

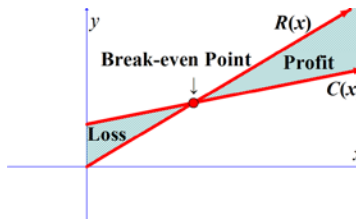
## Section 1.5B Break Even Analysis

When a company neither makes a profit nor sustains a loss this is called the **break-even level of operation**.

**Note:** The break even level of operation is represented by the point of intersection of two lines.

The break even level of production means the profit is zero. This means  $P(x) = R(x) - C(x) = 0$ , which implies that  $R(x) = C(x)$ .

Consider the following graph:



The point of intersection above,  $(x_o, y_o)$ , is referred to as the break-even point.

$x_o$  = break even quantity

$y_o$  = break even revenue

If  $x < x_o$  then  $R(x) < C(x)$ . Hence,  $P(x) = R(x) - C(x) < 0$  which indicates a LOSS.

If  $x > x_o$  then  $R(x) > C(x)$ . Hence,  $P(x) = R(x) - C(x) > 0$  which indicates a PROFIT.

Example 1: A company has a break-even point of (1,575, \$125,000). If it produces and sells 2,000 units would the company make a profit or sustain a loss? How do you know?

Example 2: A company has a profit function of  $P(x) = 32x - 300,000$ .

a. What is the break even quantity?

b. How many units must the company produce and sell to make a profit of \$84,000?

Example 3: Find the break-even quantity and break-even revenue if  
 $C(x) = 62x + 375000$  and  $R(x) = 32x$

*break-even quantity:*

*break-even revenue:*

Example 4: The XYZ Company has a fixed cost of 200,000, a production cost of \$12 for each unit produced and a selling price of \$20 for each unit produced.

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

*break-even quantity:*

*break-even revenue:*

b. If the company produces and sells 33,000 units, would it have a profit or loss?

c. If the company produces and sells 40,000 units, what would be the profit?

Example 5: *Iota Airplane Supplier* manufactures a certain airplane part for small airplanes. Each part sells for \$250 and the variable cost of producing each unit is 42% of the selling price. The manufacturer's monthly fixed cost is \$638,000. What is the manufacturer's break-even point?