Quiz 4: Production and Costs

A firm has production function:

\[ F(K, L) = K + \sqrt{L} \]

(i) What is the marginal product of labor? Is there diminishing marginal product of labor?

(ii) What is the marginal product of capital? Is there diminishing marginal product of capital?

(iii) Are there increasing, constant or decreasing returns to scale?

(vi) What is the total short run cost \( SRC_K(w, r, Q) \) of producing \( Q \) units of output when \( w \) is the wage rate of labor and \( r \) is the rental price of capital given that capital is fixed at \( K \)?

(v) What is the total long run cost \( C(w, r, Q) \)? Is the cost-minimizing demand for labor always increasing in \( Q \)? Give an economic intuition for your answer.