QUIZ 2


You have 25 minutes.

No notes, no books.

YOU MUST SHOW ALL WORK TO RECEIVE CREDIT

Good luck!

Name ________________________________

1. ___________ (/20 points)

2. ___________ (/20 points)

Total ___________ (/40 points)
1a. Find a number $k$ so that the function
\[
f(x) = \begin{cases} 
  x - \sqrt{x + 2} & x < 2 \\
  \frac{x - \sqrt{x + 2}}{3x - 6} & 3x - 6 \\
  2^{kx - 3} & x \geq 2
\end{cases}
\]
is continuous at $x = 2$.

1b. Sketch a graph of a function $y = f(x)$ which satisfies ALL of the following conditions:

- $f$ is even
- $f(0) = 0$
- $f(-2) = 1$
- $\lim_{x \to \infty} f(x) = 2$
- $\lim_{x \to -2^-} f(x) = 3$
- $\lim_{x \to -2^+} f(x) = -\infty$
- $\lim_{x \to -4^-} f(x) = \infty$
- $\lim_{x \to -4^+} f(x) = \infty$
- $\lim_{x \to -4^+} f(x) = -\infty$
2a. State the $\epsilon - \delta$ definition for 

\[ \lim_{x \to a} f(x) = L. \]

2b. Using the above definition, prove that

\[ \lim_{x \to 3} x^2 - 6x + 9 = 0. \]