

NAME: KEY UIN: _____ Score: _____ / 10 points

Linear Cost, Revenue, and Profit Models

What is your seat number (on the back of the chair)? _____

You must work with at least one other person on this activity. List their names and seat numbers below:

The cost to make a sofa is \$600 per sofa plus a fixed setup cost of \$4,500. Each sofa sells for \$750.

1. What is the cost to manufacture 20 sofas? $\$4500 + 20 * 600 = 16,500$

Hint: Remember to include the setup cost along with the manufacturing cost for 20 sofas at \$600 each.

2. What is the cost to manufacture x sofas? $C(x) = 4500 + 600x$

3. How much revenue is generated from selling 20 sofas at \$750 each? $\$750 * 20 = 15000$

4. How much revenue is generated from selling x sofas? $R(x) = 750x$

5. How much profit does the company gain (or lose) by making and selling 20 sofas? $\$15000 - \16500

Checkpoint: Did you find that the company **loses \$1500**? If not, subtract the answer to 1 from 3.

6. How much profit is gained or lost from selling x sofas? $P(x) = 750x - (600x + 4500) = 150x - 4500$

- **Total Cost function: $C(x) = cx + F$ gives the total cost for making x units at a unit cost of c and fixed costs F . This is the money paid out by the company.**
- **Revenue function: $R(x) = sx$ gives the total revenue from making and selling x units at the selling price s . This is the money brought in by the company.**
- **Profit function: $P(x) = R(x) - C(x) = sx - (cx + F) = (s - c)x - F$ gives the total profit from making and selling x units. This is the net amount of money the company will have after paying all of its expenses.**

The linear Cost, Revenue, and Profit functions for this problem are:

$$C(x) = 600x + 4500$$

$$R(x) = 750x$$

$$P(x) = 150x - 4500$$

Hint: These are the same functions you should have found in 2, 4 and 6.

7. How many sofas must be sold in order to have a profit of \$12,000? **110** sofas

8. Which of these three linear models has a positive y-intercept? **C**

Why? **The y-intercept is when $x=0$. When $x=0$, we have fixed costs F , which are positive.**

9. Which of these three linear models contains the origin? **R**

Why? **When no items are sold ($x=0$), the revenue is zero.**

10. Which of these three linear models has a negative y-intercept? **P**

Why? **When no items are made and sold, you lose your fixed costs.**