GRADE 11 APPLIED
UNIT A – QUADRATICS
ASSIGNMENT – OPTIMIZATION

Name: _____
Date: _____

1. You make the best Bannock in town. You sell **40** loaves weekly each at **$3.00** per loaf. But you want to *optimize* your weekly income: make it a maximum. You know that for every quarter (**$0.25**) you **increase** the **price** of your bannock you will get ***two*** **fewer customers**.

Price $								
# Loaves sold								**0**
Income $	**0**							**0**

You also know that your *income function* is: **Income = Price per loaf** X **loafs sold**

a. what is the lowest price per loaf you could charge at which you make exactly **zero** income? Record it in the table above.

b. what is the highest price you could charge per loaf that would earn an income of exactly **zero**. Record it in the table above. (*hint: how many increases of $0.25 before you lose all your customers!*)

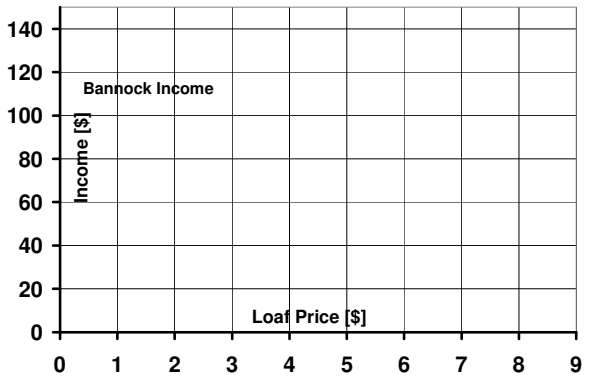
c. what price of loaf is halfway between the two '*zeros*' (when the income function is zero?). Record it in the table above. Calculate and record the income for that price also!

d. select and calculate a couple other convenient prices of loaf and the resultant income in the table.

e. now graph your table !

f. what is the optimum price to charge for a loaf to make the most profit?

g. what is that optimized weekly profit?



h. **Advanced**. What is a possible formula for this Income Function?

2. An orchard currently has **20** trees on one hectare. The average ***yield*** is **300** oranges per tree. It is estimated that **for each additional tree added**, that the average yield per tree will be **reduced by 10** oranges.

Nbr Trees								
Yield each tree								**0**
Total Orange Crop	**0**							**0**

You also know that your *total oranges* crop *function* is:

Crop = (Nbr of Trees) X (Yield per tree)

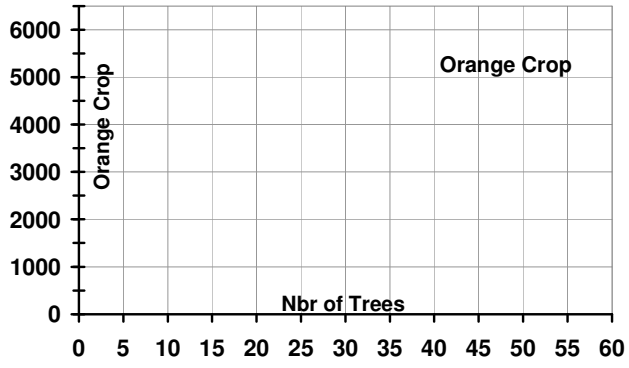
a. what is the lowest number of trees you could grow at which your total crop is exactly **zero** oranges? Record it in the table above.

b. what is the largest number of trees you could grow until you have exactly **zero** crop? Record it in the table above. (*hint: how many increases of a tree before the trees produce no oranges!*)

c. what is number of trees that is halfway between the two '*zeros*' (when the *crop function* is zero?). Record it in the table above. Calculate and record the total crop for that number of trees also!

d. select and calculate a couple other convenient numbers of trees and the resultant total crop. Record in your table.

e. now graph your table !



f. what is the optimum number of trees to grow in your orchard?

g. what is that optimized number of oranges in your crop?

h. **Advanced**. What is a possible formula for this Orange Crop Function?