7.1 day 2

Ex 1) Use a graphing utility to graph the cost and revenue functions in the same viewing window. Find the sales x necessary to break even (R = C) and the corresponding revenue R obtained by selling x units. Round to the nearest whole unit.

Profit = R − C

Cost = C = 8650x + 250,000
Revenue = R = 9950x

X ≈ 192 sales

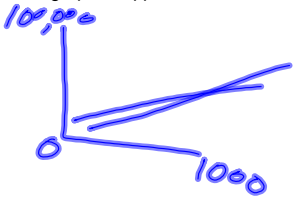
Ex 2) **Break-Even Analysis**: A small software company invests $16,000 to produce a software package that will sell for $55.95. Each unit can be produced for $35.45.

A) Write the cost and revenue functions for x units produced and sold.

C = 35.45x + 16000

R = 55.95x

B) Use a graphing utility to graph the cost and revenue functions in the same viewing window. Use the graph to approximate the number of items sold to break even.



X = 780.5

X ≈ 781 units

C) Verify the results algebraically.

$35.45x + 16000 = 55.95x$
$-35.45x \quad -35.45x$
$\frac{16000}{20.5} = \frac{20.5x}{20.5}$
$780.5 = x$
$781 = x$

Ex 3) **Sales**: The table shows the sales S (in billions of dollars) for grocery stores and general merchandise stores from 1995 to 2001.

Year	Grocery Sales, S_1	~~Grocery Sales, S_2~~ ⇒ General merchandise
1995	356.9	300.6
1996	366.1	315.4
1997	373.1	331.5
1998	382.4	351.5
1999	401.8	381.4
2000	415.3	405.9
2001	425.4	430.5

a) Use the regression feature of a graphing utility to find the quadratic models for the data. Let x represent the year, with x = 5 corresponding to 1995.

$S_1 = 0.681x^2 + 0.98x + 334.5$ $S_2 = 1.31x^2 + 1.06x + 261.37$

b) Use a graphing utility to graph the models with the original data in the same viewing window.

c) Use the graph in part (b) to determine the year in which general merchandise store sales exceeded grocery store sales.

$x = 10.7$ in year 2000

d) Algebraically determine the year in which general merchandise store sales exceeded grocery store sales.

e) Compare your results from (c) and (d).