1. (6) Given the function \( f(x) = x^2 - 3x + 1 \), compute and simplify \( \frac{f(x + 2) - f(x)}{2} \).

2. (4) Given the function \( q(x) = \begin{cases} 
-\sqrt{2} & x < -3 \\
-3 & -3 \leq x \leq 3 \\
x^2 - 4 & x > 3 
\end{cases} \), evaluate each of the following:

(a) \( q(-4) \)  
(b) \( q(-3) \)  
(c) \( q(3) \)  
(d) \( q(6) \)
3. (3,3,2,2) The cost of manufacturing \( w \) widgets per day is given by the function \( C(w) = -\frac{1}{3}w^2 + 60w + 1500 \) for \( 0 \leq w \leq 90 \). The revenue generated by \( w \) widgets is given by \( R(w) = 90w - 177 \). The profit (or loss) generated by \( w \) widgets is given by the difference between the revenue generated by \( w \) widgets and the cost of manufacturing \( w \) widgets.

(a) How many widgets can be manufactured for a cost of $3525?

(b) What is the revenue generated at production level determined in part (a)?

(c) Determine a function \( P(w) \) which represents the profit (or loss) generated by \( w \) widgets.

(d) Determine the zero of \( P \) and explain what it means in practical (“real world”) terms.