Part I. Short Answer (Two Points Each). Show how you calculate each answer in the space provided for that purpose. Place your answer on the appropriate line in the answer column.

1. Suppose $f(x) = \sqrt{3x+1}$. Evaluate f(5).

1. 4

2. Using "x" as your independent variable and "y" as your dependent variable, write an equation for the line that passes through the points (4, 26) and (10, 56).

2. $y = 5x + 6$

3. A new machine that costs $20,000 has a useful life of nine years and a scrap value of $2,000. Using straight-line depreciation, find the equation for the value V of the machine in terms of t where t is years.

$V = 20000 - 2000\,t$

3._____

4.-.7 Problems 4.-7. refer to this situation. 1996 it was estimated that for typical small sized fertilizer plants in Indiana fixed costs were about $230,000 and it was estimated that it cost $200 to produce each ton of fertilizer. These plants were able to sell their fertilizer output at $250 per ton. Let C(t), R(t), and P(t) represent a plant's cost to produce t tons of fertilizer, its revenue gained from the sale of t tons of fertilizer, and its profit derived from the production and sale of t tons of fertilizer respectively.

4. Specify a plant's cost function.

$C(t) = 200t + 230000$

4._____

5. Specify a plant's revenue function.

$R(t) = 250t$

5._____

6. Specify a plant's profit function.

$P(t) = 50t - 23000$

6._____

7. Determine a plant's break-even quantity.

7. $4,600$

8. Assume that the yield response of a type of grain to nitrogen fertilizer is given by $y = 2000 + 42x - 0.25x^2$ where y is in pounds per acre and x is pounds of nitrogen per acre. How much nitrogen results in a maximum yield? (Express your answer in terms of lbs/acre.)

8. $84\ lbs/acre$