10.54- The Production Function

10.54- Demonstrate an understanding of the production function and phases of production.
By: Carter Greene

Kickoff:

❖ Go to Google Classroom and complete the assignment **"KO- 11/26"**
   ➢ The economics of Black Friday
❖ **Roll Call:** Will you go Black Friday shopping?

Announcements:

- ❖ **11/27-** Start Thanksgiving Break
- ❖ **12/3-** Have modules 52 - 55 read
- ❖ Enjoy your Thanksgiving Break
  - ➢ Watch lots of football and basketball

Quiz:

❖ 10 Questions
❖ 15 minutes
❖ NO TALKING EVEN WHEN YOU ARE DONE
❖ When you're done, work on the back of the worksheet from last Thursday
   ➢ "Cost, Cost, Cost and More cost"

Take 10…

❖ Discuss any Qs you missed on the quiz with people around you
❖ Work on completing "Cost, Cost, Cost, and more Cost" if you haven't already
❖ Then, see how much of the handout you can complete before we even go over notes
  ➢ Page 1 = review
  ➢ Pages 2 & 3 = new information

10.53- Profit Maximization

10.53- Determine the profit-maximizing level of output using the optimal output rule.
By: Carter Greene

Key Assumption:

❖ Cost numbers we discuss today include ALL COSTS
  ➢ Explicit and implicit
❖ Firms base their decisions of whether or not to stay open off of:
  ➢ Economic Profit
❖ Must make a Normal Profit

Again, our goal as a business is to... ?

❖ Maximize profits
❖ In order to do this, we need to sell the optimal __Quantity__ of our product at the optimal ___Price___.
❖ Price is set by the factors of what?
  ➢ Supply and Demand
❖ So let's figure out the quantity **our** firm should produce.
❖ In economics we always want to think on the __Margin__.

Marginal Analysis

❖ **Marginal Cost**
  ➢ Change in total cost from one more unit of output

$$MC = \frac{\text{Change in total cost}}{\text{Change in output}} = \frac{\Delta TC}{\Delta Q}$$

❖ **Marginal Revenue**
  ➢ Change in total revenue from the sale of an additional produce
  ➢ MR = Price

$$\text{Marginal Revenue} = \frac{\triangle \text{in TR}}{\triangle \text{in Q}}$$

Profit Maximizing Rule

❖ **MR = MC**
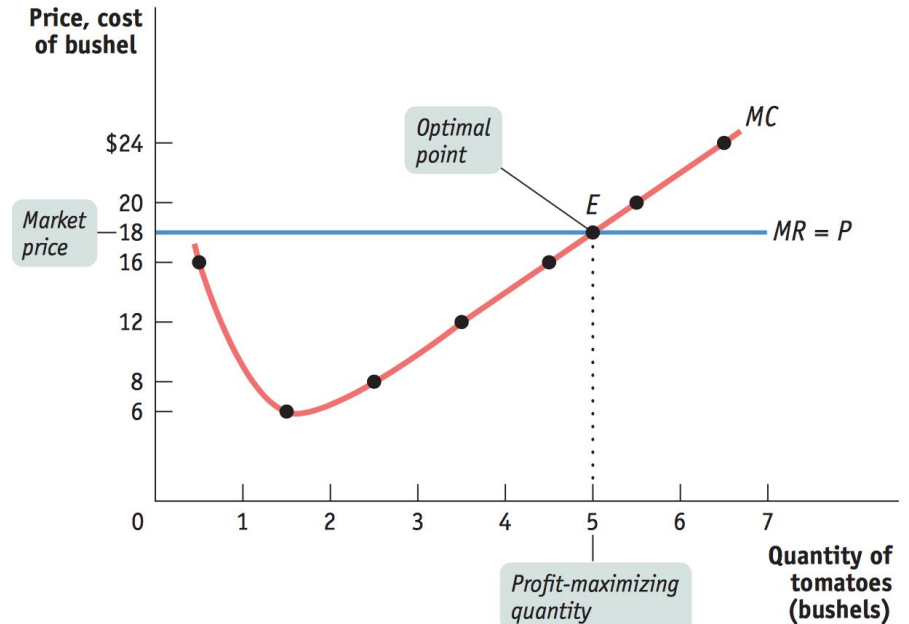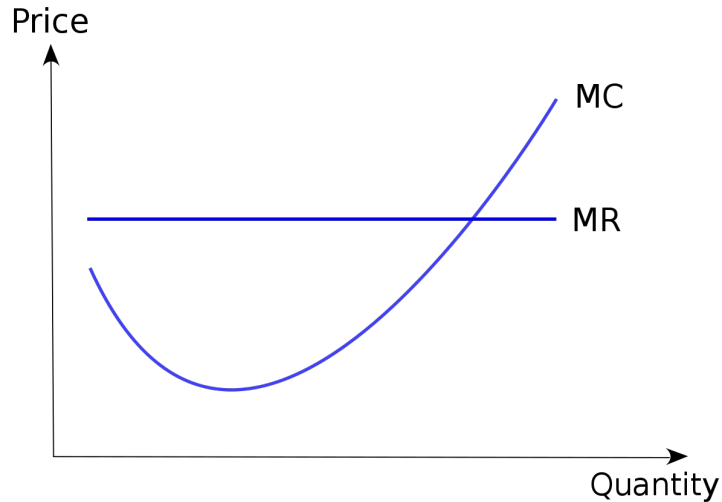 ➢ The most important rule in Microeconomics
❖ If MR > MC
  ➢ Keep frikin producing!!!
  ➢ Because what is increasing?
❖ If MR < MC
  ➢ Quit frikin producing!!!
  ➢ What's happening to Profit??

Profit Maximizing Quantity- Graphically

❖ Profit maximizing quantity = intersection of MC and MR

Price

MC

MR

Quantity

Price, cost of bushel

Optimal point

Market price

$24

20
18
16

12

8
6

E

MC

MR = P

0   1   2   3   4   5   6   7

Profit-maximizing quantity

Quantity of tomatoes (bushels)

Profit Maximizing Quantity- Looking at a Table

❖ Steps to finding optimal output:
  ➢ Find MC
  ➢ Identify MR
  ➢ Compare MR and MC
  ➢ Determine where MR and MC are equal

❖ Price = $20
❖ Find the profit maximizing quantity

Q	TC	MC	MR
0	20		
1	30		
2	35		
3	45		
4	60		
5	90		
6	130		

10.54- The Production Function & Intro To Cost

Demonstrate an understanding of the production function and phases of production.
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Fixed v. Variable Inputs

❖ <u>Fixed Inputs-</u> resources whose quantity cannot be easily/quickly varied
  ➢ Land, factories, etc.
❖ <u>Variable Inputs-</u> resource whose quantity can be easily/quickly changed
  ➢ Labor

Long-Run v. Short Run

❖ Long-Run
  ➢ All resources are variable and supply can adjust to changes in demand
❖ Short-Run
  ➢ At least one production input is fixed and supply cannot fully adjust to changes in demand
❖ Lets just focus on the Short-Run for now

Total v. Average v. Marginal Product

❖ <u>Total Product-</u> total output by all workers (inputs)
❖ <u>Average Product-</u>
  ➢ Output per worker
  ➢ Total output / variable input (workers)
❖ <u>Marginal Product-</u>
  ➢ Additional production of each new worker
  ➢ Change in output / change in input

Law of diminishing marginal returns (product)

❖ How many coaches are necessary for a team?

❖ Too many chefs in the kitchen?

❖ Law of diminishing marginal returns–

➤ as firms increase variable resources, additional production of each worker will decrease, *eventually*

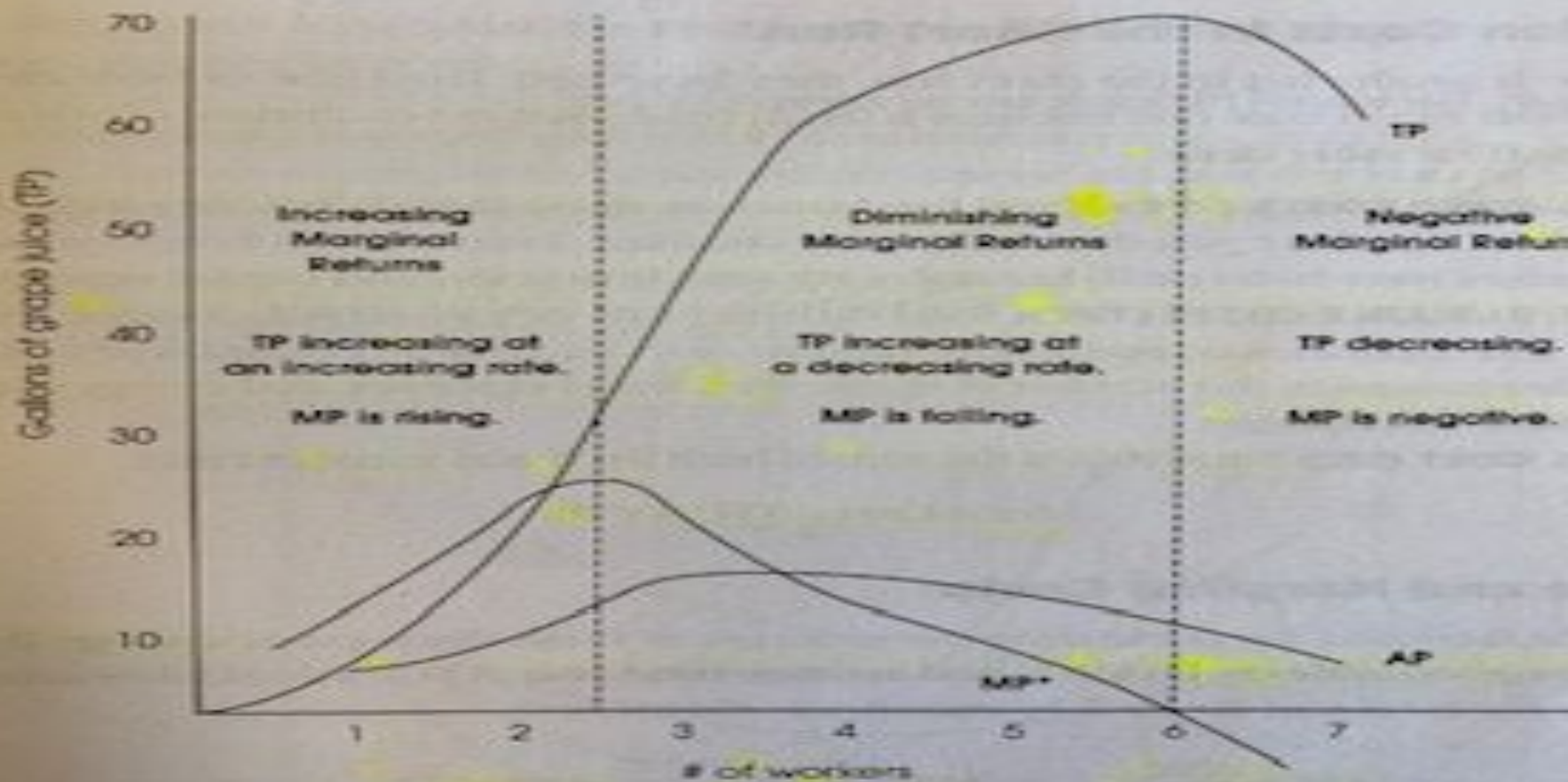# As input increases, what happens to output?

- ❖ Phase 1:
  - ➢ Increasing marginal returns
  - ➢ TP increases at increasing rate
  - ➢ MP is increasing
- ❖ Phase 2:
  - ➢ Diminishing marginal returns
  - ➢ TP increases at a decreasing rate
  - ➢ MP is falling
- ❖ Phase 3:
  - ➢ Negative marginal returns
  - ➢ TP is decreasing
  - ➢ MP is negative

10.53 & 10.54 Practice

❖ Staying in your seats, working with on partner if you wish
❖ Be sure to have Cost, Cost, Cost, and more Cost" finished as well
❖ If you finish early make sure you are caught up on the readings
  ➢ 10.52 – 10.54

Closure