

Name \_\_\_\_\_

Homework 3  
Section 1.1

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  $q(x) = \begin{cases} -\sqrt{2} & x < -3 \\ x + 5 & -3 \leq x \leq 3 \\ x^2 - 4 & x > 3 \end{cases}$ , evaluate each of the following:

(a)  $q(-4)$

(c)  $q(3)$

(b)  $q(-3)$

(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.