Sheet #440. Maximizing Profit

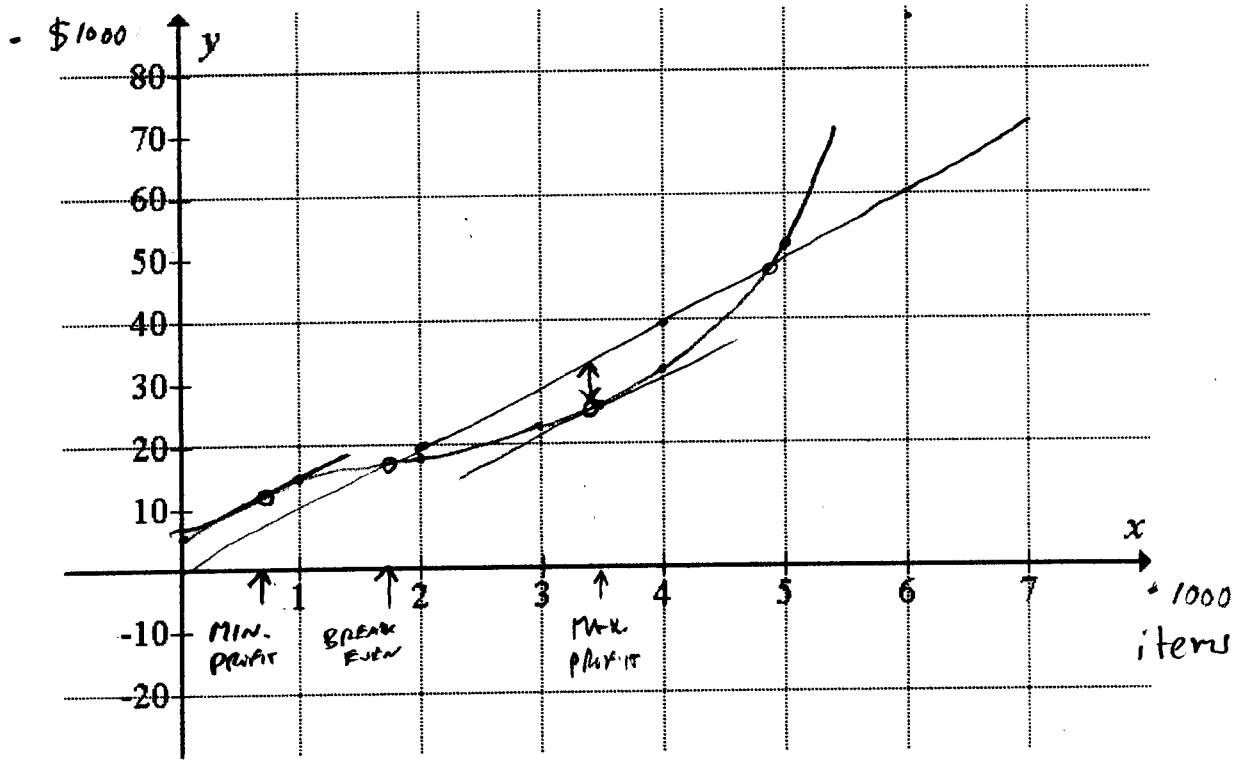
Name: KEY Period: ____

A company wants to maximize its profit. Let $x = q$ be the number of items sold in **thousands** (same as produced).

Cost (in thousands of dollars) = $C = x^3 - 6x^2 + 15x + 5$.

Revenue (in thousands of dollars) = $R = 10x$

a) Graph the functions C and R in the window [0, 7] by [-20, 80].



b) What are the fixed costs? $5000

c) What is the price per item? $10

d) For what x does the company break even? 1850

e) Looking at the graph, approximately for what x is the profit maximized? (ESTIMATE 3530)

f) Find x at the maximum profit. What is maximum profit? 3,530 $81,200

144
- 60
84
4·21

g) Graph the Profit = $\Pi = R - C$ to confirm your answer.

h) What algebraic equation do you need to solve for maximum profit? (If you run out of time, don't solve it)

$R' = C'$ $10 = 3x^2 - 12x + 15$

$3x^2 - 12x + 5 = 0$

$x = \frac{12 \pm \sqrt{(12)^2 - 4 \cdot 3 \cdot 5}}{6}$

$= 2 \pm \frac{\sqrt{84}}{6}$

$= 2 \pm \frac{1}{3}\sqrt{21}$

$= \begin{cases} 3.528 \\ 0.472 \end{cases}$

i) What is the meaning of the two solutions to the above equation?

$x = .472$ at MINIMUM PROFIT / MAXIMUM LOSS