Essentials of Calculus

Homework 4.4

Profit

1. It costs a company $C(q) = 200 + 20q$ dollars to make q objects, which it can sell for $R(q) = 1000q - 2q^2$ dollars.

   a) What is the profit function?

   Numeric answer: $\pi(q) = -2q^2 + 980q - 200$ dollars

   b) How many objects should the company make to maximize profits?

   Numeric answer: $q = 245$ objects

2. It costs a company $C(q) = 500 + 5q^2$ dollars to make q things, which it can sell for $R(q) = 100q$ dollars.

   a) What is the profit function?

   Numeric answer: $\pi(q) = -5q^2 + 100q - 500$ dollars

   b) How many things should the company make to maximize profits?

   Numeric answer: $q = 10$ things

3. It costs a company $C(q) = 10000 + 10000q + 5q^2$ dollars to make q objects, which it can sell for $R(q) = 40000q - 5q^2$ dollars.

   a) What is the profit function?

   Numeric answer: $\pi(q) = -10q^2 + 30000q - 10000$ dollars

   b) How many objects should the company make to maximize profits?

   Numeric answer: $q = 1500$ objects

   c) If it can only make up to 10000 objects, how many objects should the company make to maximize profits?

   Numeric answer: $q = 1500$ objects

d) If it can only make up to 1000 objects, how many objects should the company make to maximize profits?

Numeric answer: q = 1000 objects

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