Directions: Please answer the following questions and make sure your answers are legible. You must show your work to receive credit for your answers. You may not use a calculator (or any other technology) on this quiz. Good Luck.

1. (4 points) The temperature \( T \), in degrees Fahrenheit, \( t \) hours after 6 AM is given by:

\[
T(t) = -\frac{1}{2}t^2 + 8t + 32, \quad 0 \leq t \leq 12
\]

(a) What is the warmest temperature of the day?

(b) When does this happen?

2. (10 points) Solve the following inequalities, write your answer in interval notation.

(a) \( |1 - 2x| \geq x + 5 \)

(b) \( x|x + 5| \geq -6 \)
3. (4 points) For \( G(t) = 4(t - 2)^3(t + \frac{1}{2}) \), identify each of the following: 

(a) degree: 3 
(b) leading term: \( 4t^3 \) 
(c) leading coefficient: 4 
(d) constant term: \( 4 \)  
\[ 4 \left(-\frac{3}{2}\right)^3 \left(\frac{1}{2}\right) = 8 \]

4. (7 points) For \( h(x) = x^2(x - 2)^2(x + 2)^2 \),

(a) Find the real zeros of the polynomial \( h \) and their corresponding multiplicities.
(b) Find the sign chart for the polynomial \( h \).
(c) Make a rough sketch of the graph \( h \).

\[ \text{zeros} \quad \text{mul1} \]
\[ \begin{array}{c|c}
0 & 2 \\
2 & 2 \\
-2 & 2 \\
\end{array} \]

\[ f(-3) = (+) [+] \]
\[ f(-1) = (+) [-] [-] \]
\[ f(1) = (-) [-] [-] \]
\[ f(3) = (+) [+] [-] \]

\[ h(x) = x^2(x - 2)^2(x + 2)^2 \]

\[ y = h(x) \]