EE211 Section 1
Homework 3 due on April 21st, 2025 (Email: kaewkwanee211@gmail.com)
Explain your answers with graph in details.

1. Draw a production function that exhibits diminishing marginal product of labor. Draw the associated total cost curve (in both cases, be sure to label the axes.) Explain the shapes of the two curves you have drawn.
2. Define total cost, average total cost, and marginal cost. How are they related?
3. How and why does a firm's average-total-cost curve in the short run differ from its average-total-cost curve in the long run?
4. Define economies of scale and explain why they might arise?
5. Define diseconomies of scale and explain why they might arise?
6. Nimbus, Inc. makes brooms and sells them door-to-door. Here is the relationship between the number of workers and Nimbus's output during a given day.

Workers	Output	Marginal product	Total cost	Average Total Cost	Marginal Cost
0	0				
1	20				
2	50				
3	90				
4	120				
5	140				
6	150				
7	155				

   a. Fill in the column of marginal products. What pattern do you see? How might you explain it?
   b. A worker costs $100 a day, and the firm has fixed costs of $200. Use this information to fill in the column for total cost.

c. Fill in the column for average total cost. What pattern do you see?
d. Now fill in the column for marginal cost. What pattern do you see?
e. Compare the column for marginal product with the column for marginal cost. Explain the relationship.
f. Compare the column for average total cost with the column for marginal cost. Explain the relationship.

7. Consider the following cost information for a pizzeria:

Quantity	Total Cost	Variable Cost
0 dozen pizzas	$300	$0
1	350	50
2	390	90
3	420	120
4	450	150
5	490	190
6	540	240

a. What is the pizzeria's fixed cost?
b. Construct a table in which you calculate the marginal cost per dozen pizzas using the information on total cost. Also calculate the marginal cost per dozen pizzas using the information on variable cost. What is the relationship between these sets of numbers? Explain.

8. Consider the following table of long-run total costs for three different firms:

Quantity	1	2	3	4	5	6	7
Firm A	$60	$70	$80	$90	$100	$110	$120
Firm B	11	24	39	56	75	96	119
Firm C	21	34	49	66	85	106	129

Does each of these firms experience economies of scale or diseconomies of scale? Explain.