MATH 170 – Sections 003 and 004 – Quiz 2

You may work with other class members on this quiz, but you may not receive assistance from people not in your MATH 170 section. You must show all of your work to receive full credit. Do all your work on other pieces of paper and be sure to staple together all the pieces of paper or YOU WILL GET A ZERO ON THE QUIZ. Do not use decimal approximations unless asked to do so. Your work on this quiz must be handed in by the beginning of class on Friday, 3 February 2006. Good luck!

1) Sketch the graph of

\[ f(x) = \begin{cases} 
2^x & \text{if } x < 0 \\
1 - x & \text{if } x > 0
\end{cases} \]

Does \( \lim_{x \to 0} f(x) \) exist? If so, what is its value? Explain.

2) Prove:

\[ \lim_{x \to 0} x^6 \sin(5x^{-3}) = 0 \]

3) Let \( f(x) = \sqrt{x} \). Find the largest value of \( \delta \) such that the condition

\[ |x - 4| < \delta \]

guarantees that

\[ |f(x) - 2| < \frac{1}{10} \]

4) Use the precise definition of limit to prove:

\[ \lim_{x \to 3} (4x - 2) = 10. \]