Lab 5 Questions for ECON 2101-001 (Intermediate Microeconomics)

Week of May 31 , 2017

1. A firm can employ two inputs with the production function $y=2z_1 + 5z_2$, where one could think of z_1 as low-skilled workers and z_2 as high skilled workers. Let $w_1=4$ and $w_2=8$. The firm is in a long-run situation.

    - How can one tell that one of these workers is low skilled and one is high skilled?
    - How much of each input will the firm use? What will be the long run total cost function, C(y)?
    - Draw an isocost-isoquant diagram showing the firm's choice when y=10.
    - Re-calculate the firm's choice when w_2 rises to $12. Show on a diagram. Show that the cost of producing y=10 is higher now.

2. A firm produces widgets, y with the production function $y=(z_1\, z_2)^{1/2}$, where z_1 is workers and z_2 is robots. Let $w_1=18$ and $w_2=8$.

    - Accurately draw the isoquant for y=6.
    - Assume the firm is in a short run where $z_2=9$. Find the short-run cost curves: TC, VC, F, AVC, AFC, AC. Accurately draw these along with MC=40y (you will need 2 diagrams). At what y is AC=MC?
    - When y=12, how much z_1 will the firm use? What will its total cost be?
    - Assume the firm is in different short run where $z_2=16$. When y=12, how much z_1 will the firm use? What will its total cost be? Is this higher or lower than before?

3. Suppose a firm has the production function $y=(z_1z_2)^a$, where "a" is a constant that is bigger than 0 but no bigger than 1. Let $w_1=w_2=1$. The firm is in a long-run situation. Given: $TRS=z_2/z_1$, regardless of a.

    - For the cases of a=1/4, 1/2 and 1, explain what are the returns to scale.
    - For the cases of a=1/4, 1/2 and 1, find the input demands for each input, and the C(y).
    - For each case, draw the C(y) and LAC(y) functions. What do you notice about the shapes of these functions and the returns to scale?