

Linear Cost, Revenue, Profit, Supply, and Demand

Complete the following questions to investigate different types of linear models. Record your responses on this worksheet

The cost to manufacture 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 manufacturer gain (or lose) by manufacturing 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 does the manufacturer gain (or lose) by manufacturing and selling x sofas?

$P(x) =$ _____

- $C(x) = cx + F$, the *Total Cost function*, gives the total cost for manufacturing x units at a unit cost of c and fixed costs F . (The money paid out by the company.)
- $R(x) = sx$, the *Revenue function*, gives the total revenue realized from manufacturing and selling x units at the selling price s . (The money brought in by the company.)
- $P(x) = R(x) - C(x) = sx - (cx + F) = (s - c)x - F$, the *Profit function*, gives the total profit realized from manufacturing and selling x units. (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

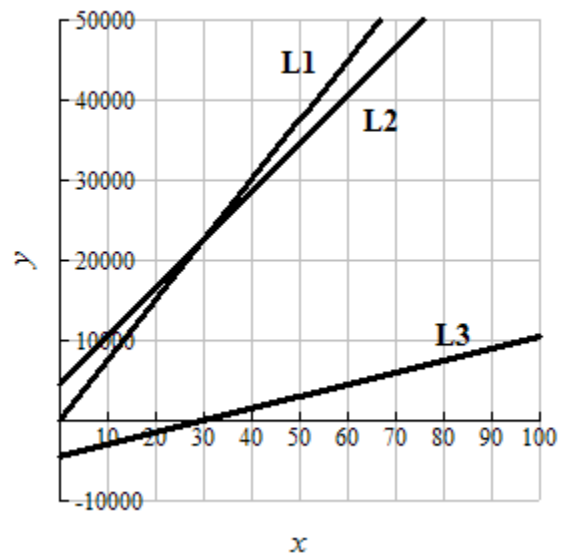
8. The Cost, Revenue, and Profit functions are graphed below on the same grid.

Determine which graph corresponds to each function.

$C(x)$: _____

$R(x)$: _____

$P(x)$: _____



9. Which of these three linear business models should always contain the origin? Why?

_____ should always contain the origin because _____