

EXERCISES CHAPTER 14

Exercise 1. Assume a firm is a price-taker. For each of the following cost functions below, confirm the firm has increasing marginal costs. For output price $p = 300$, set up the profit function, and determine the optimal y^* and the profit earned by producing y^* .

- (a) $c(y) = y^2$
- (b) $c(y) = y^2 + 10$
- (c) $c(y) = y^3$

Exercise 2. Suppose a firm has cost function $c(y) = 2\sqrt{y}$ and that they are a price-taker with fixed output price $p = \frac{1}{2}$.

- (a) Show the cost function has **decreasing** marginal cost.
- (b) What y^* makes marginal profit zero?
- (c) What profit does the firm earn by producing y^* ?
- (d) Pick some other output values around y^* and use a calculator to determine the profit for those values.
- (e) Does y^* appear to be an output that actually maximizes profit?

Exercise 3. Consider a firm with the production function

$$f(x_1, x_2) = x_1^{\frac{1}{2}} x_2^{\frac{1}{2}},$$

Assume $w_1 = 4$, $w_2 = 1$, and output price $p = 16$, answer the following:

- (a) Suppose, in the short run, x_2 is fixed at 4.
- (b) What is the firm's short-run cost function?
- (c) Determine the profit-maximizing level of and output y in the short run. How much profit do they make in the short run?
- (d) Through cost-minimization, determine the firm's long run cost function.
- (e) Is long run marginal cost decreasing, increasing, or constant?
- (f) Why is there no long-run profit maximizing level of output?