1. Consider a competitive firm that produces peanuts. The fixed cost is $2. The variable cost of peanuts is given by the function

\[ vc(q) = \frac{q^2}{2} \]

where \( q \) represents the number of units produced.

(a) What is the total cost function? Draw it.
(b) Calculate and draw the average total cost function and the average variable cost function.
(c) Calculate and draw the marginal cost function.
(d) If the price of one unit of peanuts was $4, what would the profit maximizing level of output be? What would the corresponding level of profits be?
(e) If the price of one unit of peanuts was $6, what would the profit maximizing level of output be? What would the corresponding level of profits be?
(f) If the price of one unit of peanuts was $1, what would the profit maximizing level of output be? What would the corresponding level of profits be? Should the firm produce peanuts in this case, or not? Why?
(g) Draw the supply function. Can you its mathematical formula?

2. Prove that the supply function cannot be decreasing.