Amish Patel **PAR**
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Profitability & Reporting Assignment

Task 1a)

From referring to and using the memo from Bob Harris and the figures in Appendix 1, I will be calculating the total profit. **Appendix 1** is illustrated below.

Division	1	2	3	4
Product	P1	P2	P3	P4
Volume	7,000	6,500	10,000	8,000
S.P per unit (£)	11.00	10.00	10.50	12.00
Turnover	77,000	65,000	105,000	96,000
Materials	28,000	19,500	45,000	40,000
Labour	21,000	16,250	12,500	40,000
Other Costs				
Apportioned Central				
Overheads				
Personnel	10,000	8,000	7,000	10,000
Finance	5,000	6,000	6,000	7,000
Administration	4,000	4,000	6,000	6,000
TOTAL EXPENSES	68,000	53,750	76,500	103,000
PROFIT/LOSS	9,000	11,250	28,500	-7,000

Total Profit = Sum of Product 1 Profit + Sum of Product 2 Profit + Sum of Product 3 Profit + Sum of Product 4 Profit = £9,000 + £11,250 + £28,500 + £-7000 = **£41, 750.**

Task 1b)

The **Saved Costs** are going to be the **Variable Costs**. The Variable Costs from using the table above are **Labour (£40,000)** & **Materials (£40,000).** Labour costs will be saved because if division 4 was to close then Spark Ltd will not need any labour to manufacture product 4 and so no funds will need to be spent on purchasing materials to fabricate that respective product in that particular department.

Subsequently, the company will save **£80,000**. This was determined by adding up the **VC's** and then deducting it from the table.

The **Incurred Costs** which are still going to take place are the **Fixed Costs.** Fixed costs are those costs which remain congruent regardless of changes in the level of activity. In the case of Spark Ltd the fixed elements of costs can be identified as being **Administration (£6,000), Finance (£7,000) and Personnel (£10,000).** By totalling up these fixed costs it is evident that the company are going to incur **£23,000.**

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Task 1c)

Based on my cost analysis in the previous question, I will now establish the change in total profit if division 4 was to close. To do this I will have to consider contribution. Contribution is calculated by taking away the selling price per unit from the variable costs. In the case of division 4, the contribution will be worked out as follows:

Division	1	2	3	4
Product	P1	P2	P3	P4
Volume	7,000	6,500	10,000	8,000
S.P per unit (£)	11.00	10.00	10.50	12.00
Turnover	77,000	65,000	105,000	96,000
Materials	28,000	19,500	45,000	40,000
Labour	21,000	16,250	12,500	40,000
Other Costs				
Apportioned Central Overheads				
Personnel	10,000	8,000	7,000	10,000
Finance	5,000	6,000	6,000	7,000
Administration	4,000	4,000	6,000	6,000
TOTAL EXPENSES	68,000	53,750	76,500	103,000
PROFIT/LOSS	9,000	11,250	28,500	-7,000

Using the illustration of appendix 1 above, we can see that it is evident that D4 generates a **turnover of £96,000**. If this added to the turnover of the other three divisions, the total turnover of the firm sums up to being **£343,000** and the profit of the entire company is **£41,750**.

If Spark Ltd considers the closure of Division 4, then it becomes indicative that the business's total profit will decrease. This was worked by first calculating the total profits of the company which is **£41,750** and then deducting the total profits of division 1 to 3 away from that figure leaving **(£23,750)**. This means that removing Division 4 will cost or give the company a shortfall of £18,000.

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Task 1d)

MEMORANDUM

TO: Bob Harris

From: Jane Jones
Date: 01/10/2004

SUBJECT: Division 4

Having analysed the financial information and prepared necessary calculations, I have come to the conclusion that you should not close division 4. This is because my calculations indicate that if division 4 is removed then you will have a deficit of £18,000. Having established that, the rule of thumb to bear in mind is that Division 4 is still providing you with a positive contribution of £23,750 with regards to the total turnover of Spark Ltd and so eradicating that respective division will reduce the business's total profits. As you can see after examining the implications towards the closure of division 4, it would be detrimenta l to close down that certain division with regards to the financial stability of the business as it yields in £18,000 of the business's total profit. Therefore from a financial perspective, the foreclosure of division 4 cannot be monetarily viable.

Kind Regards,
Jane Jones

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Task 1e)

The notion of contribution is useful in decision-making scenarios as you have seen in the preceding question. However having said that, there are circumstances when it would be level-headed to adjust that theory.

Such situations that need to be taken into account are limiting factors towards the business. In the case of Spark Ltd they could also be placed at a huge disadvantage – they could be limited in their activities on the grounds of social factors.

For example, in the occurrence that Spark Ltd was to close down division 4, redundancies and unemployment may take place which is most likely to lead to a spiral of decline in terms of unemployment in the local neighbouring vicinity. This could lead to a potential decline in sales because local people will lose their goodwill and faith towards the company.

As a result of that, things such as insecurity may transpire within the company itself and the local area because those workers which still remain employed by the organisation may feel as though they will be next on the line to get laid off. As a result, this may stir up a lot of tension and demotivate staff within the corporate culture of Spark Ltd.

Other state of affairs which need to be taken into account due to the possible closure of division 4, are that Spark Ltd may well lose some of their clients. Customers may say that they have found a better, more convenient supplier who supplies them with the same four products as Spark Ltd do - clientele will go elsewhere to a different supplier. If the organisation was renowned in the eyes of people, then individuals will perceive the company negatively and won't purchase of them no more.

Task 2a)

With regards to this entire task, I will be referring to the memo from Yasmin Singh.

To complete this part of the task the high/low method and the information within Yasmin's memo will be utilised to pinpoint the fixed and variable costs of element.

The high/low method is worked out as follows:

Step 1: Select the highest and lowest levels of activity
Step 2: Determination of costs and activity at each level
Step 3: The variable cost per unit has to be calculated

$$\frac{\text{Total Cost of higher level} - \text{Total Cost at lower level}}{\text{Total Units at higher level} - \text{Total Units at lower level}}$$

Step 4: Establishment of fixed cost:
Total Cost of higher activity level – Total Units of higher activity level X Variable cost per unit

Step1: Highest level of activity **= 60,000**
Lowest level of activity **= 30,000**
Step 2: Total Cost at higher activity level = 60,000 X £16.00 = **£960,000**
Total Cost at lower activity level = 30,000 X £20.00 = **£600,000**
Step 3: **£960,000 - £600,000** = **£360,000 = £12 per unit (VC)**
60,000 – 30,000 **30,000**
Step 4: Fixed Cost: This was calculated as follows:
If 60,000 units are produced then the total cost per unit is **£16.00.** Having Identified this, to establish the total costs we do **volume x total cost per unit.** This works out to be, **60,000 x £16.00 = £960,000.** Using this as basis to workout fixed cost, we do highest level of activity **60,000 x VC per unit (£12) = £720,000.** Thus the fixed is £**960,000 - £720,000 = £240,000.**

Task 2b)

If 35,000 units are sold then the profit will be £110,000. This was worked out in the following method.

Output = 35,000
SP = £12.00
Turnover = £770,000
Fixed Cost (FC) = £240,000
Variable Cost (VC) Maximum Output for 1st year (35,000) x SP (£12.00) = £420,000
Total Cost = FC + VC = £660,000

If profit is effectively the difference between the total costs that are associated with regard to manufacturing a product; in this case **£660,000** and the money generated from sales (sales revenue), we can now workout the profit for the organisation if they produce 35,000 units. Profit = **£770,000 - £660,000 = £110,000.**

Task 2c)

Each **individual Spark Component costs £12.00 to manufacture** and **sells for £22.00 each**. This gives a contribution to the business of **£10.00** (Selling Price per Unit – Variable Cost) which equals **£22.00 - £12.00.** This contribution is not the same as profit because the company cannot possibly make a profit unless it has paid off its fixed costs. The firm must make enough contributions of **£10.00** to pay off fixed costs of £240,000 in order to achieve break-even.

Task 2d)

In conjunction to this task, I will be calculating the break-even point with regards to Spark Ltd. Break-even point is the point at which the total sales revenue equals the total cost. In other words it is the point at which the business is making neither a loss nor profit. To calculate the break-even point for Spark Ltd you do the **Fixed Costs (£240,000) / Contribution per unit (£10) = 24,000 units.** To prove this is the break-even point, I will provide relevant evidence making use of the table and break-even chart methods on the following page.

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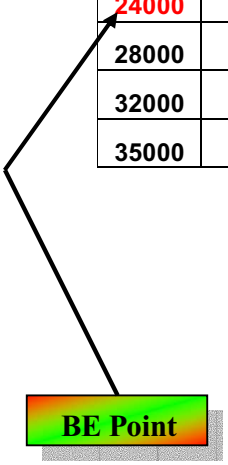
Selling Price per unit = £22.00
Fixed Costs = £240,000
Variable Costs = £420,000

To calculate my VC per unit, I do £22.00 and multiply this with the amount of output/quantity given. Subsequently my TC will then be calculated by adding up the sum of FC and VC's. Multiplying the (Quantity) with the selling price per unit, which is £22.00, will give me the Sales Revenue (SR) figure. Taking away the Total Cost's (TC) from the Sales Revenue (SR) will give me an indication as to whether or not Spark Ltd are making a loss, has achieved break-even, or even profit for that matter.

Break-Even Table

Q	FC	VC	TC	SR	P/(L)
0	£240,000.00	£0.00	£240,000.00	£0.00	-£240,000.00
4000	£240,000.00	£48,000.00	£288,000.00	£88,000.00	-£200,000.00
8000	£240,000.00	£96,000.00	£336,000.00	£176,000.00	-£160,000.00
12000	£240,000.00	£144,000.00	£384,000.00	£264,000.00	-£120,000.00
16000	£240,000.00	£192,000.00	£432,000.00	£352,000.00	-£80,000.00
20000	£240,000.00	£240,000.00	£480,000.00	£440,000.00	-£40,000.00
24000	£240,000.00	£288,000.00	£528,000.00	£528,000.00	£0.00
28000	£240,000.00	£336,000.00	£576,000.00	£616,000.00	£40,000.00
32000	£240,000.00	£384,000.00	£624,000.00	£704,000.00	£80,000.00
35000	£240,000.00	£420,000.00	£660,000.00	£770,000.00	£110,000.00



Task 2e)

Margin of Safety

The margin of safety is the number of units of production by which the selected operating point i.e. the planned production or sales level exceeds the break-even point. In other words it is the distance from the break-even point to the maximum output in terms of either percentage or units. There is a simple formula as to how the margin of safety can be worked out. This is demonstrated below:

$$\textbf{Margin of Safety} = \frac{\textbf{Actual Output} - \textbf{BE Output}}{\textbf{Actual Output}}$$

Using the scenario of Spark Ltd, I will now illustrate and express the margin of safety. Once having worked determined the margin of safety I will mark it onto the break-even chart I drew up.

$$\textbf{Margin of Safety} = \frac{35{,}000 - 24{,}000}{35{,}000} \times 100\% = 31.4\%$$

In interpreting the margin of safety for Spark Ltd, the assumption can be made that if the production for the business falls by 11,000 units, or the sales decrease by £330,000, then that will be the exact point in time where they achieve break-even and more importantly from a business perspective, start to generate profit.

Task 2f)

Profit or Loss at Given levels of Production

From referring to the break-even chart, it is all too easy to just exclusively concentrate on the point break-even point. However having said that, the chart is very valuable as it tells as more than just this; the chart also illustrates the profit and loss at any level of production/sales contained within the graph.

To workout the profit/loss at any given point on the graph, all we have to do is measure the gap between the sales revenue and total costs at a chosen number of units, and read the amounts off the "y" axis.

To test whether this method works, I will now take any two given points of both profit and loss on the chart and read the figures on the graph for those two specified points and see if they tally with my data. The rationale to calculate a certain level of profit or loss is mentioned below. In relation, these two given points are emphasised on a segregated graph in **Appendix 1.**

The Point of Operating Profit that I have chosen to test is 35,000 units.

For example, at an operating profit of 35,000 units, the profit "gap" is £110,000. This was calculated by at first looking at the maximum level of production scheduled for the first year (35,000 units), then going up to the point on the break-even chart until you reach the sales revenue figure of £770,000. Having once pinpointed the sales

revenue figure, I then went down directly until I found the point of the total costs figure for 35,000 units which was £660,000. In turn, all I did was subtract the sales revenue figure of £770,000 away from the total costs of £660,000. This as a result gave me an operating profit figure of £110,000.

The Selected Point at which Spark Ltd encounters a Loss and to which I have elected to use as an example is 10,000 units

At an operating loss of 20,000 units, the loss "gap" is £40,000. In other words, at this point on the break-even chart, Spark Ltd encounters a deficit of £40,000 before they achieve break-even. Using the above example as a basis from which to work the loss out, all I did was simply go across the y axis until I identified 20,000 units. Once having found the number of units at which I would like to investigate the loss, I went straight up until I established the sales revenue. At this point on the graph the sales revenue figure is £440,000.

The next step I did was to find the total costs because unless I know what my total costs are I cannot determine profit or loss and more importantly I will be unable to find out how much each unit costs at a desired output. At 20,000 units on the graph, it shows that the total costs are £480,000. As a result, to gauge whether a profit was made at this interval, I deducted the sales revenue away from the total costs which on the graph indicated that Spark Ltd were making a shortfall of £40,000 in that moment in time.

Usefulness of Break-Even

It is imperative for a company irrespective of its size and nature, to know when they break-even. The break-even point is the exact moment in time when all of a business's fixed costs have been absorbed and where the total costs equal the sales revenue. A viable decision for using break-even analysis/chart is when a business is considering to set-up. The break-even point is significant to a certain extent as it helps to see the level of sales that a business needs in order to cover its costs or make a certain level of profit.

Break-even can be measured in terms of physical sales in the form of numerical data and serves as a fundamental business tool to all businesses. Before the break-even point can be pinpointed, the different types of costs involved must be identified. To calculate the break-even point an understanding of fixed costs, variable costs and total costs must have taken place.

For example, if the fixed or total costs are unknown, then organisation will be unable to calculate the sales revenue because the break-even point cannot be found because break-even occurs when sales revenue equals total costs. Variable costs are those costs that vary with the level of output. They are direct costs and include loans, insurance, interest and rates. Total costs are the result of fixed and variable costs being added together. Break-even will go a long way to achieving any given business' aims and objectives (sales/profit) because it identifies how many sales have to be made down to the nearest unit before a profit can be realised.

It is vital to know/calculate the break even point because:

- It helps to show how many units have to be sold over a particular/certain amount of time for Total Costs to equal Sales Revenue;
- To show when a profit might be absorbed or gained, and alternatively to show when a loss might be suffered;
- To use as a target/objective;
- To help spot problems if break even is not being met and to then go onto rectifying the current situation one step further;
- To help review the possible action to move towards break-even;
- To help analyse the effects of events taking place outside the firm which may affect the chances of break-even taking place.

Furthermore, it is of the essence for finding the break-even point because for a business, break-even is a critical point: For example, the business needs to know if a product will generate profit, i.e. by selling at above the break-even point. Break-even is then an important tool or part of a Business Plan because a lender will want to know that it can get its money back from the lendee. Break-even also serves as a means for a business to ask the question 'what if?' For e.g. what if rent increases by 10%? This can be answered in part at least by looking at the break-even chart.
The effect on the profitability of the business can be seen, subject to the limitations – i.e. the relationship between sales revenue, variable costs and fixed costs all remain the same at different levels of production which is not true. A question such as 'what if' sales increase by 50%?' can be answered by examining the effect on the nature of the fixed and variable costs and then re-calculating the BE point.

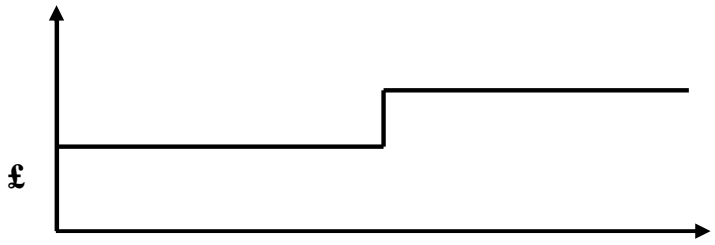
Limitations of Break-Even Analysis

The primary downfall of making use of the break-even analysis is that it presumes that the relationship between sales revenue, variable costs and fixed costs remain congruent at all levels of production. This cannot be feasible and is rather one-dimensional to some degree because, for example, in order to increase sales a business will often need to provide and offer bulk discounts.

So as a direct implication of this, the sales revenue may also have to be reduced at a higher level of output. In other words, Break-even totally ignores other aspects such as economies of scale. Below I have analysed some of the wider aspects with regards to the limitations of break-even taking into account a few of the drawbacks I came across when calculating the break-even point for Spark Ltd.

- With the break-even prognosis, the postulation is made that all of the production is sold. For example, there is point in anticipating and preparing the cost data, calculating the break-even point, and approximating the profits to be established if the Spark Component will not sell in adequate amounts.
- Taking into consideration the above statement, a business's fixed costs are not going to stay fixed at all levels of production. For example, in the scenario where Spark Ltd decide to double production it is most likely to increase the fixed costs because in order to manufacture more units, they will be using up overheads such as factory rent. In light of what has just been acknowledged, fixed costs can be portrayed as to being "stepped costs", because they frequently increase by a large amount. To illustrate this point made, i have drawn a model of what a company's fixed costs may look like if they planned to increase production by twice as much.

When plotted on a graph, it is clearly evident that the fixed costs take the outward appearance of a "step".



Units of Production

The profit or loss highlighted by the chart in reality probably speaks to being true for figures close to current production levels – the further away from the current figures you go, the less accurate and precise will the profit or loss be shown.

- Based on my experience with constructing the break-even chart, I feel that another limitation could be that when in the process of drawing the different lines i.e. sales revenue, total costs etc, if a blunt pencil is used then it can be it tremendously difficult and tedious to workout where the break-even point is. This is because when the pencil is blunt it tends to be more flat rather than sharp and so when you draw the lines they will turnout to be thick. This makes the graph less accurate and precise.
- Another limitation could be that when trying to determine the break-even point, and in particular when drawing up a table of values, I did not list the full, broad picture concerning the quantities/units of production. For example, the break-even chart could have been more accurate if I examined more output levels and went up in 100's rather than 1000's. If I did this, then I would get a more complete overview and a clearer picture of the break-even point. However having said that, as I was limited by the main factor of time, I did not have the sufficient time to fabricate a more complete break-even table, graph.

Task 3a)

In relation to the task at hand, I will be referring to the fax from Heather Bull and by considering the contribution per unit of scarce resource; will be calculating a revised production schedule which will attempt to maximise Spark Ltd's profits, taking into account the limiting factor. To do this, I will have to look at the revenue each division contributes. To work this out, all I did was multiply the volume with the selling price per unit of each product. To obtain these figures, I referred to **Appendix 1.**

Step 1:

Revenue

Division 1 = 7,000 x £11.00 = £77,000
Division 2 = 6,500 x £10.00 = £65,000
Division 3 = 10,000 x £10.50 = £105,000
Division 4 = 8,000 x £12.00 = £96,000

Step 2:

Variable Cost

To calculate the variable cost for each division, I simply added the variable elements of costs from **Appendix 1** which were the sum of **Materials +Labour** together**.**

Division 1 = £28,000 + £21,000 = £49,000
Division 2 = £19,500 + £16,250 = £35,750
Division 3 = £45,000 + £12,500 = £57,500
Division 4 = £40,000 + £40,000 = £80,000

Step 3:

The next step will be to determine the **Contribution per Division.** Taking into consideration the sales revenue and variable cost each division incurs, to workout the contribution per division I did **(Sales Revenue – Variable Cost).**

The contribution per division is underlined below:

Division 1 = £77,000 - £49,000 = £28,000
Division 2 = £65,000 - £35,750 = £29,250
Division 3 = £105,000 - £57,500 = £47,500
Division 4 = £96,000 - £80,000 = £16,000

Step 4:

Contribution Per Unit

To determine the contribution per unit, all I have to do is workout the contribution each division makes and then divide the contribution by the volume of each product that each division plans on producing. Formula = **(Contribution/Volume).**

Division 1 = £28,000/ 7,000 = £4.00 Contribution Per Unit
Division 2 = £29,250/ 6,500 = £4.50 Contribution Per Unit
Division 3 = £47,500/ 10,000 = £4.75 Contribution Per Unit
Division 4 = £16,000/ 8,000 = £2.00 Contri bution Per Unit

Step 5:

Having identified the contribution per unit that each division makes, I will now have to workout the contribution per unit per kg so that I can afterwards construct the revised production schedule, but more importantly establish how many kilograms all 4 products add up to being as Spark Ltd are limited to only having 50,000kg.

The method I used to verify the contribution per unit per kg was **Contribution Per Unit/kg Per Unit.** To obtain how much each division's products costs in terms of **materials per 1 unit** I referred to **Appendix 1.**

Contribution Per Unit Per Kg

Division 1 = £4.00 Contribution Per Unit/ 2kg = £2.00 per kg (Ranked 3)
Division 2 = £4.50 Contribution Per Unit/1.5kg = £3.00 per kg (Ranked 1)
Division 3 = £4.75 Contribution Per Unit/ 2.25kg = £2.1 per kg (Ranked 2)
Division 4 = £2.00 Contribution Per Unit/ 2.5kg = 80p per kg (Ranked 4)

As a direct consequence of finding out how much it costs each division in terms of contribution per unit per kg, I have now ranked each product according to which one contributes the most for Spark Ltd. If we consider the limiting factor, product 2 would be the most suited for Spark Ltd simply because it contributes/produces the most per unit, per kg.

Revised Production Schedule

As mentioned on the preceding page, I will now produce a revised production schedule for Spark Ltd. In order to make a final decision as to which product would be the most suitable, I will have to bear in mind the volume of each separate product that each division intends to produce because in the fax from Heather Bull, she specifically stresses that the firm will not be able to accommodate for any more than 50,000kg of materials. To calculate how much kg in terms of materials each separate product provides, I will have to multiply the e**xpected volume of each product** with the **materials per 1 unit**. Therefore, the revised production schedule will take the shape of something like:

Product 2 = 6,500 x 1.5kg = 9,750kg
Product 3 = 10,000 x 2.25kg = 22,500kg
Product 1 = 7,000 x 2kg = 14,000kg
Product 4 = 1500 x 2.5kg = 3,750kg

STEP 1:
9,750kg + 22,500kg + 14,000 = SUBTOTAL of 46,250kg of Materials.

STEP 2:
50,000kg – 46,250kg = 3750kg

STEP 3:
Therefore after adding up product 1-3 and subtracting that sum away from 50,000kg we are left with **3,750kg**. This figure must now be transferred to Product 4, as that Product originally consumed up 20,000kg materials & when added to the other 3 product's, had made the materials sum to being 66,250, taking the materials plan 16,250kg above initially planned.

STEP 4:
As mentioned here, I adjusted the original planned production levels in terms of volume for product 4 to **1,500 units.** This volume was decided by **dividing 3,750kg** with **2.5kg** which is the amount of materials product 4 devours through to make each unit. As a result **3,750kg/2.5kg = A volume of 1500.**

Volume has been slightly modified because if the original volume for product 4 was to be used then Spark Ltd will exceed the limited proportion of materials which is **50,000kg.** If product 4's originally planned volume was used in conjunction with the other 3 product's, then the total of materials would be **66,250kg.** Therefore it would be financially inadvisable to produce 8000 individual product 4 units.