**BREAKEVEN / CVP Analysis Questions for revision**

**Use the questions below to revise this topic and attempt questions 1 and 2**

TEST YOURSELF CVP ANALYSIS QUESTIONS [Answers are the end of Q 2]

**1. Which of the following correctly defines the break-even point?**

1. The point at which the fixed costs and revenues of a business are equal
2. The point at which the total costs and revenues of a business are equal
3. The point at which the variable costs of a business exceed the fixed costs
4. The point at which the business is incurring only fixed costs

**2. A company makes a single product**

**In total, the company incurs fixed costs of £25,200. Each item sells for £150, and the variable cost of producing each item is £45 per unit.**

**Calculate the number of units that the company must sell in order to break even.**

1. 129 units
2. 168 units
3. 240 units
4. 560 units

**3. A company manufactures bicycles. Each bicycle sells for £199.99 and has variable costs of £92.49.**

**The company predicts that it will be able to produce and sell 700 units next year, and it will incur fixed costs of £35,412.50. The company has a profit target of £35,000.**

**Calculate the minimum number of units that the company will need to sell in order to achieve its profit target.**

1. 175 units
2. 325 units
3. 700 units
4. 655 units

**4. Which of the following is NOT an underlying assumption of break-even analysis?**

1. The fixed costs incurred by a company will remain constant, regardless of the level of activity
2. The variable cost per unit for each product will vary for different levels of production
3. The relationship between selling price and demand for each product will remain constant overall levels of activity
4. A company producing more than one product will sell these products in a consistent ratio

**5. Which of the following concepts is calculated using the following formula?**

|  |
| --- |
| **Selling price per unit – Variable costs per unit** |
| **Selling price per unit** |

1. The break-even point in units
2. The contribution to sales ratio
3. The margin of safety
4. The break-even revenue

**6. A business manufactures three products: S, M and L. The following information is available:**

**In total, the business incurs fixed costs of £7,000,000.**

**Rank these three products according to their contribution to sales ratio, from highest to lowest.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Product** | **S** | **M** | **L** |
| **Selling Price per Unit (£)** | **5,000** | **1,000** | **4,000** |
| **Variable Cost per Unit (£)** | **2,500** | **400** | **1,000** |

**7. Which of the following correctly describes the margin of safety?**

1. The proportion of revenue that contributes towards both fixed costs and profit
2. The number of units that must be sold in order to generate a specific profit figure
3. The reduction in sales that can occur before the break-even point of a business is reached
4. The point at which the costs and revenues of a business are equal

**Question (with suggested solutions)**

An existing product is to be introduced into a new market segment.

The following details relate to this product:

Selling price per game: £200.

Variable costs per game: £120.

Fixed costs per annum specific to this game: £400,000.

**Calculate the breakeven sales revenue, the sales revenue to achieve a target profit of £150,000 and the margin of safety.**

**Answers**

Contribution per game = £ (200 – 120) = £80

C/S ratio = £80 / £200 = 0.4

BEP in sales revenue = Total fixed costs / C/S ratio

£400,000 / 0.4 = £1,000,000

Profit required = £150,000

Contribution required = Profit + fixed costs = £ (150,000 + 400,000) = £550,000

Sales revenue required = Contribution required / C/S ratio

= £550,000 / 0.4 = £1,375,000

Margin of safety = £1,375,000 - £1,000,000 = £375,000

**Question 1**

A Ltd manufacture and sell kitchen electric products for domestic use. A new product, an electric kettle, is planned for in 2023. Details of this planned launch is as follows.

Selling price per kettle is £25 and expect to sell 35,000 kettles

Variable costs of production and sales are £15 per kettle.

Total fixed costs specific to the new kettle product line is expected to be £220,000 and the maximum production capacity is 50,000 kettles.

**Required:**

**a) Breakeven sales volume and sales revenue.**

**b) Budgeted profit.**

**c) Margin of safety.**

**d) The sales volume and sales revenue required to make a profit of £100,000.**

**e) If the selling price reduces by £2 per kettle, calculate the budgeted profit for the 35,000 kettles and the breakeven point. Comment briefly on the results.**

**f) Discuss the limitations of the above analysis.**

**Question 2**

B Ltd requires your advice about a new product. The following data are relevant to this product.

Selling price per unit £250

Variable cost per unit £130

Fixed costs per year £2,400,000

Budgeted production and sales are 30,000 units.

Maximum capacity is 50,000 units.

**Required:**

**(a) The C/S ratio (2 marks)**

**(b) Budgeted profit (4 marks)**

**(c) Break-even sales volume and margin of safety (4 marks)**

**(d) Sales volume required to make a profit of £600,000. (5 marks)**

**(e) Sales director suggests the following changes:**

* **Selling price to reduce to £220 per unit**
* **Variable costs per unit to reduce to £100**
* **Fixed costs to increase by 2%**
* **Sell 35,000 units.**

**Calculate the profit, breakeven point and margin of safety for**

**this strategy. Comment on this strategy. (10)**

**CVP ANALYSIS KNOWLEDGE SOLUTIONS**

**1.**

***B. The point at which the total costs and revenues of a business are equal***

The break-even point is the point at which the costs and revenues of a business are equal, meaning that the business is neither making a profit nor a loss.

Turning to the other options:

The point at which the business is incurring only fixed costs is when zero units are being produced.

The other two options - the point at which the variable costs of a business exceed the fixed costs and the point at which the fixed costs and revenues of a business are equal - are not definitions for any specific terms.

**2.**

The formula to calculate the break-even point in units is as follows:

Therefore, the break-even point for Item X is:

***C. 240 units***

|  |  |
| --- | --- |
| Break-even point in units = | Fixed costs |
| Selling price per unit – Variable cost per unit |

|  |  |  |
| --- | --- | --- |
| Break-even point = | £25,200 | = 240 units |
| £150 – £45 |

**3.**

***D. 655 units***

The number of units required to generate a specific profit can be calculated as follows:

Where:

Contribution per unit = Selling price per unit – Variable cost per unit

Therefore, the contribution per bicycle is:

Contribution per unit = £199.99 - £92.49 = £107.50

As the total fixed costs are £35,412.50, the minimum number of units the company must sell in order to generate a £35,000 profit is equal to:

**4.**

A break-even analysis assumes that the variable cost per unit will remain the same for all levels of production.

Turning to the other options:

A break-even analysis assumes that the relationship between the selling price and demand per unit, and the total fixed costs, will all remain constant, regardless of the activity level.

A break-even analysis is also based on the assumption that a company either only makes one product, or sells several products in a consistent ratio.

|  |  |  |
| --- | --- | --- |
| Units required to generate a specific profit target | = | Profit target + Fixed costs |
| Contribution per unit |

|  |  |  |  |
| --- | --- | --- | --- |
| Units required to generate a specific profit target | = | £35,412.50 + £35,000 | = 655 units |
| £107.50 |

***B. The variable cost per unit for each product will vary for different levels of production***

**5.**

***B. The contribution to sales ratio***

The contribution to sales (C/S) ratio illustrates how much contribution a product generates for every unit of currency of sales revenue generated. It is calculated as follows:

Where:  
Contribution = Selling price – Variable costs  
Therefore, substituting the contribution equation into the C/S ratio formula:

Turning to the other options:

Margin of safety = Predicted sales – Break-even point

|  |  |
| --- | --- |
| C/S ratio = | Contribution per unit |
| Selling price per unit |

|  |  |
| --- | --- |
| C/S ratio = | Selling price per unit – Variable costs per unit |
| Selling price per unit |

|  |  |
| --- | --- |
| Break-even point in units = | Fixed costs |
| Selling price per unit – Variable cost per unit |

|  |  |
| --- | --- |
| Break-even revenue = | Fixed costs |
| C/S ratio |

**6.**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.** |  |  | ***Product L*** |
|  |  | |  |
| **2.** |  |  | ***Product M*** |
|  |  | |  |
| **3.** |  |  | ***Product S*** |

In order to answer this question, it is necessary to calculate the contribution to sales ratio (C/S ratio) for each of the products, using the following formula:

Note that the numerator, in the above equation, which is the contribution, has been substituted for (Selling price – Variable cost)

Therefore, inputting the selling price and the variable cost for each product:

|  |  |
| --- | --- |
| C/S Ratio = | Selling price - Variable cost |
| Selling price |

|  |  |  |
| --- | --- | --- |
| Product S C/S ratio = | (£5,000 - £2,500) | = 0.5 or 50% |
| 5,000 |

|  |  |  |
| --- | --- | --- |
| Product M C/S ratio = | (£1,000 - £400) | = 0.6 or 60% |
| 1,000 |

|  |  |  |
| --- | --- | --- |
| Product L C/S ratio= | (£4,000 - £1,000) | = 0.75 or 75% |
| 4,000 |

Therefore, the highest C/S ratio is provided by Product L, then Product M and finally S

**7.**

***C. The reduction in sales that can occur before the break-even point of a business is reached***

The margin of safety is the difference between the number of units that a business predicts it will sell and the number of units required to match the break-even point:

Margin of safety = Predicted sales - Break-even point

The margin of safety shows the reduction in sales that can occur before the break-even point of a business is reached. This can also be interpreted as showing how much a business can afford to underperform by before beginning to make a loss.

The point at which the costs and revenues of a business are equal is the break-even point, and the proportion of revenue that contributes towards both fixed costs and profit is the total contribution.