

AGEC 1113 w/ Norwood  
Spring 2017  
Exam 2

Answer all questions on this test booklet. Use only the calculator provided to you.

**Version A**

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| Last Name: <i>key</i> |
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| Deepest, darkest secret: |
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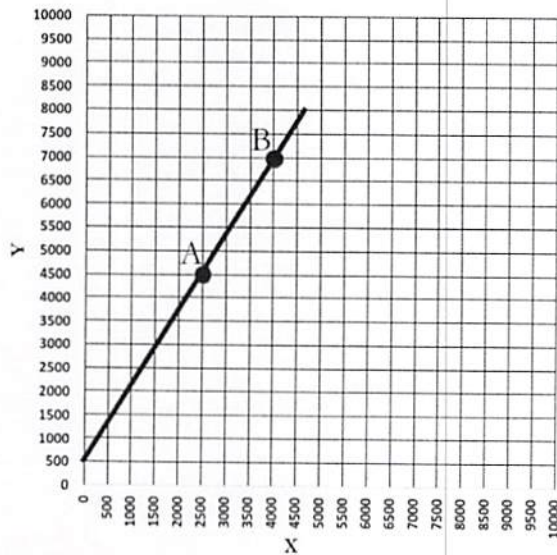
(1) [1 Pt] In Figure 1 below, as you move from point A to point B, what is the “run”, as opposed to the “rise”? Give a precise number.

Run = ~~2500~~ 1500

(2) [1 Pt] In Figure 1 below, what is the slope of the line between points A and B? Give a precise number. *As fraction or 4 dec: max*

Slope = ~~5/3 or 1.666...~~  
 $2500/1500 = 1.66666$

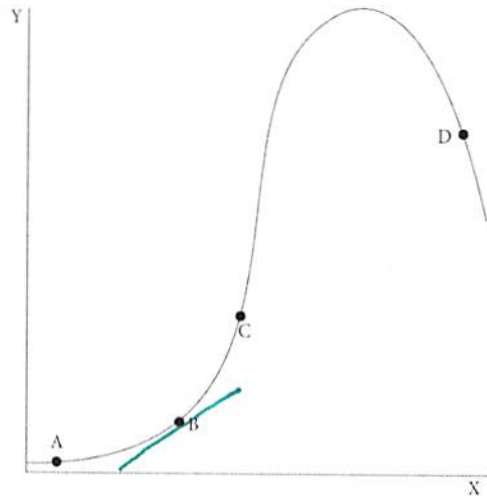
Figure 1



(3) [1 Pt] In Figure 2, between points B and C, the slope of the tangent line is (select one)

- a. Positive and rising
- b. Positive and falling
- c. Negative and rising
- d. Negative and falling
- e. zero

Figure 2



(4) [1 Pt] In Figure 2, draw a tangent line at point B.

(5) [1 Pt] Which stages of production are present in Figure 2? (select one)

- a. Stage 1 only
- b. Stage 2 only
- c. Stage 3 only
- d. Stages 1 and 2 only
- e. Stages 2 and 3 only
- f. Stages 1, 2, and 3

(6) [1 Pt] Suppose that wheat yield increases from 10 to 17 bushels per acre as nitrogen use increases from 11 to 13 lbs per acre. What is the marginal product of nitrogen?

MP =  $\frac{7}{2}$  or 3.5 bu wheat / lb N

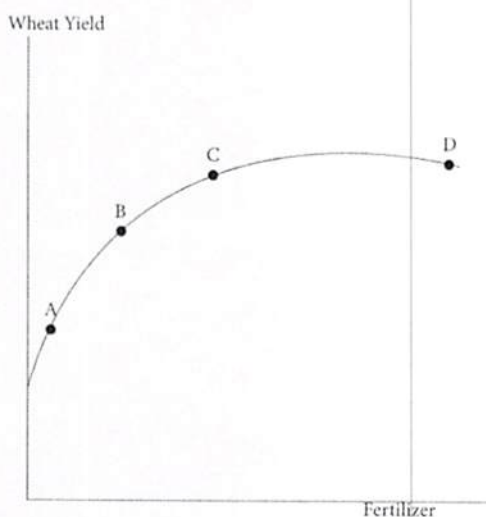
(7) [1 Pt] Which stages of production do bamboo and Sequoias trees exhibit? (select one)

- a. Stage 1 only
- b. Stage 2 only
- c. Stage 3 only
- d. Stages 1 and 2 only
- e. Stages 2 and 3 only
- f. Stages 1, 2, and 3

(8) [1 Pt] In Figure 3, at point B, if Y = wheat yield and X = lbs of N fertilizer, the marginal product of fertilizer is

- a. Positive and rising
- b. Positive and falling**
- c. Negative and rising
- d. Negative and falling
- e. zero

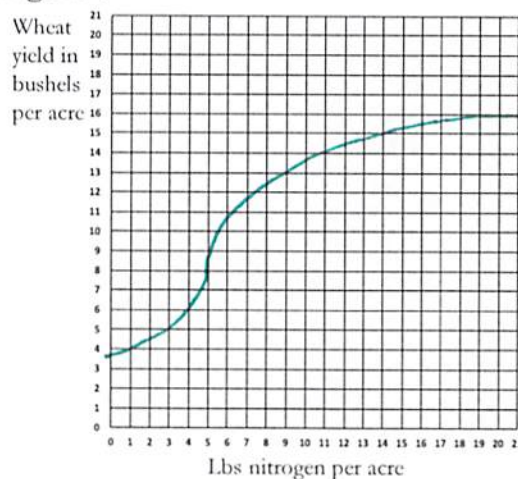
Figure 3



(9) [2 Pts] In Figure 4, draw a production function that exhibits

- Stage 1 between 0 and 5 lbs N per acre
- Stage 2 between 5 and 21 lbs N per acre
- No Stage 3

Figure 4



(10) [4 Pts] Calculate the marginal product of N fertilizer in the Table 1 below. That is, fill in the last column of the table.

Table 1

| Produce Wheat? | Change in N (lbs / acre) | Change in Wheat yield (bushels / acre) | Marginal Product of N |
|----------------|--------------------------|--|-----------------------|
| NO             | -----                    | -----                                  | -----                 |
| Yes            | 0 → 10                   | 23 → 24                                | 0.1                   |
| Yes            | 10 → 20                  | 24 → 30                                | 0.6                   |
| Yes            | 20 → 30                  | 30 → 34                                | 0.4                   |
| Yes            | 30 → 40                  | 34 → 36                                | 0.2                   |
| Yes            | 40 → 50                  | 36 → 37                                | 0.1                   |
| Yes            | 50 → 60                  | 37 → 36                                | -0.1                  |

(11) [1 Pt] Regarding Table 1, Stage 1 begins at 0 → 10 lbs of nitrogen per acre and ends at 10 → 20 lbs.

(12) [1 Pt] Stage 2 begins at 10 → 20 lbs

of nitrogen per acre and ends at

40 → 50 lbs.

(13) [1 Pt] Stage 3 begins at 50 → 60 lbs

of nitrogen per acre and ends at

50 → 60 lbs.

(14) [1 Pt] If a steer does not gain any weight during a day, we know that (if output is the animal weight and the input is 'days on feed') the animal is between stages (select one)

- a. 1 and 2
- b. 2 and 3
- c. 3 and 4

Use the following information to answer questions 15-18

Suppose that you are given the following marginal product formula for cattle in a feedlot: MP in lbs of animal weight per DOF =  $4.3 - 0.017(\text{DOF})$

(15) [1 Pt] What is the marginal product of DOF at 50 days? Round to two decimal places

MP = 3.45

$$MP = 4.3 - 0.017(50) =$$

(16) [1 Pt] According to this formula, the cattle can only be in what stages of production (select one)

- a. Stage 1 only
- b. Stage 2 only
- c. Stage 3 only
- d. Stages 1 and 2 only
- e. Stages 2 and 3 only
- f. Stages 1, 2, and 3

(17) [3 Pts] How many days on feed will result in the animal reaching its maximum weight? Show your work.

$$\text{set } MP = 0$$

$$4.3 - 0.017(MP) = 0$$

$$MP = \frac{4.3}{0.017} = 252.94 \text{ DOF}$$

(18) [5 Pts] Suppose the output price of live-cattle is \$1.1 per lb and the price of one DOF is \$0.6. Using algebra, calculate the profit maximizing number of days on feed, and show your work.

$$(1.1)(4.3 - 0.017(MP)) = 0.6$$

$$(1.1)(4.3) - (1.1)(0.017)(MP) = 0.6$$

$$- (1.1)(0.017)(MP) = 0.6 - (1.1)(4.3)$$

$$MP = \frac{(1.1)(4.3) - 0.6}{(1.1)(0.017)} = 220.46 \text{ DOF}$$

(19) [1 Pt] In Oklahoma, wheat is planted in the \_\_\_\_\_ and harvested in the \_\_\_\_\_. (select one)

- a. summer, fall
- b. spring, late fall
- c. fall, fall
- d. fall, summer
- e. spring, spring

(20) [1 Pt] If farmers attempt to graze cattle on wheat and then harvest wheat grain, they must remove the cattle from the field when ....? (select one)

- a. The wheat begins to form seeds
- b. The wheat develops its first hollow stem
- c. The wheat begins to flower
- d. The bees begin pollinating the wheat

(21) [2 Pts] Name a variable cost of wheat production. Be sufficiently specific so that we know it is a *variable* cost.

seed                      hourly labor  
fertilizer                land rental  
pesticides  
fuel

(22) [2 Pts] Name a fixed cost of wheat production. Be sufficiently specific so that we know it is a *fixed* cost.

land (if owned)  
machinery  
salary labor  
insurance

(23) [1 Pt] We say that firms should 'produce' (e.g., farmers should harvest wheat) whenever (select one) (below, 'price' refers to the output price, like the price of wheat for a wheat producer)

- a. Price > minimum average total cost
- b. Price > all average total costs for all possible output levels
- c. Price > minimum average variable cost
- d. Price > all average variable costs for all possible output levels
- e. Price > average total cost + average variable cost for all possible output levels

(24) [1 Pt] If revenues are greater than total variable cost, then it must be that price is greater than the average variable cost (select one)

- a. True
- b. False

(25) [2 Pts] If we take the marginal product of an input, and then multiply it by the price of the output, what do we call the resulting number?

marginal value product

→→Continue to next page→→

(26) [10 Pts] Fill in the missing cells below

|                      |     |            |
|----------------------|-----|------------|
| Price of wheat       | 3   | \$/ bushel |
| Price of nitrogen    | 0.2 | \$/ lb     |
| Fixed Costs          | 100 | \$/ acre   |
| Other Variable Costs | 50  | \$/ acre   |

| Produce wheat? | Nitrogen (lbs / acre) | Wheat yield (bushels / acre) | Cost of nitrogen application (\$ / acre) | Total fixed costs (\$ / acre) | Total variable costs (\$ / acre) | Total costs (\$ / acre) | Revenues (\$ / acre) | Profits (\$ / acre) |
|----------------|-----------------------|------------------------------|--|-------------------------------|----------------------------------|-------------------------|----------------------|---------------------|
| NO             | 0.00                  | -----                        | -----                                    | 100                           | -----                            | 100                     | -----                | (100)               |
| Yes            | 0.00                  | 20                           | -----                                    | 100                           | 50                               | 150                     | 60                   | (90)                |
| Yes            | 10.00                 | 25                           | 2  | 100                           | 52                               | 152                     | 75                   | (77)                |
| Yes            | 20.00                 | 30                           | 4  | 100                           | 54                               | 154                     | 90                   | (64)                |
| Yes            | 30.00                 | 34                           | 6  | 100                           | 56                               | 156                     | 102                  | (54)                |
| Yes            | 40.00                 | 35                           | 8  | 100                           | 58                               | 158                     | 105                  | (53)                |
| Yes            | 50.00                 | 35.5                         | 10                                       | 100                           | 50                               | 160                     | 106.5                | (53.5)              |

(28) [1 Pt] Should you produce wheat? (select one)

- a.  Yes  
 b.  No

(29) [1 Pt] If you answered 'no' to the previous question, you will automatically be awarded full credit for this question. If you answered

'yes', answer the following: The farmer should produce wheat, apply 40 lbs N per acre, harvesting 35 bushels per acre of wheat, and earning profits of \$ (53) per acre.

I should have stated it as follows: if you answered 'no' to the previous question and 'no' is the correct answer you get full credit. You don't get credit for #29 if you answer 'yes' to #28