1. -6 points SCalcET7 2.2.004.

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) \( \lim_{x \to 2^-} f(x) \)

(b) \( \lim_{x \to 2^+} f(x) \)

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

(d) \( f(2) \)

(e) \( \lim_{x \to 4} f(x) \)

(f) \( f(4) \)
2. -/8 pointsSCalcET7 2.2.007.

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.)

\[
\begin{align*}
(a) \quad & \lim_{t \to 0^-} g(t) \\
(b) \quad & \lim_{t \to 0^+} g(t) \\
(c) \quad & \lim_{t \to 0} g(t) \\
(d) \quad & \lim_{t \to 2^-} g(t) \\
(e) \quad & \lim_{t \to 2^+} g(t) \\
(f) \quad & \lim_{t \to 2} g(t) \\
(g) \quad & g(2) \\
(h) \quad & \lim_{t \to 4} g(t)
\end{align*}
\]
3. -4 points SCalcET7 2.2.011.

Sketch the graph of the function.

\[ f(x) = \begin{cases} 
3 + x & \text{if } x < -2 \\
 x^2 & \text{if } -2 \leq x < 2 \\
6 - x & \text{if } x \geq 2 
\end{cases} \]

Use the graph to determine the values of \( a \) for which \( \lim_{x \to a} f(x) \) does not exist. (Enter your answers as a comma-separated list.)

\[ a = \text{ } \]
4. −4 points SCalcET7 2.2.025.

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. (Round your answer to two decimal places.)

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

5. −4 points SCalcET7 2.2.031.

Determine the infinite limit.

\[
\lim_{x \to 4} \frac{3 - x}{(x - 4)^2}
\]

6. −4 points SCalcET7 2.2.046.

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 \( v \to c^-? \)

\( m \to \infty \)

\( m \to m_0 \)

\( m \to -\infty \)

\( m \to 0 \)
7. \(-5/5\) pointsSCalcET7 2.2.503.XP.MI.

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

\[
\begin{align*}
(a) \quad \lim_{x \to 5^-} f(x) \\
(b) \quad \lim_{x \to 5^+} f(x) \\
(c) \quad \lim_{x \to 5} f(x) \\
(d) \quad \lim_{x \to 9} f(x) \\
(e) \quad f(9)
\end{align*}
\]

8. \(-5/5\) points

Consider \(\lim_{t \to 0^+} \frac{-2 \sin(2t)}{\sin(2t) + 2t \cos(2t)}\). Using a table of values, the limiting value is

\[
\begin{align*}
& \quad \\
\end{align*}
\]

(Enter "DNE" if the limit does not exist.)
9. -/8 points

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 $R =$

http://www.webassign.net/web/Student/Assignment-Responses/last?dep=12374559
(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 $C=(4r^2,0)$ 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:

\[ y = \]

(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).