Business Finance

Bachelors of Business

Study Notes & Tutorial Questions

Chapter 4: Project Analysis and Evaluation
Introduction

Marginal costing is an alternative method of costing to absorption costing. In marginal costing, only variable costs are charged as a cost of sale and a contribution is calculated (sales revenue minus variable cost of sales). Closing inventories of work in progress or finished goods are valued at marginal (variable) production cost. Fixed costs are treated as a period cost, and are charged in full to the profit and loss account of the accounting period in which they are incurred.

The marginal production cost per unit of an item usually consists of the following.

- Direct materials
- Variable production overheads
- Direct labour

Direct labour costs might be excluded from marginal costs when the work force is a given number of employees on a fixed wage or salary. Even so, it is not uncommon for direct labour to be treated as a variable cost, even when employees are paid a basic wage for a fixed working week. If in doubt, you should treat direct labour as a variable cost unless given clear indications to the contrary. Direct labour is often a step cost, with sufficiently short steps to make labour costs act in a variable fashion.

The marginal cost of sales usually consists of the marginal cost of production adjusted for inventory movements plus the variable selling costs, which would include items such as sales commission, and possibly some variable distribution costs.
The principles of Marginal Costing

The principles of marginal costing are as follows.

a) Period fixed costs are the same, for any volume of sales and production (provided that the level of activity is within the 'relevant range'). Therefore, by selling an extra item of product or service the following will happen.
   (i) Revenue will increase by the sales value of the item sold.
   (ii) Costs will increase by the variable cost per unit.
   (iii) Profit will increase by the amount of contribution earned from the extra item.

b) Similarly, if the volume of sales falls by one item, the profit will fall by the amount of contribution earned from the item.

c) Profit measurement should therefore be based on an analysis of total contribution. Since fixed costs relate to a period of time, and do not change with increases or decreases in sales volume, it is misleading to charge units of sale with a share of fixed costs. Absorption costing is therefore misleading, and it is more appropriate to deduct fixed costs from total contribution for the period to derive a profit figure.

d) When a unit of product is made, the extra costs incurred in its manufacture are the variable production costs. Fixed costs are unaffected, and no extra fixed costs are incurred when output is increased. It is therefore argued that the valuation of closing inventories should be at variable production cost (direct materials, direct labour, direct expenses (if any) and variable production overhead) because these are the only costs properly attributable to the product.

Break Even Point (BEP)

At this point there is neither profit nor loss; that is, the activity breaks even. Where the volume of activity is below BEP, a loss will be incurred because total cost exceeds total sales revenue. Where the business operates at a volume of activity above BEP, there will be a profit because total sales revenue will exceed total cost. The further below BEP, the higher the loss; the further above BEP, the higher the profit.
Deducing BEPs by graphical means is a laborious business. Since the relationships in the graph are all linear (that is, the lines are all straight), however, it is easy to calculate the BEP.

We know that at BEP (but not at any other point):

\[ \text{Total sales revenue} = \text{Total cost} \]

If we call the number of units of output at BEP b, then

\[ b = \frac{\text{Fixed cost}}{\text{Sales revenue per unit} - \text{Variable cost per unit}} \]

\[ \text{BEP (unit)} = \frac{\text{FC}}{\text{Contribution per unit} (\text{SP} - \text{VC})} \]

\[ \text{BEP ($)} = \frac{\text{FC + Target Profit}}{\text{C.S Ratio}} \]

\[ \text{C/S Ratio} = \frac{\text{(sales revenue - cost of sales)}}{\text{sales revenue}} \times 100. \]

The sloping line starting at zero represents the sales revenue at various volumes of activity. The point at which this finally catches up with the sloping total cost line, which starts at F, is the break-even point (BEP). Below this point a loss is made, above it a profit.
If we look back at the break-even chart above, this formula seems logical. The total cost line starts off at point F, higher than the starting point for the total sales revenues line (zero) by amount F (the amount of the fixed cost). Because the sales revenue per unit is greater than the variable cost per unit, the sales revenue line will gradually catch up with the total cost line. The rate at which it will catch up is dependent on the relative steepness of the two lines. Bearing in mind that the slopes of the two lines are the variable cost per unit and the selling price per unit, the above equation for calculating b looks perfectly logical.

Though the BEP can be calculated quickly and simply without resorting to graphs, this does not mean that the break-even chart is without value. The chart shows the relationship between cost, volume and profit over a range of activity and in a form that can easily be understood by non-financial managers. The break-even chart can therefore be a useful device for explaining this relationship.

**Contribution**

Contribution is an important measure in marginal costing, and it is calculated as the difference between sales value and marginal or variable cost of sales.

Contribution is of fundamental importance in marginal costing, and the term 'contribution' is really short for 'contribution towards covering fixed overheads and making a profit'.

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**TIME & KARMA.**

- When a bird is alive... it eats ants.
- When the bird has died... ants eat it.
- One tree can be made in to a million matchsticks... but only one match is needed to burn a million trees!
- Circumstances can change at any time... Don't devalue or hurt anyone in this life...
- You may be powerful today but time is more powerful than you!

fb/the idealist
Contribution margin ratio

The contribution margin ratio is the contribution from an activity expressed as a percentage of the sales revenue, thus:

\[
\text{Contribution margin ratio} = \frac{\text{Contribution}}{\text{Sales revenue}} \times 100\%
\]

The ratio can provide an impression of the extent to which sales revenue is eaten away by variable cost.

Profit or contribution information

The main advantage of contribution information (rather than profit information) is that it allows an easy calculation of profit if sales increase or decrease from a certain level. By comparing total contribution with fixed overheads, it is possible to determine whether profits or losses will be made at certain sales levels. Profit information, on the other hand, does not lend itself to easy manipulation but note how easy it was to calculate profits using contribution information in the question entitled Marginal costing principles. Contribution information is more useful for decision making than profit information.

Margin of safety

The margin of safety is the extent to which the planned volume of output or sales lies above the BEP. The margin of safety can be used as a partial measure of risk.

Achieving a target profit

In the same way as we can derive the number of units of output necessary to break even, we can calculate the volume of activity required to achieve a particular level of profit.

\[
t = \frac{\text{Fixed cost} + \text{Target profit}}{\text{Sales revenue per unit} - \text{Variable cost per unit}}
\]
**Profit–volume charts**

A slight variant of the break-even chart is the profit–volume (PV) chart. A typical PV chart is shown below:

The PV chart is obtained by plotting loss or profit against volume of activity. The slope of the graph is equal to the contribution per unit, since each additional unit sold decreases the loss, or increases the profit, by the sales revenue per unit less the variable cost per unit. At zero volume of activity there are no contributions, so there is a loss equal to the amount of the fixed cost. As the volume of activity increases, the amount of the loss gradually decreases until BEP is reached. Beyond BEP a profit is made, which increases as activity increases.

As we can see, the PV chart does not tell us anything not shown by the break-even chart. It does, however, highlight key information concerning the profit (loss) arising at any volume of activity. The break-even chart shows this as the vertical distance between the total cost and total sales revenue lines. The PV chart, in effect, combines the total sales revenue and total variable cost lines, which means that profit (or loss) is directly readable.
The economist’s view of the break-even chart

So far in this chapter we have treated all the relationships as linear – that is, all of the lines in the graphs have been straight. This is typically the approach taken in management accounting, though it may not be strictly valid.

Consider, for example, the variable cost line in the break-even chart; accountants would normally treat this as being a straight line. Strictly, however, the line should probably not be straight because at high levels of output economies of scale may be available to an extent not available at lower levels. For example, a raw material (a typical variable cost) may be able to be used more efficiently with higher volumes of activity. Similarly, buying large quantities of material and services may enable the business to benefit from bulk discounts and so lower the cost.

There is also a tendency for sales revenue per unit to reduce as volume is increased. To sell more of a particular product or service, it will usually be necessary to lower the price per unit. Economists recognise that, in real life, the relationships portrayed in the break-even chart are usually non-linear. The typical economist’s view of the chart is shown in Figure below.

As volume increases, economies of scale have a favourable effect on variable cost, but this effect is reversed at still higher levels of output. At the same time, sales revenue per unit will tend to decrease at higher levels to encourage additional buyers.
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Note, above figure, that the total variable cost line starts to rise quite steeply with volume but, around point A, economies of scale start to take effect. With further increases in volume, total variable cost does not rise as steeply because the variable cost for each additional unit of output is lowered. These economies of scale continue to have a benign effect on cost until a point is reached where the business is operating towards the end of its efficient range. Beyond this range, problems will emerge that adversely affect variable cost. For example, the business may be unable to find cheap supplies of the variable-cost elements or may suffer production difficulties, such as machine breakdowns. As a result, the total variable cost line starts to rise more steeply.

At low levels of output, sales may be made at a relatively high price per unit. To increase sales output beyond point B, however, it may be necessary to lower the average sales price per unit. This will mean that the total revenue line will not rise as steeply, and may even curve downwards.

Note how this ‘curvilinear’ representation of the break-even chart can easily lead to the existence of two break-even points.
Accountants justify their approach to this topic by the fact that, though the lines may not, in practice, be perfectly straight, this defect is probably not worth taking into account in most cases. This is partly because all of the information used in the analysis is based on estimates of the future. As this will inevitably be flawed, it seems pointless to be pedantic about the minor approximation of treating the total cost and total revenue lines as straight when strictly this is not so. Only where significant economies or diseconomies of scale are involved should the non-linearity of the variable cost be taken into account. Also, for most businesses, the range of possible volumes of activity at which they are capable of operating (the relevant range) is pretty narrow. Over very short distances, it may be perfectly reasonable to treat a curved line as being straight.

**Failing to break even**

Where a business fails to reach its BEP, steps must be taken to remedy the problem: there must be an increase in sales revenue or a reduction in cost, or both of these. Below case discusses how Ford’s subsidiary Volvo is struggling to reach its BEP. Ford has recently disposed of its three UK luxury brands (Aston Martin, Jaguar and Land Rover) and is thought to be considering the possibility of selling off Volvo as well.

"The biggest risk is not taking any risk... In a world that changing really quickly, the only strategy that is guaranteed to fail is not taking risks."

- Mark Zuckerberg

www.facebook.com/learningpetals
Weaknesses of break-even analysis

As we have seen, break-even analysis can provide some useful insights concerning the important relationship between fixed cost, variable cost and the volume of activity. It does, however, have its weaknesses. There are three general problems:

Non-linear relationships

The management accountant’s normal approach to break-even analysis assumes that the relationships between sales revenues, variable cost and volume are strictly straight-line ones. In real life, this is unlikely to be the case. This is probably not a major problem, since, as we have just seen:

- Break-even analysis is normally conducted in advance of the activity actually taking place. Our ability to predict future cost, revenue and so on is somewhat limited, so what are probably minor variations from strict linearity are unlikely to be significant, compared with other forecasting errors; and
Most businesses operate within a narrow range of volume of activity; over short ranges, curved lines tend to be relatively straight.

**Stepped fixed cost**

Most types of fixed cost are not fixed over all volumes of activity. They tend to be ‘stepped’ fixed cost. This means that, in practice, great care must be taken in making assumptions about fixed cost. The problem is heightened because most activities will probably involve various types of fixed cost (for example rent, supervisory salaries, administration cost), all of which are likely to have steps at different points.

**Multi-product businesses**

Most businesses do not offer just one product or service. This is a problem for break-even analysis since it raises the question of the effect of additional sales of one product or service on sales of another of the business’s products or services. There is also the problem of identifying the fixed cost of one particular activity. Fixed cost tends to relate to more than one activity – for example, two activities may be carried out in the same rented premises. There are ways of dividing the fixed cost between activities, but these tend to be arbitrary, which calls into question the value of the break-even analysis and any conclusions reached.
Sensitivity Analysis or What-if Analysis

Sensitivity Analysis is a tool used in financial modeling to analyze how the different values of a set of independent variables affect a specific dependent variable under certain specific conditions. In general, Sensitivity Analysis is used in a wide range of fields, ranging from biology and geography to economics and engineering.

A Financial Sensitivity Analysis, also known as a What-If analysis or a What-If simulation exercise, is most commonly used by financial analysts to predict the outcome of a specific action when performed under certain conditions.

Financial Sensitivity Analysis is done within defined boundaries that are determined by the set of independent (input) variables.

For example, Sensitivity Analysis can be used to study the effect of a change in interest rates on bond prices if the interest rates increased by 1%. The “What-If” question would be: “What would happen to the price of a bond If interest rates went up by 1%?”. This question is answered with sensitivity analysis.

The analysis is performed in Excel under the Data section of the ribbon and the “What-if Analysis” button, which contains Goal Seek and Data Table.

Sensitivity analysis example

John is in charge of sales for HOLIDAY CO that sells Christmas decorations at a shopping mall. John knows that the holiday season is approaching and that the mall will be crowded. He wants to find out whether an increase in customer traffic at the mall will raise the total sales revenue of HOLIDAY CO and if so, by how much.
The average price of a packet of Christmas decorations is $20 and during the previous year’s holiday season, HOLIDAY CO sold 500 packs of Christmas decorations, resulting in total sales worth $10,000.

After carrying out a Financial Sensitivity Analysis, John determines that a 10% increase in customer traffic at the mall results in a 7% increase in the number of sales.

Using this information, John can predict how much money company XYZ will generate if customer traffic increases by 20%, 40%, or 100%.

Based on John’s Financial Sensitivity Analysis, these will result in an increase in revenue by 14%, 28%, and 70% respectively.

<table>
<thead>
<tr>
<th>Mall Traffic Growth</th>
<th>Unit Price</th>
<th>Sales Volume</th>
<th>Revenue</th>
<th>Rev. Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0%</td>
<td>$20</td>
<td>500</td>
<td>$10,000</td>
<td>na</td>
</tr>
<tr>
<td>10.0%</td>
<td>$20</td>
<td>535</td>
<td>$10,700</td>
<td>7%</td>
</tr>
<tr>
<td>20.0%</td>
<td>$20</td>
<td>570</td>
<td>$11,400</td>
<td>14%</td>
</tr>
<tr>
<td>30.0%</td>
<td>$20</td>
<td>605</td>
<td>$12,100</td>
<td>21%</td>
</tr>
<tr>
<td>40.0%</td>
<td>$20</td>
<td>640</td>
<td>$12,800</td>
<td>28%</td>
</tr>
<tr>
<td>50.0%</td>
<td>$20</td>
<td>675</td>
<td>$13,500</td>
<td>35%</td>
</tr>
<tr>
<td>60.0%</td>
<td>$20</td>
<td>710</td>
<td>$14,200</td>
<td>42%</td>
</tr>
<tr>
<td>70.0%</td>
<td>$20</td>
<td>745</td>
<td>$14,900</td>
<td>49%</td>
</tr>
<tr>
<td>80.0%</td>
<td>$20</td>
<td>780</td>
<td>$15,600</td>
<td>56%</td>
</tr>
<tr>
<td>90.0%</td>
<td>$20</td>
<td>815</td>
<td>$16,300</td>
<td>63%</td>
</tr>
<tr>
<td>100.0%</td>
<td>$20</td>
<td>850</td>
<td>$17,000</td>
<td>70%</td>
</tr>
</tbody>
</table>

**Advantages of Financial Sensitivity Analysis**

There are many important reasons to perform sensitivity analysis:

Sensitivity Analysis adds credibility to any type of financial model by testing the model across a wide set of possibilities.

Financial Sensitivity Analysis allows the analyst to be flexible with the boundaries within which to test the sensitivity of the dependent variables to the independent variables. For example, the model to study the effect of a 5-point change in interest rates on bond prices would be different
from the financial model that would be used to study the effect of a 20-point change in interest rates on bond prices.

Sensitivity analysis helps one make informed choices. Decision-makers use the model to understand how responsive the output is to changes in certain variables. This relationship can help an analyst in deriving tangible conclusions and be instrumental in making optimal decisions.

I'm not a HANDSOME guy, but I can give my HAND-TO-SOME one who needs help. Beauty is in heart, not in face.

Dr. A. P. J. Abdul Kalam
Practice Questions

Question 1

Cottage Industries Ltd makes baskets. The fixed costs of operating the workshop for a month totals £500. Each basket requires materials that cost £2 and takes one hour to make. The business pays the basket makers £10 an hour. The basket makers are all on contracts such that if they do not work for any reason, they are not paid. The baskets are sold to a wholesaler for £14 each.

What is the BEP for basket making for the business?
The BEP (in number of baskets) is:

Question 2

Can you think of reasons why the managers of a business might find it useful to know the BEP of some activity that they are planning to undertake?

Question 3

In practice, relationships between costs, revenues and volumes of activity are not necessarily straight-line ones. Can you think of at least three reasons, with examples, why this may be the case?
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Question 4

Motormusic Ltd makes a standard model of car radio, which it sells to car manufacturers for £60 each. Next year the business plans to make and sell 20,000 radios. The business’s costs are as follows:

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Cost per Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td></td>
</tr>
<tr>
<td>Variable materials</td>
<td>£20 per radio</td>
</tr>
<tr>
<td>Variable labour</td>
<td>£14 per radio</td>
</tr>
<tr>
<td>Other variable costs</td>
<td>£12 per radio</td>
</tr>
<tr>
<td>Fixed cost</td>
<td>£80,000 per year</td>
</tr>
<tr>
<td>Administration and selling</td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>£3 per radio</td>
</tr>
<tr>
<td>Fixed</td>
<td>£60,000 per year</td>
</tr>
</tbody>
</table>

Required:
(a) Calculate the break-even point for next year, expressed both in quantity of radios and sales value.
(b) Calculate the margin of safety for next year, expressed both in quantity of radios and sales value.

Question 5

A company wishes to make a profit of $150,000. It has fixed costs of $75,000 with a C/S ratio of 0.75 and a selling price of $10 per unit.

How many units would the company need to sell in order to achieve the required level of profit?

If you fail, never give up because F.A.I.L. means "First Attempt In Learning". End is not the end, if fact E.N.D. means "Effort Never Dies". If you get No as an answer, remember N.O. means "Next Opportunity". 

Dr. Abdul Kalam

kalam-quotes.blogspot.in
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Question 6

An organisation manufactures a single product which is sold for $80 per unit. The organisation's total monthly fixed costs are $99,000 and it has a contribution to sales ratio of 45%. This month it plans to manufacture and sell 4,000 units.

What is the organisation's margin of safety this month (in units)?

A 1,250
B 1,750
C 2,250
D 2,750

(2 marks)

Question 7

A company manufactures a single product which it sells for $20 per unit. The product has a contribution to sales ratio of 40%. The company's weekly break-even point is sales revenue of $18,000.

What would be the profit in a week when 1,200 units are sold?

A $1,200
B $2,400
C $3,600
D $6,000

(2 marks)

Question 8

A company has established the following information for the costs and revenues at an activity level of 500 units:

<table>
<thead>
<tr>
<th></th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>2,500</td>
</tr>
<tr>
<td>Direct labour</td>
<td>5,000</td>
</tr>
<tr>
<td>Production overheads</td>
<td>1,000</td>
</tr>
<tr>
<td>Selling costs</td>
<td>1,250</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
<td>9,750</td>
</tr>
<tr>
<td>Sales revenue</td>
<td>17,500</td>
</tr>
<tr>
<td><strong>Profit</strong></td>
<td>7,750</td>
</tr>
</tbody>
</table>

20% of the selling costs and 50% of the production overheads are fixed over all levels of activity.

What would be the profit at an activity level of 1,000 units?

A £15,500
B £16,250
C £16,500
D £17,750
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Question 9
A company has calculated its margin of safety as 20% on budgeted sales and budgeted sales are 5,000 units per month.

What would be the budgeted fixed costs if the budgeted contribution was £25 per unit?

Question 10
A company wishes to make a profit of £150,000. It has fixed costs of £75,000 with a C/S ratio of 0.75 and a selling price of £10 per unit.

How many units would the company need to sell in order to achieve the required level of profit?

Question 11
A company has the following budgeted data:

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakeven level of sales</td>
<td>12,000 units</td>
</tr>
<tr>
<td>Margin of safety</td>
<td>20%</td>
</tr>
<tr>
<td>Budgeted annual variable costs</td>
<td>€100,000</td>
</tr>
<tr>
<td>Budgeted annual fixed costs</td>
<td>€40,000</td>
</tr>
<tr>
<td>Budgeted annual net profit</td>
<td>€10,000</td>
</tr>
</tbody>
</table>

What is the budgeted unit selling price?

Question 12
Donegal Ltd has just completed its budget for 2012. An extract from the budget is as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales revenue</td>
<td>€1,000,000</td>
</tr>
<tr>
<td>Variable costs</td>
<td>€450,000</td>
</tr>
<tr>
<td>Fixed production overheads</td>
<td>€275,000</td>
</tr>
<tr>
<td>Fixed selling overhead</td>
<td>€55,000</td>
</tr>
</tbody>
</table>

What is the break-even revenue value?
Question 13

Despard Ltd manufactures and sells a single product. The following data have been extracted from the current year’s budget:

- Sales and production (units): 5,000
- Variable cost per unit: £50
- Fixed cost per unit: £70
- Contribution to sales ratio: 75%

The selling price per unit for next year is to be 8% above the current year’s budgeted figure, whereas both the variable cost per unit and the total fixed costs are forecast to increase by 12% above their budgeted level in the current year.

The target for next year is that total profit should remain the same as that budgeted for the current year.

Required:

(a) Calculate for the CURRENT YEAR the budgeted:
   (i) contribution per unit;
   (ii) total profit.  

(b) Calculate the number of units which the company should produce and sell next year in order to achieve the target level of profit.

(c) Explain, with an example, the term semi-variable (mixed) cost. How would such a cost be dealt with in undertaking the analysis in (a)?

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The strong person is not the good wrestler. Rather, the strong person is the one who controls himself when he is angry.

The Prophet Muhammad
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Question 14

Marco Ltd manufactures and sells a single product. The budgeted profit and loss statement for next year, which has been drawn up using absorption costing principles, is as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>£000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales (40,000 units)</td>
<td>4,400</td>
</tr>
<tr>
<td>Less Cost of sales:</td>
<td></td>
</tr>
<tr>
<td>Production cost (45,000 units):</td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>1,800</td>
</tr>
<tr>
<td>Fixed</td>
<td>1,476</td>
</tr>
<tr>
<td></td>
<td>3,276</td>
</tr>
<tr>
<td>Less Closing stock (5,000 units)</td>
<td>(364)</td>
</tr>
<tr>
<td></td>
<td>(2,912)</td>
</tr>
<tr>
<td>Gross profit</td>
<td>1,488</td>
</tr>
<tr>
<td>Less Non-production expenses:</td>
<td></td>
</tr>
<tr>
<td>Variable selling costs</td>
<td>360</td>
</tr>
<tr>
<td>Fixed selling, administration and distribution costs</td>
<td>598</td>
</tr>
<tr>
<td></td>
<td>(958)</td>
</tr>
<tr>
<td>Net profit</td>
<td>530</td>
</tr>
</tbody>
</table>

There will be no stock at the beginning of next year.

Required:

(a) Using marginal costing principles, calculate the following for next year:

(i) the total budgeted contribution from sales; and
(ii) the budgeted net profit. (4 marks)

(b) Calculate the break-even point (in units) for next year. (2 marks)

(c) Explain clearly why Marco Ltd’s net profit for next year using marginal costing principles differs from that under absorption costing. Under what conditions would the two net profits be the same? (3 marks)

Confidence and Hard-work is the best medicine to kill the disease called failure. It will make you a successful person.
Question 15

Granta Ltd is planning to make a fluid for use in the contract cleaning industry. The fluid is expected to sell for £10 per litre and the following unit costs are expected to apply to the production of the fluid during the year ending 31 December 2011:

Chemical DS: 0.30 litres at £2.50 per litre
Chemical DT: 0.70 litres at £3.50 per litre
Direct labour: 0.25 hours at £6.00 per hour

Variable factory overheads are absorbed at the rate of £5.00 per direct labour hour. Fixed factory overheads are forecast to be £8,632 per year. They are expected to accrue evenly over the year and will be absorbed on a unit basis, over the anticipated annual production of 10,400 litres.

Planned production and sales for the first quarter of 2011 are as follows:

January to March 2011
- Production: 2,600 litres
- Sales: 2,300 litres

There is no loss or wastage during the production process.

Required:

(a) Produce a detailed forecast income statement for the three-month period ending 31 March 2011 using each of the following:

(i) Absorption costing
(ii) Marginal costing

(8 marks)

(8 marks)

Calculations should clearly show the cost of production, the value of closing inventory for each method, and the contribution if relevant. Individual accounts for each month are not required.
(b) Prepare a statement reconciling the profit calculated in (a) (i) with that calculated in (a) (ii). (3 marks)

(c) For each of the following, name the type of costing system which would be most appropriate for use in each example and give two reasons for your choice in each case:

(i) A mechanic undertaking a full car service
(ii) The paint manufacturing industry (6 marks)

(Total 25 marks)

“Failure is an option here. If things are not failing, you are not innovating enough.”

~ Elon Musk

www.facebook.com/learningetals
Chapter 4: Project Analysis & Evaluation

Question 16

Norton Ltd manufactures a single product, which is sold for $136 per unit.

The standard variable costs per unit of the product are:

- Direct material: 4 kilos at $7.5 per kilo
- Direct labour: 5 hours at $11 per hour
- Production overhead: $2.4 per direct labour hour
- Sales overhead: $5 per unit

The company expects to manufacture and sell 8,000 units in total during the forthcoming year (Year 1).

The fixed overhead costs for the forthcoming year are:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>$60,000</td>
</tr>
<tr>
<td>Administration</td>
<td>$35,000</td>
</tr>
<tr>
<td>Sales</td>
<td>$11,000</td>
</tr>
</tbody>
</table>

Required:

(a) Calculate for the forthcoming year (Year 1):
   (i) The break-even point in dollars and units
   (ii) The margin of safety in dollars and units
   (iii) The amount of sales in units that would earn the company a profit of $180,000

(b) The following cost increases are expected in the following year (Year 2):

Variable costs: Direct material: +5%
                Direct labour: +4%
                Production overhead: +10%
                Sales overhead: +10%

Fixed overhead: Production: +3%
                Administration: +8%
                Sales: +10%

Required:
Chapter 4: Project Analysis & Evaluation

Calculate for Year 2:

(i) The selling price that will maintain the company’s contribution to sales ratio at the same level as Year 1. (3 marks)

(ii) The break-even point in dollars using the selling price calculated in (i) above. (2 marks)

(iii) The amount of sales in units to earn the company a profit of $180,000 if the selling price was raised to $150. (3 marks)

(Total 25 marks)

“Do not pray for an easy life, pray for the strength to endure a difficult one.”
Bruce Lee
Question 17

The following details relate to a shop which currently sells 40,000 pairs of shoes annually:

\[
\begin{align*}
\text{Selling price per pair of shoes} & \quad 60 \\
\text{Buying price per pair of shoes} & \quad 40 \\
\end{align*}
\]

**Total annual fixed costs:**

\[
\begin{align*}
\text{Salaries and wages} & \quad 200,000 \\
\text{Rent and rates} & \quad 60,000 \\
\text{Other fixed costs} & \quad 300,000 \\
\end{align*}
\]

**Required:**

(a) Calculate, both in number of units sold and sales value, the:

(i) Breakeven point
(ii) Margin of safety

(8 marks)

**Note:** Required parts (b) to (d) are to be considered individually and are not related to each other.

(b) Calculate the shop’s profit or loss if 26,500 pairs of shoes were sold during a year.

(5 marks)

(c) Calculate how many pairs of shoes would need to be sold if a sales commission of $2 per pair of shoes was paid in addition to other costs and the owner required a net profit of $240,100.

(2 marks)

(d) Calculate how many pairs of shoes would need to be sold to breakeven if an advertising campaign costing $20,000 was undertaken while, at the same time, selling prices were increased by 15%.

(2 marks)

(e) Explain what is meant by each of the following terms and give one example of each:

(i) Fixed cost
(ii) Variable cost

(8 marks)

(Total 25 marks)
Question 18

Graham’s business is selling a particular motor vehicle to the motor trade. Motor traders order these vehicles from Graham in batches of 6, 12 or 18 vehicles and Graham then purchases the vehicles from the manufacturer. Graham’s buying and selling prices are as follows:

<table>
<thead>
<tr>
<th>Number of Vehicles</th>
<th>Buying Price per Vehicle</th>
<th>Selling Price per Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>£10,000</td>
<td>£16,000</td>
</tr>
<tr>
<td>12</td>
<td>£10,000 – 5%</td>
<td>£16,000 – 5%</td>
</tr>
<tr>
<td>18</td>
<td>£10,000 – 10%</td>
<td>£16,000 – 10%</td>
</tr>
</tbody>
</table>

The maximum number of vehicles that Graham can sell is 18 per week given his present premises and sales force.

Graham’s total weekly fixed costs are budgeted at £24,012 including the salesman’s basic wages.

The salesman is also paid a commission of 5% of the selling price for each vehicle that he sells.

Required:

(a) Calculate the total profit per week at each of the sales levels of 6, 12 and 18 vehicles. (6 marks)

(b) Graham is worried about local competition and would like to ensure that he will sell 18 vehicles per week. He is only concerned that the company breaks even until all competition is finally discouraged.

   (i) Calculate, to the nearest £, the minimum selling price required for each vehicle in order to achieve break-even point at 18 vehicles per week. (6 marks)

   (ii) Using your answer to (i), calculate the minimum selling price required for each vehicle in order to achieve a profit of £209 per vehicle. (3 marks)

(c) Classifying costs as either fixed or variable is not always straightforward.

   Identify and describe two methods that may be used to identify the fixed and variable elements of a cost where it does not fall conveniently into a category of either totally fixed or totally variable. (10 marks)

(Total 25 marks)
Question 19

The Setright Engineering Company (SEC) makes die cast metal chassis components for use in a range of consumer electrical products such as refrigerators and washing machines.

Falcon is a major customer of SEC and they are looking to reduce their own production costs. They currently purchase 20,000 units per year of product SA172 from SEC and are the sole customer for this product. They have approached SEC with an offer of a substantial increase in order size in return for an improved discount on the current price. SEC currently sells product SA172 for £110 per unit.

Product SA172 is produced in one particular section of the factory and the standard cost is as follows:

**Direct Materials**

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>4kgs</td>
<td>£10.00 per kg</td>
</tr>
<tr>
<td>Fastenings</td>
<td>10</td>
<td>£0.50 each</td>
</tr>
</tbody>
</table>

**Direct Labour**

<table>
<thead>
<tr>
<th>Labour Type</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled</td>
<td>£10.50</td>
</tr>
<tr>
<td>Unskilled</td>
<td>£7.00</td>
</tr>
</tbody>
</table>

Fixed costs for the section total £11,500 per month.

Included in the fixed costs are wages for two supervisors. An additional supervisor would be needed, at a cost of £18,000 per annum (per year), for production volumes in excess of 25,000 units per annum.

Falcon have suggested that for a discount of 5% they would be willing to guarantee orders of 24,000 units per annum and for a discount of 10% they would be willing to guarantee orders of 28,000 units.

SEC does not hold any stock of product SA172.
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Required:

(a) Calculate the following annual figures for output levels of 20,000, 24,000 and 28,000 units of product SA172:

(i) Sales revenue (3 marks)
(ii) Cost of direct materials (3 marks)
(iii) Cost of direct labour (3 marks)
(iv) Total contribution (3 marks)
(v) Fixed costs (3 marks)
(vi) Total profit (3 marks)

(b) Based on your calculations in part (a), which level of output would you recommend to SEC? Explain your answer. (3 marks)

(c) Outline what other factors SEC would need to consider before deciding whether to offer Falcon a discount in exchange for a guaranteed increased order. (3 marks)

(d) What is the name given to the cost behaviour of the supervisors’ wages? (Total 25 marks)

If today were the last day of your life, would you want to do what you are about to do today?

Steve Jobs
1955 – 2011
Chapter 4: Project Analysis & Evaluation

Question 20

Trondyme Ltd manufactures and sells the Tron. You are supplied with the following information for May 2007:

<table>
<thead>
<tr>
<th></th>
<th>Per Tron £</th>
<th>Total for May 2007 £</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>25.00</td>
<td>200,000</td>
</tr>
<tr>
<td>Direct material</td>
<td>12.00</td>
<td>96,000</td>
</tr>
<tr>
<td>Direct labour</td>
<td>5.00</td>
<td>40,000</td>
</tr>
<tr>
<td>Overheads</td>
<td></td>
<td>36,000</td>
</tr>
</tbody>
</table>

Required:

(a) Define ‘contribution’ and ‘margin of safety’. (4 marks)

(b) Using the information above, calculate unit contribution for the Tron and total contribution for May 2007. (2 marks)

(c) How many Trons will Trondyme Ltd need to sell to break even? (4 marks)

(d) How many Trons will Trondyme Ltd need to sell to make a profit of £80,000? (4 marks)

(e) Calculate the margin of safety, in number of units and sales value, based on the level of sales calculated in part (d). (4 marks)

(f) Calculate the profit/volume ratio. (4 marks)

(g) If overheads increase by £5,000, how many extra units of Tron will the company need to sell to break even? (3 marks)

(Total 25 marks)
Question 21

Bully Ltd budgets its costs and revenue for product A for the next financial period as follows:

<table>
<thead>
<tr>
<th></th>
<th>$ per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling Price</td>
<td>40</td>
</tr>
<tr>
<td>Direct Material</td>
<td>8</td>
</tr>
<tr>
<td>Direct Labour</td>
<td>6</td>
</tr>
<tr>
<td>Variable Overhead</td>
<td>3</td>
</tr>
</tbody>
</table>

For the period concerned the budgeted fixed overhead is $100,000 and the budgeted sales are 12,000 units.

Required:

(a) Calculate the budgeted profit for the period. (4 marks)

(b) Calculate and explain the significance of

(i) The Break Even Point in units and dollars (3 marks)

(ii) The Margin of Safety in units and dollars. (3 marks)

(c) Show by means of a statement, the effect on the budgeted profit of each of the following independent courses of action, and calculate the Break Even Point for each of the three courses of action.

(i) Reduce the selling price to $35 per unit, this will increase sales by 2,000 units with an increase in fixed overhead of $10,000.

(ii) Increase the selling price to $45 per unit, this will reduce sales by 4,000 units and increase direct material costs by $2 per unit for all units, with fixed costs being unchanged.

(iii) Reduce the selling price to $30 per unit, this will increase sales by 5,000 units, increase fixed overhead by $12,000 and decrease direct material costs by $3 per unit for all units. (15 marks)

(Total 25 marks)
**Question 22**

A company produces and sells a single product, the standard unit cost details of which are as follows:

- **Direct material**: 2 kilos x $4.5 per kilo
- **Direct labour**: 3 hours x $5 per hour
- **Variable overhead**: 3 hours x $3 per hour

The total fixed overhead is budgeted at $90,000 per month and is absorbed on a rate per unit basis.

The budgeted output per month is 15,000 units.

The product has a standard selling price of $50 per unit.

The following activity took place during January and February:

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>14,000 units</td>
<td>16,000 units</td>
</tr>
<tr>
<td>Production</td>
<td>16,000 units</td>
<td>14,500 units</td>
</tr>
</tbody>
</table>

There is an opening stock on 1 January of 3,000 units.

**Required:**

(a) Calculate the standard cost and profit for one unit of output. (5 marks)

(b) Prepare profit statements for each month, using

   (i) Marginal costing
   (ii) Absorption costing (16 marks)

(c) Prepare a statement reconciling the marginal with the absorption profit for each month. (4 marks)
   (Total 25 marks)
Chapter 4: Project Analysis & Evaluation

Question 23

(a) Holder Ltd, which manufactures four products, has forecast the following results for the forthcoming year:

<table>
<thead>
<tr>
<th></th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>350</td>
<td>500</td>
<td>400</td>
<td>600</td>
<td>1,850</td>
</tr>
<tr>
<td>Material</td>
<td>80</td>
<td>160</td>
<td>168</td>
<td>170</td>
<td>578</td>
</tr>
<tr>
<td>Labour</td>
<td>160</td>
<td>160</td>
<td>100</td>
<td>180</td>
<td>600</td>
</tr>
<tr>
<td>Variable overhead</td>
<td>90</td>
<td>130</td>
<td>110</td>
<td>200</td>
<td>530</td>
</tr>
<tr>
<td>Fixed overhead</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>Profit/(loss)</td>
<td>(5)</td>
<td>25</td>
<td>(3)</td>
<td>25</td>
<td>42</td>
</tr>
</tbody>
</table>

It has been proposed that production of both W and Y is abandoned as both products result in a loss.

You are required to

Advise the company with supporting figures as to whether to cease production of W and Y. (5 marks)

(b) Based on the above figures, calculate:

(i) The contribution to sales ratio, based on the sales mix of the four products above. (2 marks)

(ii) The break-even point in $000. (3 marks)

(iii) The required sales in $000 to earn a profit of $70,000. (3 marks)
Question 24

A company manufactures two products, Product A and Product B. The following incomplete management report has been prepared in respect of these two products:

<table>
<thead>
<tr>
<th></th>
<th>Product A</th>
<th>Product B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>£600,000</td>
<td>(vi)</td>
</tr>
<tr>
<td>Variable costs</td>
<td>(i)</td>
<td>(vii)</td>
</tr>
<tr>
<td>Contribution</td>
<td>(ii)</td>
<td>(viii)</td>
</tr>
<tr>
<td>Fixed costs</td>
<td>(iii)</td>
<td>(ix)</td>
</tr>
<tr>
<td>Profit</td>
<td>(iv)</td>
<td>£240,000</td>
</tr>
<tr>
<td>Contribution/Sales ratio</td>
<td>40%</td>
<td>50%</td>
</tr>
<tr>
<td>Break-even point (in sales revenue)</td>
<td>(v)</td>
<td>£320,000</td>
</tr>
<tr>
<td>Margin of Safety (in sales revenue)</td>
<td>£350,000</td>
<td>(x)</td>
</tr>
</tbody>
</table>

Required:

(a) Copy the above table into your answer book and complete the missing figures.  

(b) Discuss two assumptions on which break-even calculations are based.  

(c) State two examples of situations where marginal costing can be used as a decision-making aid.

“I was born to make mistakes, not to fake perfection.”  
-Drake
Question 25

For Period 1 Wilson Ltd has produced the following budget figures for Product X:

<table>
<thead>
<tr>
<th>$ per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling Price</td>
</tr>
<tr>
<td>Direct Material</td>
</tr>
<tr>
<td>Direct Labour</td>
</tr>
<tr>
<td>Variable Overhead</td>
</tr>
</tbody>
</table>

For the period, the budgeted fixed overhead is $100,000 and the budgeted sales are 12,000 units.

Required:

(a) Calculate the budgeted profit for Period 1. (4 marks)

(b) Calculate (to the nearest whole unit):
   (i) The Break-Even Point in units; (2 marks)
   (ii) The Margin of Safety in units. (2 marks)

(c) The sales manager has suggested the following three options for the next period and has asked for an evaluation.

   Option 1  Reduce the selling price to $75 per unit. This will increase sales by 2,000 units. Labour costs will increase by $2 per unit and fixed overheads will decrease by $10,000.

   Option 2  Increase the selling price to $85 per unit. This will decrease sales by 4,000 units and decrease fixed overheads by $10,000.

   Option 3  Reduce the selling price to $70 per unit. This will increase sales by 5,000 units, increase fixed overhead by $12,000 and decrease direct material costs by $3 per unit.
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Required:

Calculate, for each of the three options individually:

(i) The budgeted profit;

(ii) The Break-Even Point in units (work to the nearest whole unit). (15 marks)

(d) State which option in (c) should be undertaken in order to provide the highest profit. (2 marks)

(Total 25 marks)
Chapter 4: Project Analysis & Evaluation

Question 26

The following details relate to a shop which currently sells 40,000 pairs of shoes annually:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling price per pair of shoes</td>
<td>$60</td>
</tr>
<tr>
<td>Buying price per pair of shoes</td>
<td>$40</td>
</tr>
</tbody>
</table>

**Total annual fixed costs:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries and wages</td>
<td>$200,000</td>
</tr>
<tr>
<td>Rent and rates</td>
<td>$60,000</td>
</tr>
<tr>
<td>Other fixed costs</td>
<td>$300,000</td>
</tr>
</tbody>
</table>

**Required:**

(a) Calculate, both in number of units sold and sales value, the:

(i) **Breakeven point**

(ii) **Margin of safety**

(b) Calculate the shop’s profit or loss if 26,500 pairs of shoes were sold during a year.

(c) Calculate how many pairs of shoes would need to be sold if a sales commission of $2 per pair of shoes was paid in addition to other costs and the owner required a net profit of $240,100.

(d) Calculate how many pairs of shoes would need to be sold to breakeven if an advertising campaign costing $20,000 was undertaken while, at the same time, selling prices were increased by 15%.

(e) Explain what is meant by **each** of the following terms and give one example of each:

(i) **Fixed cost**

(ii) **Variable cost**

(8 marks)
Chapter 4: Project Analysis & Evaluation

**Question 27**

I'm selling a product for $15 per unit. My variable cost per unit is $7. My fixed costs are $9,000. How many units do I have to sell to break even?

**Question 28**

I'm selling a product for $15 per unit. My variable cost per unit is $7. My fixed costs are $9,000. What is my break-even sales dollar figure?

**Question 29**

Blue Corp. shows monthly fixed costs of $1,797 and per-unit cost of $9.28. It sells 411 units in a month. What is the minimum price Blue Corp. must sell each unit for to break even?

**Question 30**

A start-up company has the following expenses:
- Rent = $1,100
- Utilities = $265
- Material and assembly = $12.65/unit
- Monthly labor = $625

If its product sells for $29.99/unit, how many units must it sell to break even?

- Live as if you were to die tomorrow. Learn as if you were to live forever.
  - Mahatma Gandhi
**Question 31**

I sell a product for $24.75 and fill orders averaging 37 units per day. My cost to produce and assemble each item is $3.11. If I am open for business five days per week, what is my contribution margin per unit?

**Question 32**

What is the break-even sales dollars figure for an operation that sells 615 products at $17.50 if each item costs $7.05 to produce and the fixed costs for the operation are $3,700/month?

**Question 33**

A company sells 900 units/month at $49.99 each, with an $18.12 per-unit cost and $2,175 monthly fixed costs. Is this company making a profit?

**Question 34**

Tandem Trucking spends $11,455 per month to run its business. It makes an average of 420 deliveries per month at a fee of $55 per delivery. Rounded to the nearest percent, what is Tandem’s monthly return on its $11,455 investment?

*Ask not what your country can do for you; ask what you can do for your country.*  
- *January 20, 1961*
Chapter 4: Project Analysis & Evaluation

Question 35

I sell a product for $35. My fixed costs for the week are $194, and it costs me $2.10 per unit to produce the product. If I sell only 6 units this week, how am I doing?

Question 36

Zyleron Corp. shows monthly fixed costs of $37,210 and a per-unit cost of $34.79. It sells 275 units in a month. What is the minimum price Zyleron Corp. must sell each unit for to break even?

Question 37

A start-up company has the following expenses:
- Rent = $875
- Utilities = $115
- Material and assembly = $4.75/unit
- Monthly labor = $480

If its product sells for $18.99/unit, how many units must it sell to break even?

Question 38

I sell a product for $21.50 and fill orders averaging 19 units per day. My cost to produce and assemble each item is $8.47. If I am open for business five days per week, what is my contribution margin each week?
Question 39

Diagram showing costs and revenues over a range of activity levels.
Question 40

Z-Boxes sell for £299 and their variable production cost is £99. The research and development, and fixed production overheads for the year are £1.2 million.

a) Calculate the break-even level of sales volume and revenue?
b) Calculate the break-even revenue using C/S ratio?
c) The budget revenue is £2.99 million; calculate the margin of safety in units and as a percentage?
d) Produce a break-even chart and profit-volume chart using the information above?
e) How many Z-Boxes must be sold to achieve £500,000 profit
Question 41

Moole cock spaniel plc makes 3 products, details as follows:

<table>
<thead>
<tr>
<th></th>
<th>Apples (£)</th>
<th>Pears (£)</th>
<th>Cockneys (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling price</td>
<td>60</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td>Variable cost</td>
<td>(20)</td>
<td>(30)</td>
<td>(20)</td>
</tr>
<tr>
<td>Contribution</td>
<td>40</td>
<td>50</td>
<td>20</td>
</tr>
</tbody>
</table>

Sales (units) 2,000 3,000 5,000

Fixed overhead for the year £800,000

**Calculate the break-even level of sales?**

Question 42

A company provides a number of different services to its customers from a single office. The fixed costs of the office, including staff costs, are absorbed into the company’s service costs using an absorption rate of $25 per consulting hour based on a budgeted activity level of 100,000 hours each period.

Fee income and variable costs are different depending on the services provided, but the average contribution to sales ratio is 35%.

**Calculate the break-even fee income?**

“Success is a lousy teacher. It seduces smart people into thinking they can’t lose.”

–Bill Gates
Question 43

Shiverton Community Building sub-contracts labour-only to various building firms at a charge of £10.00 per man-hour. Its overheads per year are £24,600 and the wage bill is £62,000. How many chargeable man-hours would it have to contract for to break even? The business expects to work 48 weeks in a year.

Question 44

Sunniside Therapy Collective has an average charge per client of £12.00. Its overheads are £15,956 and the therapists take £8 from every commission/charge. How many clients does the Collective need to serve in a year to break even? The therapists are unavailable five weeks a year and are available to work 47 weeks in the year.

“Have the courage to follow your heart and intuition. They somehow know what you truly want to become.”

- Steve Jobs
Question 45

Rubex Ltd manufactures plastic storage boxes. The following is a budgeted Income Statement for the business for June 2013:

<table>
<thead>
<tr>
<th></th>
<th>€/£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Revenue</td>
<td>15,000</td>
</tr>
<tr>
<td>Direct Material</td>
<td>5,200</td>
</tr>
<tr>
<td>Direct Labour</td>
<td>2,390</td>
</tr>
<tr>
<td>Production Overhead</td>
<td>3,200</td>
</tr>
<tr>
<td>Selling Overhead</td>
<td>890</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11,680</strong></td>
</tr>
<tr>
<td>Profit</td>
<td>3,320</td>
</tr>
</tbody>
</table>

The following information is also supplied:

1. The monthly budgeted production and sales is 5,000 units.
2. The following breakdown between fixed and variable costs applies:

<table>
<thead>
<tr>
<th></th>
<th>Variable</th>
<th>Fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Materials</td>
<td>100%</td>
<td>n/a</td>
</tr>
<tr>
<td>Labour</td>
<td>£1,340</td>
<td>£1,050</td>
</tr>
<tr>
<td>Production Overhead</td>
<td>£2,680</td>
<td>£520</td>
</tr>
<tr>
<td>Selling Overhead</td>
<td>100%</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Required:

(a) Calculate the following:

i. Contribution for the year;
ii. Contribution per unit;
iii. Contribution / sales ratio;
iv. Breakeven sales volume;
v. Margin of safety %;
vi. Sales volume required to achieve a profit of £2,220.

**Note:** Each section carries equal marks.

12 Marks

(b) Prepare a clearly labelled breakeven chart, showing the breakeven point, margin of safety and expected profit.

6 Marks

(c) In deciding whether to make or buy the labels which are glued to the storage boxes, list any two qualitative factors that would need to be considered in making this decision.

2 Marks
Canning Ltd. budgets to sell 3 products and has provided you with the following selling prices and variable costs:

<table>
<thead>
<tr>
<th>Product</th>
<th>Sales Units</th>
<th>Selling Price per unit €/£</th>
<th>Variable Cost per unit €/£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>600,000</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Beta</td>
<td>400,000</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Gamma</td>
<td>1,000,000</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

Annual fixed costs are budgeted at €/£4,000,000.

Required:

(a) Calculate the total budgeted profit.  
3 Marks

(b) Calculate the contribution / sales ratio for each product.  
3 Marks

(c) Calculate the breakeven sales volume per product in total.  
5 Marks

(d) How many units of each product and in total would Canning Ltd need to sell to earn a total profit of €/£6,000,000?
4 Marks

(e) Management are deciding whether or not to spend an extra €/£400,000 on advertising and sales promotion of Product Alpha. It is considering reducing its selling price to €/£9 per unit, resulting in expected sales of 800,000 units. Advise whether or not it is financially worth while spending €/£400,000 on the advertising and sales promotion.  
5 Marks

The Only way to do Great Work is to Love what you do.

Steve Jobs