Solutions to Quiz 2

MATH 139-02
Tuesday, January 26, 2004

1. Tasty Fire inc. makes cinnamon flavored candies. They have fixed costs of $12,000 and variable costs of $0.28 per box of candy.

   (a) Find a cost function $C(q)$ giving the cost for Tasty Fire to produce q boxes of candy.

   Solution: $C(q) = 12000 + 0.28q$.

   (b) If Tasty Fire sells a box of candy for $1.95 per box, determine the revenue function $R(q)$.

   Solution: $R(q) = 1.95q$.

   (c) Find the profit function for Tasty Fire.

   Solution: The profit function is $P(q) = R(q) - C(q) = 1.95q - (12000 + 0.28q) = 1.67q - 12000$.

   (d) What is the break-even point?

   Solution: The break-even point occurs when $P(q) = 0$, or, equivalently, when $R(q) = C(q)$. We get $1.67q - 12000 = 0$, or $1.67q = 12000$. Solving for q gives $q = \dfrac{12000}{1.67} \approx 7185.6$, so Tasty Fire needs to sell about 7186 units to break even.

2. A $400,000 office building is depreciated linearly over 25 years. Find its value as a function of time.

   Solution: The value of the building after 25 years is $0, so the points $(0, 400000)$ and $(25, 0)$ lie on the depreciation line. The slope of this line is therefore $\dfrac{400000 - 0}{0 - 25} = -16000$. The starting value of $400000 is also the y-intercept, so we have a value V after t years of $V(t) = 400000 - 16000t$.