

Linear Cost, Revenue, and Profit Models

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? \$ _____
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? $C(x) =$ _____
3. How much revenue is generated from selling 20 sofas at \$750 each? \$ _____
4. How much revenue is generated from selling x sofas? $R(x) =$ _____
5. How much profit does the company gain (or lose) by making and selling 20 sofas? \$ _____
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? $P(x) =$ _____

- **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? _____ sofas
8. Which of these three linear models has a positive y-intercept? _____ Enter C, R or P
Why? _____
9. Which of these three linear models contains the origin? _____ Enter C, R or P
Why? _____
10. Which of these three linear models has a negative y-intercept? _____ Enter C, R or P
Why? _____