

Math 111B,C - Winter 2003  
Mid-Term Exam Number One  
January 30, 2003

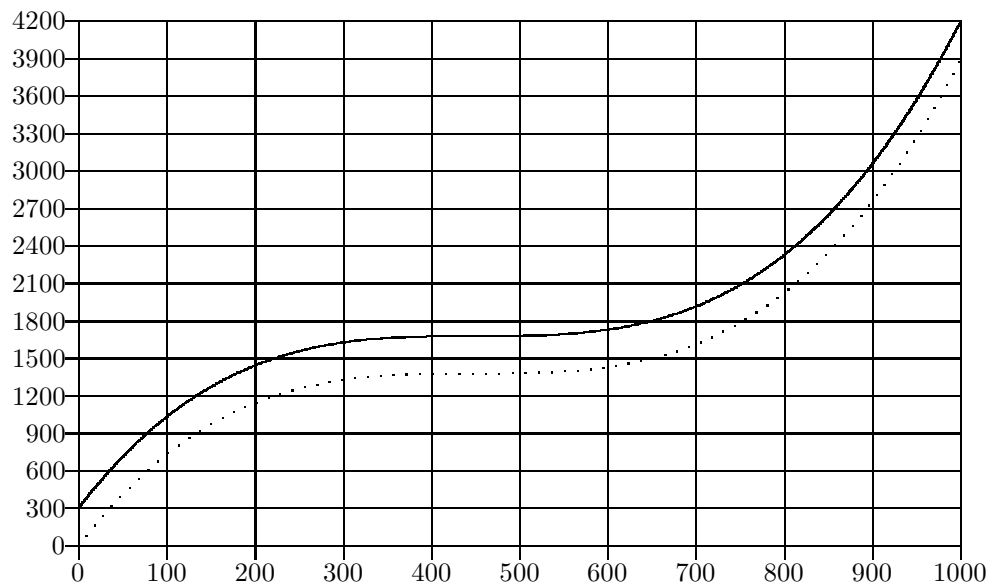
Name: \_\_\_\_\_

Section: \_\_\_\_\_

|       |    |  |
|-------|----|--|
| 1     | 20 |  |
| 2     | 15 |  |
| 3     | 20 |  |
| 4     | 20 |  |
| Total | 75 |  |

- Complete all questions.
- You may use a calculator during this examination. Other electronic devices are not allowed.
- You may use one hand-written 8.5 by 11 inch page of notes. You may write on both sides of the note page.
- Show all work for full credit.
- You have 50 minutes to complete the exam.

1. Suppose you are manufacturing and selling solar-powered turnip peelers. The graph below shows total cost (TC - the solid curve) in dollars and variable cost (VC - the dashed curve) in dollars for a range of production quantities  $q$ .



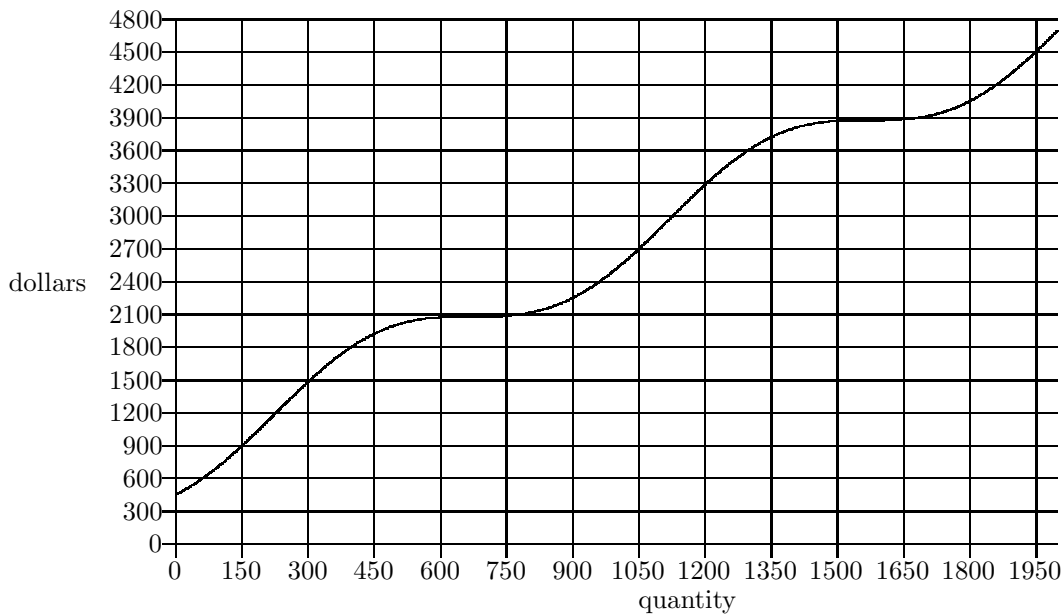
(a) Find the Breakeven Point.

(b) Find the Shutdown Point.

(c) Estimate the marginal cost (MC) for  $q = 250$ .

(d) How many peelers are produced when the average cost is equal to the marginal cost?

2. You are manufacturing and selling electric shoehorns. The graph of total cost versus quantity of shoehorns is shown below.

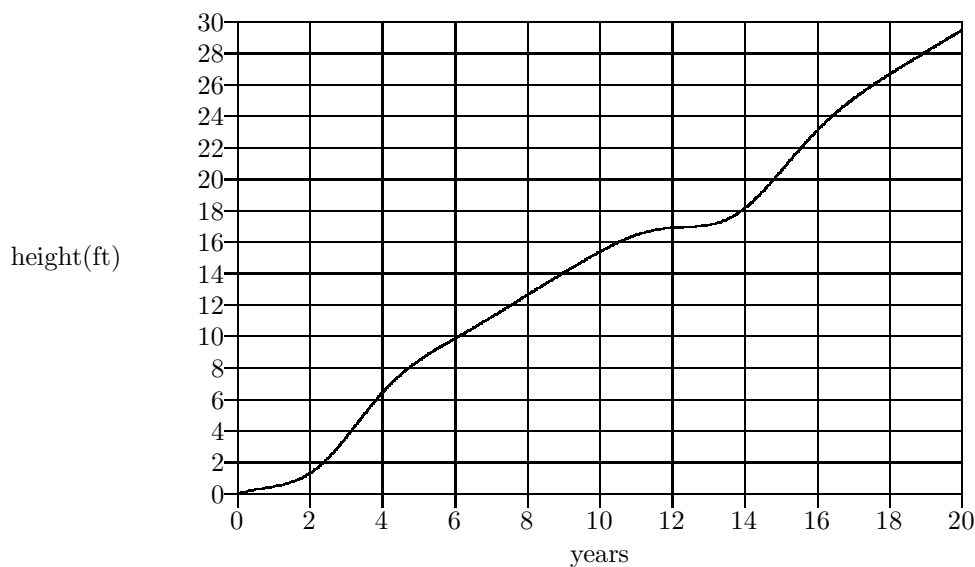


(a) What is the fixed cost (FC)?

(b) Find all quantities at which the marginal cost (MC) is \$1.20.

(c) What is the smallest quantity at which you could break even (i.e., profit = \$0) if you sell the shoehorns for \$2.70 each?

3. Suppose the height (in feet) of a tree  $t$  years after planting a seed is given by the function  $H(t)$ .



- (a) Find the overall rate of change of the height of the tree after 14 years.
- (b) What is the incremental rate of change of the tree's height from 6 years to 12 years?
- (c) Translate the following statement into an equivalent English statement, using the phrase *rate of change* at least once:

$$\frac{H(18) - H(7)}{18 - 7} < \frac{H(15) - H(13)}{15 - 13}$$

- (d) Translate the following statement into an equivalent English statement:

$$H(16) - H(6) = 13$$

