The break-even point is that magic place where costs and revenue are exactly equal. In the graph below, it is where revenue line intersects the variable costs line. Anything above this intersection is profit, anything below it is loss. The graphical method is the simplest way to determine the break-even point, but it is not very precise. You should therefore also be familiar with at least one other approach to break-even analysis, the contribution method.

The price for any product or service must cover three cost factors:

1. some portion of overall fixed costs (the size of this portion is a management decision).
2. the variable costs associated with providing each unit of the product or service (if you don’t recover variable costs, you will lose money each time a unit is sold).
3. profit (again, the desired profit margin is a management decision).

To use the contribution method, you must therefore know the following:

- *the portion of overall fixed costs to be recovered* through sales of a specific product or service, which may be stated (a) as a flat sum (e.g., $100) or (b) as a percent of total fixed costs (e.g., 5%) in which case you will need to know both the percent and the total fixed costs – e.g., 5% of $100).
• variable costs for each unit of the product or service, stated as a flat sum.
• the actual or proposed sales price of one unit.
• the desired profit per unit, stated either as a flat sum (e.g., $0.50) or as a percentage of the sales price (e.g., 3%).

Using the contribution method, you can precisely determine two important pieces of information:

1. how many units of a particular product must be sold to break-even
2. how much sales revenue must be generated to break-even.

The increased precision of the contribution method is a great advantage over the graphical method to calculate the break-even point.

To use the contribution method, two preliminary calculations are necessary.

A. To determine how many units must be sold, you must calculate the contribution per unit, that is, how much of the sales price is available to cover fixed costs and profit after subtracting variable costs.

\[
\text{Contribution per unit} = (\text{sales price}) - (\text{variable costs})
\]

B. To determine how much sales revenue must be generated, you must calculate the contribution ratio. This tells you the percentage of the sales price that covers fixed costs and profit after subtracting variable costs.

\[
\text{Contribution ratio} = 1 - \frac{\text{variable costs}}{\text{sales price}}
\]

Example

What we need to know

• Sales price = $1.25
• Variable costs per item = $0.54
• Total daily fixed costs = $57.00
• Daily fixed costs to be recovered through sale of item = 15% or $8.55 (or 15% x $57)
• Assume a zero profit rate for simplicity here (insert a different profit rate as desired)

1. Our first step is to use this information to calculate

   a. Contribution per unit = (sales price) – (variable costs)
      
      \[= (1.25 - 0.54) = 0.71\]

   b. Contribution ratio = 1 – (variable costs) / (sales price)
      
      \[= 1 - (0.54) / (1.25) = 1 - (0.432) = 0.568\]
2. The second step is to plug the results from step 1 into the appropriate break-even formulas.

- To find the break-even point in number of units, we use the contribution per unit from step 1(a):
  
  \[
  \text{break-even point in units} = \frac{\text{fixed costs} + \text{profit}}{\text{contribution per unit}}
  
  \text{break-even point in units} = \frac{($8.55) + ($0)}{($0.71)} = 12.04 \text{ units}
  
  \text{We must sell 12.04 units to break-even}
  
- To find the break-even point in sales, we use the contribution ratio from step 1(b):
  
  \[
  \text{break-even point in sales} = \frac{\text{fixed costs} + \text{profit}}{\text{contribution ratio}}
  
  \text{break-even point in sales} = \frac{($8.55) + ($0)}{(.568)} = $15.05
  
  \text{We must have $15.05 in sales to break-even.}