Math 121C
Fall 2009
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Applied Calculus I
Quiz 1
Write your name on this quiz

You produce and sell instruction manuals for how use a hammer. Your factory has \$220 in fixed operating costs, and it costs you a total \$270 to produce 10 hammer manuals. You sell the manuals for \$10 each to local hardware stores.

1. How many hammer manuals must you sell in order to NOT lose money?
2. How many manuals must you sell in order to profit \$770?

① Find the cost function first:

$$C(x) = mx + b \rightsquigarrow mx + 220$$

m: marginal cost

b: fixed costs

$$\left.\begin{array}{l} C(10) = m \cdot 10 + 220 \\ \quad \| \\ 270 \end{array}\right\} \rightarrow 270 = m \cdot 10 + 220$$

$$\downarrow$$

$$50 = m \cdot 10$$

$$\downarrow$$

$$5 = m$$

So $\left.\begin{array}{l} C(x) = 5x + 220. \\ R(x) = 10x. \end{array}\right\} \rightarrow$ Profit $= R(x) - C(x)$

$$= 10x - (5x + 220)$$

$$\downarrow$$

$$P(x) = 5x - 220$$

When is $P(x) = 0$?

$$0 = 5x - 220 \rightarrow 220 = 5x \rightarrow \boxed{44 = x}$$

$\boxed{\text{So 44 manuals to break even.}}$

(2) When is $P(x) = 770$?

$$770 = 5x - 220$$

$$990 = 5x$$

$$\frac{990}{5} = x$$

$$\boxed{198 \text{ manuals}}$$