Chapter 19 Question
A firm has two variable factors and a production function, \( f(x_1, x_2) = x_1^{1/2} x_2^{1/4} \). The price of its output is 4. Factor 1 receives a wage of \( w_1 \) and factor 2 receives a wage of \( w_2 \).

(a) Write an equation that says that the value of the marginal product of factor 1 is equal to the wage of factor 1.

(b) Write an equation that says that the value of the marginal product of factor 2 is equal to the wage of factor 2.

(c) Solve two equations for the two unknowns, \( x_1 \) and \( x_2 \), to give the amounts of factors 1 and 2 that maximize the firm’s profits as a function of \( w_1 \) and \( w_2 \).

(d) If the wage of factor 1 is 2, and the wage of factor 2 is 1, how many units of factor 1 will the firm demand?

(e) If the wage of factor 1 is 2, and the wage of factor 2 is 1, how many units of factor 2 will the firm demand?

(f) How much output will the firm produce?

(g) How much profit will the firm make?