

1. You own a Christmas tree farm and it is December. All of your trees are 5 feet tall and you can sell them for \$50 each. Next year they will be 6 feet tall and you can sell them for \$60. The interest rate is 10%.
 - (a) What is the present value of a tree if you harvest them next year? Should you harvest now or next year? (5 points)
 - (b) What is the rate of return to waiting until next year to harvest the trees? (5 points)
 - (c) It now turns out that your trees will grow one foot per year for as long as you let them and that the price of trees goes up by \$10 per foot of length. What is the profit-maximizing height at which to harvest the trees? Explain. (5 points)
2.
 - (a) Define and compare decreasing returns to scale and the law of diminishing returns. (5 points)
 - (b) Assume that the law of diminishing returns applies. Please draw a firm's average cost curve and marginal cost curve on the same graph. Explain why they have the shapes that you drew. (5 points)
 - (c) Following part 2b, please use whatever tools necessary to indicate the optimal output level and the profit level when the price is P. (Draw your graph so that P is greater than minimum average cost.) (5 points)
 - (d) Following part 2c, now assume that, for some reason, the aggregate labor supply curve shifts to the left. How will the wage rate change? Will this change affect the short run average cost curve and marginal cost curve? How will the long run output price change? (5 points)
 - (e) In the following table, you will find the firm's total cost at each output level. Assume that the price is \$100 and that the output level must be an integer. Please find the optimal level of output and explain.

Output	Total Cost
1	50
2	100
3	170
4	250
5	350
6	470
7	600