

EXERCISES CHAPTER 13

Exercise 1. Suppose $w_1 = 1$, $w_2 = 2$ and the production function is $x_1 + x_2$. What is the cost minimizing bundle for producing output $y = 10$? What is the cost of this bundle?

Exercise 2. Suppose $w_1 = 1$, $w_2 = 2$ and the production function is $3x_1 + 5x_2$. What is the cost minimizing bundle for producing output $y = 10$? What is the cost of this bundle?

Exercise 3. Suppose $w_1 = 1$, $w_2 = 2$ and the production function is $\min\{\frac{1}{2}x_1, x_2\}$. What is the cost minimizing bundle for producing output $y = 10$? What is the cost of this bundle?

Exercise 4. Suppose $w_1 = 1$, $w_2 = 2$ and the production function is x_1x_2 . What is the cost minimizing bundle for producing output $y = 10$? What is the cost of this bundle?

Exercise 5. Suppose $w_1 = 1$, $w_2 = 2$ and the production function is $\max\{x_1, x_2\}$. What is the cost minimizing bundle for producing output $y = 10$? What is the cost of this bundle?

Exercise 6. For each of the following production functions, find the conditional factor demands, cost function, and marginal cost. Is marginal cost constant, increasing, or decreasing.

- (a) $f(x_1, x_2) = x_1x_2$
- (b) $f(x_1, x_2) = x_1^{\frac{1}{3}}x_2^{\frac{1}{3}}$
- (c) $f(x_1, x_2) = \min\{x_1, x_2\}$

Exercise 7. What is the short-run cost function for producing output y when x_2 is fixed at $x_2 = 1$?

- (a) $f(x_1, x_2) = x_1x_2$
- (b) $f(x_1, x_2) = x_1^{\frac{1}{3}}x_2^{\frac{1}{3}}$

Exercise 8. A firm has perfect substitutes production function $f(x_1, x_2) = 2x_1 + 3x_2$. Assume $w_1 = 2$, $w_2 = 4$.

- (a) Sketch the firm's isoquant for producing output $y = 12$.
- (b) What is the cost of using only x_1 to produce $y = 12$? What about using only x_2 ?
- (c) What are the firm's conditional factor demands for producing output y at these input prices?
- (d) What is the firm's cost function for producing output y ?

Exercise 9. Consider a firm with the production function

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

Assume $w_1 = 1$, $w_2 = 1$.

- (a) Suppose, in the short run, x_2 is fixed at 4, what is the firm's short-run cost function?
- (b) What is the firm's long-run cost function?
- (c) Show that for output $y = 4$, the short-run and long-run costs are the same.
- (d) Show that for output $y = 2$, the short-run cost is greater than the long-run cost.