Short answer questions — you must show your work

1. \( \text{2 marks} \) Find the absolute maximum of \( f(x) = e^{x^3 - 27x} \) on the interval \([0, 4]\).

Answer:

2. \( \text{2 marks} \) The cost function of making \( x \) candle-holders a week in your factory is given by \( C(x) = 500 + 6x + \frac{4}{x} \) dollars. What is the marginal cost of making the 401\textsuperscript{st} candle?

Answer:

3. \( \text{2 marks} \) A vending machine stands in an office buildings and sells \( q \) cans of soft drink an hour for the price of \( p \) dollars a can and the demand equation is given by \( p^3q + q^2 = 72 \). Currently the machine vends 8 cans an hour for $1 a can. Use the price elasticity of demand to determine whether the price of a can should be lowered or raised in order to increase their revenue.

Answer:
Long answer question — you must show your work

4. [4 marks] A kite is flying 30 meters above the ground when the wind starts to blow it away in a direction parallel to the ground at the rate of \(3 \frac{m}{sec}\). At what rate must the string be let out when the length of string already let out is 60 meters?

Answer: