For the function $g$ whose graph is given, state the value of each quantity, if it exists. (If an answer does not exist, enter DNE.)

1. 0/8 points  

<table>
<thead>
<tr>
<th>Question</th>
<th>Points</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0/8</td>
<td>0/44</td>
</tr>
</tbody>
</table>

(a) $\lim_{t \to 0^-} g(t)$

(b) $\lim_{t \to 0^+} g(t)$

(c) $\lim_{t \to 0} g(t)$

(d) $\lim_{t \to 2^-} g(t)$

(e) $\lim_{t \to 2^+} g(t)$

(f) $\lim_{t \to 2} g(t)$

(g) $g(2)$

(h) $\lim_{t \to 4} g(t)$
2. 0/4 points

Determine the infinite limit.

\[
\lim_{x \to -2^+} \frac{x + 1}{x + 2}
\]

- \(\infty\)
- \(-\infty\)

3. 0/4 points

Determine the infinite limit.

\[
\lim_{x \to 3} \frac{2 - x}{(x - 3)^2}
\]

- \(\infty\)
- \(-\infty\)

4. 0/4 points

In the theory of relativity, the mass of a particle with velocity \(v\) is

\[
m = \frac{m_0}{\sqrt{1 - v^2/c^2}},
\]

where \(m_0\) is the mass of the particle at rest and \(c\) is the speed of light. What happens as \(v \to c^-\)?

- \(m \to -\infty\)
- \(m \to 0\)
- \(m \to \infty\)
- \(m \to m_0\)
5. 0/5 points

Use the given graph of \( f \) to state the value of each quantity, if it exists. (If an answer does not exist, enter DNE.)

(a) \( \lim_{x \to 3^-} f(x) \)

(b) \( \lim_{x \to 3^+} f(x) \)

(c) \( \lim_{x \to 3} f(x) \)

(d) \( \lim_{x \to 7} f(x) \)

(e) \( f(7) \)

6. 0/5 points

Consider \( \lim_{t \to 0^+} \frac{-2 \sin(8t)}{\sin(8t) + 2t \cos(8t)} \). Using a table of values, the limiting value is \( \) (Enter "DNE" if the limit does not exist.)
The figure below shows a fixed circle $C_1$ with equation $(x - 1)^2 + y^2 = 1$ and another shrinking circle $C_2$ centered at the origin with positive $y$-intercept $P=(0,r)$. Let $Q$ be the point of intersection between the two circles pictured, draw a line through $P$ and $Q$ and let $R$ be the $x$-intercept of that line.

(a) Find the coordinates of the point $Q$; your answers will involve $r$: $Q = (\ , \ )$.

(b) The line through $P$ and $Q$ has equation $y = x + \ $.

(c) The point $R = (\ , \ )$.

(d) $\lim_{r \to 0} R = (\ , \ )$. 
A circle of radius $r$ centered at the point $(0,r)$ in the plane will intersect the $y$-axis at the origin and the point $A=(0,2r)$, as pictured below. A line passes through the point $A$ and the point $C=(5r^2,0)$ on the $x$-axis. In this problem, we will investigate the coordinates of the intersection point $B$ between the circle and the line, as $r \to \infty$.

(a) The line through $A$ and $C$ has equation:

$$y = x +$$

(b) The $x$-coordinate of the point $B$ is  

(c) The $y$-coordinate of the point $B$ is  

(d) The limit as $r \to \infty$ of the $x$-coordinate of $B$ is (if your answer is $\infty$, write infinity).

(e) The limit as $r \to \infty$ of the $y$-coordinate of $B$ is (if your answer is $\infty$, write infinity).