Name _____

Math 120E (QUIZ 3, October 16, 1997)

Instructions: You have 25 minutes for this quiz. **Show your work; NO CREDIT for answers only.** If you use a calculator function or program to obtain an answer, briefly state what program you used. Note that the quiz is on **both sides** of the paper.

Rachel buys a small apple orchard in Wenatchee which has 100 trees. Each tree produces \$100 worth of apples each year. She consults with agricultural experts and learns that for every tree she removes, the yield from each remaining tree will increase by \$4 worth of apples each year.

a. (2 points) Let x be the number of trees in the orchard. Write down a function, $v(x)$, which gives the total value of the apples produced in Rachel's orchard each year as a function of x.

b. (2 points) What is the maximum possible value of the apples harvested from Rachel's orchard each year?

c. (2 points) Rachel hires her out-of-work cousin to care for the orchard and harvest the apples. She agrees to pay him a base salary of \$6000 per year, plus \$25 per tree. Write down a function, $w(x)$, for the wages she pays her cousin as a function of x, the number of trees in the orchard.

d. (2 points) What is the smallest possible number of trees she could have in her orchard and still make a profit?

e. (2 points) How many trees should Rachel plant to realize the most profit?