

Instructions: Complete each of the following, which are based on your lecture notes. When asked to draw graphs, use a different graph for each problem.

1. Define 'short-run' and 'long-run' production, based on the variability of inputs. Also define 'variable' and 'fixed' inputs to production.
2. Draw a production function and label the regions of the function that represent production (i) increasing at an increasing rate, (ii) increasing at a decreasing rate, and (iii) decreasing.
3. Based on the production function (aka 'total product' curve) from (2), derive the MP and AP curves. Explain.
4. Using the TP curve, show how to derive the 'labor requirements' curve. Next explain how we go from this to the TVC curve. Finally, draw a new graph that illustrates TC, TVC, and TFC. Explain the relationships between the curves.
5. Using the TVC curve, draw a new graph that illustrates the related MC and AVC curves. Explain how this is done graphically.
6. Recalling that  $MRTS = \text{slope of isoquant} = \Delta K / \Delta L$ , show that  $MC = \frac{w}{MP_L}$ , and that  $AVC = \frac{w}{AP_L}$ .
7. What is the slope of the isocost line? Illustrate in a graph and explain.
8. What is the "golden rule of cost minimization"? Derive it and explain what it means.
9. Show and explain an expansion path.
10. Define and give an example for each of the following: economies of scale, diseconomies of scale, economies of scope, diseconomies of scope.
11. Explain the assumptions used in developing the model of perfect competition.
12. Draw graphs showing a firm operating in a market with perfect competition when the firm is (i) breaking even, or earning a normal rate of profit, (ii) earning an economic profit, and (iii) earning an economic loss. Make-up numbers for Q and P, and show the profit/loss area. Also calculate the amount of profit/loss, based on your graph and numbers. Finally, explain and define "breakeven" and "normal rate of profit" in the context of this model.
13. Illustrate and explain how the supply curve can be derived from the firm's graph illustrating profit maximizing production output at various prices.
14. Draw a graph illustrating a firm who is losing money, continues to operate, minimizing its loss. Explain a situation in which a firm would want to produce at a loss, rather than not produce at all.
15. Draw a graph of a typical firm and an industry market (with supply and demand). Illustrate and explain what happens in the market if at the initial price, the typical firm is earning an economic profit. Show and explain how the two graphs will adjust toward market equilibrium.
16. Draw a graph illustrating a monopoly firm that is maximizing its profit.
17. Explain the three types of price discrimination. Give examples of each that you have experienced in your life. What conditions are required for price discrimination to be successful?
18. Draw a graph illustrating price discrimination and two different groups of consumers. Explain.