1 & \text{if } x \geq 1 \end{cases}$  Find  $\lim_{x \rightarrow 1^-} f(x)$ ,  $\lim_{x \rightarrow 1^+} f(x)$ ,  $\lim_{x \rightarrow 1} f(x)$
7.  $g(x) = \begin{cases} -\frac{1}{2}x + 2 & \text{if } x < -2 \\ -x^2 & \text{if } x \geq -2 \end{cases}$  Find  $\lim_{x \rightarrow -2^-} g(x)$ ,  $\lim_{x \rightarrow -2^+} g(x)$ ,  $\lim_{x \rightarrow -2} g(x)$
8.  $g(x) = \begin{cases} x & \text{if } x \leq 2 \\ 4 - x & \text{if } x > 2 \end{cases}$  Find  $\lim_{x \rightarrow 2^-} g(x)$ ,  $\lim_{x \rightarrow 2^+} g(x)$ ,  $\lim_{x \rightarrow 2} g(x)$
9.  $g(x) = \begin{cases} 3 & \text{if } x < 0 \\ 2x - 3 & \text{if } x \geq 0 \end{cases}$  Find  $\lim_{x \rightarrow 0^-} g(x)$ ,  $\lim_{x \rightarrow 0^+} g(x)$ ,  $\lim_{x \rightarrow 0} g(x)$
10.  $g(x) = \begin{cases} -x^2 + 3 & \text{if } x < 1 \\ 4 & \text{if } x = 1 \\ x + 1 & \text{if } x > 1 \end{cases}$  Find  $\lim_{x \rightarrow 1^-} g(x)$ ,  $\lim_{x \rightarrow 1^+} g(x)$ ,  $\lim_{x \rightarrow 1} g(x)$ ,  $g(1)$
11. Find the  $\lim_{x \rightarrow 0} \frac{1}{x}$

Evaluate each limit by showing all your steps – the LONG WAY!!

12.  $\lim_{x \rightarrow 9} \left( \frac{1}{x} + 2x + \sqrt{x} \right)$

13.  $\lim_{x \rightarrow 12} \frac{x^2 - 10x}{\sqrt{x} + 4}$

Use direct substitution, if possible, to evaluate each limit. If not possible, explain why.

14.  $\lim_{x \rightarrow 16} \frac{x^2 + 9}{\sqrt{x} - 4}$

15.  $\lim_{x \rightarrow 3} \frac{x^3 + 9x + 6}{x^2 + 5x + 6}$

16.  $\lim_{x \rightarrow -4} \frac{5x^5 - 16x^4}{x + 5}$

17.  $\lim_{x \rightarrow 5} \frac{x^3}{\sqrt{x} + 4 - 5}$

Evaluate each limit.

18.  $\lim_{x \rightarrow 4} \frac{2x^2 - 5x - 12}{x - 4}$

19.  $\lim_{x \rightarrow 1} \frac{x^2 + 4x - 5}{x^2 - 1}$

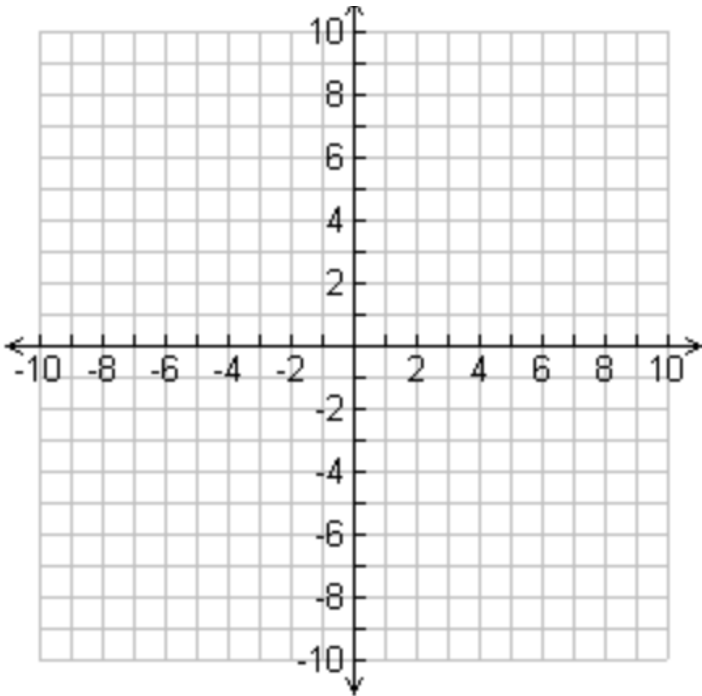
20.  $\lim_{x \rightarrow -5} \frac{4x^2 + 21x + 5}{3x^2 + 17x + 10}$

21.  $\lim_{x \rightarrow -2} \frac{x + 2}{\sqrt{6 + x} - 2}$

22.  $\lim_{x \rightarrow 0} \frac{2x}{3 - \sqrt{x} + 9}$

23.  $\lim_{x \rightarrow 6} \frac{\sqrt{x+3} - 3}{x - 6}$

24. Graph and find the following values, if they exist.  $f(x) = \begin{cases} 2x + 10 & \text{if } x \leq -2 \\ -x + 3 & \text{if } x > -2 \end{cases}$



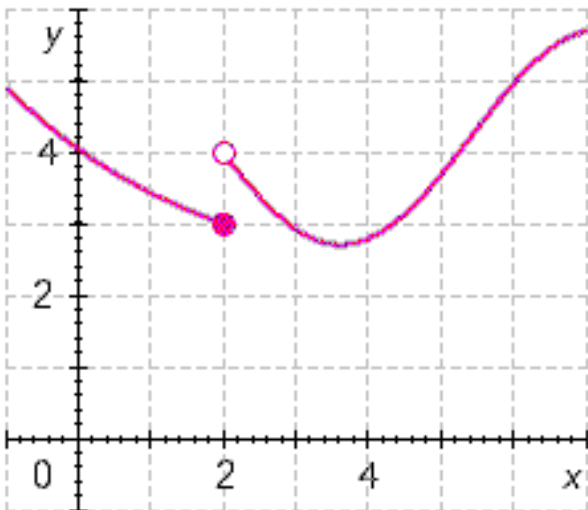
Find:  $\lim_{x \rightarrow -2^-} f(x) =$

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

$\lim_{x \rightarrow -2} f(x) =$

$f(-2) =$

25. State the value of the limit, if it exists from the given graph.



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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

$g(6)$

\_\_\_\_\_

$\lim_{x \rightarrow 6} g(x)$

\_\_\_\_\_