Math 1313
Chapter 1 – Section 1.4
Part II – Break-Even Analysis

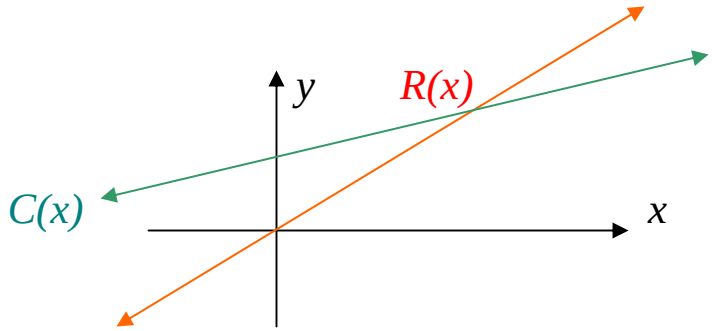
The **break-even level of operation** is when a company neither makes a profit nor sustains a loss.

Note: The break-even level of operation is represented by the point of intersection of the revenue function and the cost function.

The break-even level of production means the profit is **zero**.

Hence, $P(x) = R(x) - C(x) = 0 \Rightarrow R(x) = C(x)$.

Consider the following graph:



The point of intersection of *R(x)* and *C(x)* is referred to as the **break-even point**, (x_o , y_o).

x_o is the break-even quantity.

y_o is the break-even revenue.

If $x < x_o$, then $R(x) < C(x)$; therefore, $R(x) - C(x) = P(x) < 0$ and so this results in a **loss**.

If $x > x_o$, then $R(x) > C(x)$; therefore, $R(x) - C(x) = P(x) > 0$ and so this results in a **profit**.

Example 1: The Toyco Company has a monthly fixed cost of $84,000 and a production cost of $8 for each unit produced. The product sells for $20 per unit.

a. Find the break-even point for the company.

b. If the company produces and sells 2,000 units, would they have a profit or a loss?

c. If the company produces and sells 10,000 units, what would be the profit or loss?

Example 2: A company's profit function is $P(x) = 16x - 200{,}000$. Find the break-even quantity.

Example 3: A company has a cost function given by $C(x) = 10x + 100{,}000$ and each unit sells for \$30. Find the break-even revenue.

Example 4: A company has a cost function given by $C(x) = 15x + 175{,}000$ and a revenue function given by $R(x) = 25x$. How many units need to be produced and sold in order to obtain a profit of \$25,000?