AAE 320 Exam # 1 Review

Paul D. Mitchell

Goal

- Explain what to expect for exam
- Overview topics on exam
- Give idea of how to study

What to Expect

- Organization & format similar to previous exams
  - Mostly problems testing your knowledge of major concepts via mathematics
  - Other questions: true false and/or short answer, make graphs
  - Look at previous exams on the class page for example format and questions

Major Topics

- We have covered four major topics

1) Partial Budgeting

2) Economically optimal input use with a single input production function

3) Economically optimal input use with a two input production function

4) Cost Economics: opportunity cost and economically optimal output level

Partial Budgeting

Benefits:

1) What new revenue will be increased or added?
2) What costs will be reduced or eliminated?

Costs:

3) What will be the new or added costs?
4) What revenues will be reduced or lost?

Partial Budget:

Calculate Net Benefit = Benefits – Costs

Think Break #1, Problem Set # 1 Question 1

Single Input Production

- Examined economically optimal input use in tabular and functional forms
- Economic problem: Choose x to maximize

  $\pi = pf(x) - rx$
- Optimality condition: VMP = r or MP = r/p
- Tabular Approach: Think Brk #2 and #3, Problem Set #1 Question 2
- Calculus Approach : Think Brk #4 and #5, Problem Set #1 Question 3

Single Input Production

- You will want to know calculus, as there will be a problem like Think Break #5, or Problem Set #1 Question 3
- See Calculus review on homepage, plus notes and Think Break #4
- Remember: set up problem, find FOC, solve for input X, check SOC, then find output and net returns/profit.

Two Input Production

- Examined economically optimal input use in tabular and functional forms
- Economic problem: Choose x and y to maximize
  $\pi(x,y) = pf(x,y) - r_x x - r_y y$
- Optimality conditions: $VMP_x = r_x$ and $VMP_y = r_y$,
  plus $MP_x/MP_y = r_x/r_y$
- Ratio of MP's = Marginal Rate of Technical Substitution = Slope of Isoquant = $-\Delta Y/\Delta X$
  $-\Delta Y/\Delta X = r_x/r_y$ (notice the switch in x and y)
  Isoquant = Tradeoff Curve between Inputs

Two Input Production

- Know how to find economically optimal input combination
- Tabular approach: MRTS = input price ratio (Think Break #7, Problem Set #2 Question 1)
- Calculus approach: (Think Break # 8, Problem Set #2 Question 2
- Partial Derivatives review: Think Break #6
- Remember: set up problem, find FOC's, solve for inputs X and Y, check SOC, then find output and net returns/profit

Cost Economics

- We covered three topics in cost economics
- 1) Opportunity cost and economic profit
- 2) Different types of cost functions and their relations: TC, VC, FC, ATC, AVC, MC
- 3) Economically optimal output condition: P = MC and the connection between MC, min ATC, min AVC, profit and supply

Opportunity Cost, Marginal Cost and Average Cost

- What it means if economic profit is positive, zero, or negative
- Marginal cost as the supply curve, how marginal cost, average total cost and average variable cost relate
- How MC, ATC, AVC connect to profit being positive, zero, or negative
- How to draw the standard plot of MC, ATC, AVC
- Think Break #11, Problem Set #3 Question 2

Don’t Forget

- Don’t forget about the first few lectures, the special topics and Let’s Talk About It!
- Expect some true/false and/or short answer that test basic knowledge of these
  - Wisconsin Agriculture
  - Nitrogen and Agriculture
  - More-On Principle

How to Study

- Know the Think Breaks and the Problem Sets and how to work these types of problems
- Read over or do the old exams
- Exam will mostly be quantitative, focused on the optimality conditions and their use to make decisions on input(s)/output
- Expect more on the special topics lectures than in years past
- Email/call me with questions, we can meet in my office if needed