For the function $f$ whose graph is given, state the value of each quantity, if it exists. If it doesn't exist, explain why.

\[
\begin{align*}
\lim_{{x \to 3}} f(x) &= \underline{\phantom{0}} \\
\lim_{{x \to 3^-}} f(x) &= \underline{\phantom{0}} \\
\lim_{{x \to 3^+}} f(x) &= \underline{\phantom{0}} \\
\lim_{{x \to 0^-}} f(x) &= \underline{\phantom{0}} \\
\lim_{{x \to 0^+}} f(x) &= \underline{\phantom{0}} \\
f(3) &= \underline{\phantom{0}}
\end{align*}
\]
Use the given graph of $f$ to state the value of the given quantity, if it exists.

(a) $\lim_{x \to 2} f(x) = \phantom{000}$

(b) $\lim_{x \to 2^+} f(x) = \phantom{000}$

(c) $\lim_{x \to 2} f(x) = \phantom{000}$

(d) $\lim_{x \to 4} f(x) = \phantom{000}$

(e) $f(4) = \phantom{000}$
For the function $g$ whose graph is given, state the value of the given quantity, if it exists. If it does not exist indicate it.

Match each limit in the left column with the corresponding value in the right column.

- $g(0)$: 0
- $\lim_{x \to 4^+} g(x)$: 3
- $\lim_{x \to 0} g(x)$: 6
- $\lim_{x \to -4^+} g(x)$: doesn't exist

Problem code: stet.
02.02.06
For the function $R$ whose graph is shown, state the following.

Match each limit in the left column with the corresponding value in the right column.

1. \( \lim_{x \to 10} R(x) \)
2. \( \lim_{x \to -6^+} R(x) \)
3. \( \lim_{x \to 4} R(x) \)
4. \( \lim_{x \to -6^-} R(x) \)

Problem code: stet.
02.02.08
Pick the graph of a function \( f \) that satisfies all of the given conditions.

\[
\begin{align*}
\lim_{x \to 2^-} f(x) &= 1.5 \\
\lim_{x \to 2^+} f(x) &= 4 \\
\lim_{x \to -2} f(x) &= 2 \\
f(2) &= 3 \\
f(-2) &= 3
\end{align*}
\]
Which of the following statements are true for this graph?

a. \( \lim_{x \to 2} f(x) \) is undefined.

c. \( \lim_{x \to 2^+} f(x) = 1 \)

e. \( \lim_{x \to 1^+} f(x) = 0 \)

g. \( f(2) \) is undefined.

b. \( f(1) = 0 \)

d. \( \lim_{x \to 1^-} f(x) = 0 \)

f. \( f(1) = -1 \)

h. \( f(2) = 0 \)

Problem code: stet.
02.02.14m

7 Use a table of values to estimate the value of \( \lim_{x \to 0} \frac{\sqrt{x^2 + 1} - 1}{2x} \). If you have a graphing device, use it to confirm your result graphically.

Problem code: stet.
02.02.19

8 Use a table of values to estimate the value of the limit. If you have a graphing device, use it to confirm your result graphically.

\[ \lim_{x \to 0} \frac{\tan 2x}{\tan 5x} \]

Problem code: stet.
02.02.20
9 Use a table of values to estimate the value of the limit. If you have a graphing device, use it to confirm your result graphically.

$$\lim_{x \to 1} \frac{x^7 - 1}{x^{10} - 1}$$

Problem code: stet. 02.02.21

10 In the Theory of Relativity, the mass $m$ of a particle with velocity $v$ is

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

where $m_0$ is the rest mass of the particle and the constant $c$ is the speed of light. Given this equation, which of the following statements are true?

Select all correct answers.

a. As $v \to 0$, $\frac{m_0}{m} \to 1^+$.  
   c. As $m \to m_0$, $\frac{v^2}{c^2} \to 0$.  
   e. As $v \to c^-$, $m_0 \to m$.

b. As $v \to 0$, $\frac{m_0}{m} \to 1$.  
   d. As $v \to 0^+$, $m \to m_0$.

Problem code: stet. 02.02.38m
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>no</td>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.5</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>does not exist</td>
<td>does not exist</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. no
2. does not exist
3. \(g(0) \rightarrow \text{doesn't exist,}
   \lim_{x \to 0} g(x) \rightarrow 0,
   \lim_{x \to 4^+} g(x) \rightarrow 6
   \lim_{x \to 4^-} g(x) \rightarrow 3.
4. \(R(x) \rightarrow -\infty,
   \lim_{x \to -6^-} R(x) \rightarrow -\infty,
   \lim_{x \to -6^+} R(x) \rightarrow \infty
5. c
6. b,c,d,h
7. 0.25
8. 0.7
9. 0.4
10. b,c,d