1) Assume that each of the following can be expressed as a linear cost function. Find that linear function.

   a) For a 1-day rental a car rental firm charges $35 plus $0.20 per mile.

   $$C(x) = 35 + .20x$$

   b) You know that your marginal costs are $120, and that 100 items cost $15,000 to produce.

   $$C(x) = 120x + b$$
   $$15000 = C(100) = (120)(100) + b \qquad b = 3000$$
   $$15,000 = 12000 + b \qquad \boxed{C(x) = 120x + 3000}$$

2) The total cost (in dollars) of producing x ink cartridges is $C(x) = 24x + 18,000$. It is also known that each cartridge can be sold for $28.

   a) What are the fixed costs?

   $$18,000$$

   b) What is the total cost of producing 10,000 cartridges?

   $$C(10,000) = 240,000 + 18,000$$
   $$= 258,000$$

   c) What is the average cost per cartridge when 10,000 cartridges are made?

   $$\frac{258,000}{10,000} = 25.8$$

   d) What is the revenue function?

   $$R(x) = 28x$$

   e) What is the break-even point?

   $$28x = 24x + 18,000 \qquad\qquad x = 4,500$$
   $$4x = 18,000$$

   f) What is the profit function?

   $$P(x) = R(x) - C(x)$$
   $$= 28x - (24x + 18,000)$$
   $$= 4x - 18,000$$