**Exercise 1**

Break-even Point Equation Method

Break-even is the point of zero loss or profit. At break-even point, the revenues of the business are equal its total costs and its contribution margin equals its total fixed costs. Break-even point can be calculated by equation method, [contribution method](http://accountingexplained.com/managerial/cvp-analysis/break-even-point-contribution-approach) or graphical method. The equation method is based on the [cost-volume-profit (CVP)](http://accountingexplained.com/managerial/cvp-analysis/) formula:

|  |
| --- |
| px = vx + FC + Profit |

Where,  
**p** is the price per unit,  
**x** is the number of units,  
**v** is variable cost per unit and  
**FC** is total fixed cost.

Calculation

BEP in Sales Units

At break-even point the profit is zero therefore the CVP formula is simplified to:

|  |
| --- |
| px = vx + FC |

Solving the above equation for x which equals break-even point in sales units, we get:

|  |  |
| --- | --- |
| Break-even Sales Units = x = | FC |
| p − v |

BEP in Sales Dollars

Break-even point in number of sales dollars is calculated using the following formula:

|  |
| --- |
| Break-even Sales Dollars = Price per Unit × Break-even Sales Units |

Example

Calculate break-even point in sales units and sales dollars from following information:

|  |  |
| --- | --- |
| Price per Unit | $15 |
| Variable Cost per Unit | $7 |
| Total Fixed Cost | $9,000 |

Solution

We have,  
p = $15  
v = $7, and  
FC = $9,000

Substituting the known values into the formula for breakeven point in sales units, we get:

Breakeven Point in Sales Units (x)  
= 9,000 ÷ (15 − 7)  
= 9,000 ÷ 8  
= 1,125 units

Break-even Point in Sales Dollars = $15 × 1,125 = $16,875

**Exersise 2**



**Exercise 3**

PNG electric company manufactures a number of electric products. Rechargeable light is one of the PNG’s products that sells for $180/unit. Total fixed expenses related to rechargeable electric light are $270,000 per month and variable expenses involved in manufacturing this product are $126 per unit. Monthly sales are 8,000 rechargeable lights.

***Required:***

1. Compute break-even point of the company in dollars and units.
2. According to a research conducted by sales department, a 10% reduction in sales price will result in 25% increase in unit sale. Prepare two income statements in [contribution margin](http://www.accountingformanagement.org/contribution-margin-and-the-purpose-of-its-calculation/) format, one using the current price and one using proposed price (10% below the old sales price).
3. Compute the number of rechargeable lights to be sold to earn a net operating income of $144,000 per month.

**Solution:**

**(1) *Computation of break-even point:***

(a). Break even point in units:

Fixed expenses / Contribution margin per unit

270,000 / 54\*

= 5000 units

\*$180 – $126

(b). Break-even point in dollars can be computed by multiplying break-even point in units by sales price as shown below:

5000 units × $180

=$900,000

**(2) *Income statements***:

(a) Income statement under current operations:

|  |  |  |
| --- | --- | --- |
|  | Total | Per unit |
| Sales (8,000 lights) | 1,440,000 | $180 |
| Less variable expenses | 1,008,000 | $126 |
|  | ———— | ———— |
| Contribution margin | 432,000 | $54 |
| Less fixed expenses | 270,000 | ———— |
|  | ———— |  |
| Net operating income | 162,000 |  |
|  | ———— |  |

(b) Income statement under proposed operations:

|  |  |  |
| --- | --- | --- |
|  | Total | Per unit |
| Sales (10,000 lights) | 1,620,000 | $162 |
| Less variable expenses | 1,260,000 | $126 |
|  | ———— | ———— |
| Contribution margin | 360,000 | $36 |
| Less fixed expenses | 270,000 | ———— |
|  | ———— |  |
| Net operating income | 90,000 |  |
|  | ———— |  |

The proposal should not be accepted because it will reduce the contribution margin from $54 per unit to $36 per unit.

**(3) *Target profit analysis:***

We can compute the target income using following equation

Sales = Variable expenses + Fixed expenses + Profit

$162Q = $126Q + 270,000 + $72,000

$162Q – $126Q = $342,000

$36Q = $342,000

Q = $342, 000 / $36

Q = 9,500 Units

At the proposed selling price, company need to sell 9,500 rechargeable lights to earn a profit of $72,000

Reference:

<http://accountingexplained.com/managerial/cvp-analysis/break-even-point-equation-method>

<http://www.accountingformanagement.org/exercise-1-cvapr/>