CONTRIBUTION MARGIN
ANALYSIS
- SOME SPECIFIC CASES

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Introduction
In this chapter we investigate further the use of the contribution margin approach in making a number of specific decision choices. We will look at segmental reporting, adding and dropping product lines, changing the product mix, and make or buy decisions.

As discussed in earlier chapters, the key to any decision is the incremental or differential effects. These effects are the effects on future activities of the firm. Any monies or resources used in the past are not relevant to the decision as they are sunk costs. Therefore, when a decision is being made, for instance, as to adding or dropping a product line, the only concern should be with the costs and benefits that vary as a direct result of the present decision. For example, if a firm has spent $100,000 developing a particular product and the product is not working particularly well, then those costs spent on development are totally irrelevant to the decision to drop that product or reposition it. Furthermore, any factors that do not change as a result of a prospective decision are not relevant to the decision. Thus, if an existing business is built around two product lines, one of which is being considered for replacement, then the analysis will not include data on that product line which will not be affected.

However, you must be sure that any factors you believe will remain constant will, in fact, not be affected. There are often carry-over effects from one decision to
another existing product line, even though apparently there should be no effect. Therefore, many people when doing segmental and contribution approach analysis will use a total approach although quite large blocks of the information are technically redundant to the analysis, simply to gain an overall picture of the firm’s position. By using the total approach you can ensure that all pertinent information is included in the analysis as well as enabling the analyst to be cognisant of other relevant elements within the organisation. It is unfortunately a common trap, especially for people with limited experience in making production and related decisions, to assume that there will be no effects on other product lines when in practice certain carryover effects do occur. Thus, we recommend that, while theoretically one only needs to look selectively at those factors which will be affected by a decision, a total analysis should be carried out.

The Segmental Approach
Segmental analysis is one of the key forms of analysis carried out by marketing managers. It is also the key form of analysis used where firms are in a divisional situation, as well as when there are defined profit centres for different product groupings within an organisation. Segmental analysis is based around the fixed and variable cost approach as discussed in the previous chapter. The analysis separates the direct variable production costs from the variable overhead costs, and the product fixed costs from the company wide fixed costs. The general form of the analysis is illustrated in Exhibit 9.1 and in simplified form in Exhibit 9.2.

Exhibit 9.1
Number of Units (Product A) 1,000
Sales 100,000
Variable Costs
   Direct Materials 20,000
   Direct Labour 20,000
   Variable Production Overhead 10,000
   50,000
Contribution Margin - Production 50,000
   Variable Selling Costs 15,000
   Other Variable Overhead Costs 5,000
   20,000
Contribution Margin - Product 30,000
   Traceable Fixed Costs 20,000
   Product Margin 10,000

Exhibit 9.2
Number of Units (Product A) 1,000
Sales 100,000
Variable Production Costs 50,000
Contribution Margin - Production 50,000
Variable Overhead Costs 20,000
Contribution Margin - Product 30,000
Traceable Fixed Costs 20,000
Product Margin 10,000
Here it can be seen that the product margin is the key element in the analysis, and that no account is taken of business-wide fixed costs.

Often, in practice, it is not clear-cut as to which costs are fixed or variable, or which costs are product costs or plant wide costs. Many costs will tend to have the characteristics of, for example, variable production costs, but may have elements of other factors in them, for instance, traceable fixed costs. In these circumstances the analyst must make a decision on the materiality of the costs involved and on the objective of the analysis. In many cases the arbitrary decision to say that a particular cost is all ‘variable’ may be the most cost effective way of dealing with that item. While a common procedure in practice, it is nevertheless essential that sufficient time is devoted to the determination of the various aspects of those costs which are material, in order that the outcome of the analysis is meaningful.

An example of a cost that relates directly to a particular product but has both fixed and variable elements is power. Typically there will be an element of power which is incurred no matter what volume of production is desired, and beyond that, the power cost will increase proportionally according to the level of production. Thus, power has a traceable fixed element directly related to the product as well as a variable element directly related to the output. In a real case one has to decide whether the power charge is material in any production decision. If it is, then a determination of the cost equation of power must be made so that the contribution margin per unit can be accurately obtained. The power cost curve described above is shown in Exhibit 9.3.
One of the significant hurdles encountered in advising clients is that of determining which costs are fixed on an organisation wide basis, and which are fixed on a product basis. Management typically wishes to allocate all fixed costs to particular products. The problem is that it is not legitimate to allocate these fixed costs to particular products when they are not directly traceable. An example might be the Managing Director’s Mercedes. In this case management may consider that the Mercedes should be allocated to each product based on sale volumes. But the cost incurred in running the Mercedes is in no way a function of the sales of the individual product lines. Thus, it is not legitimate to arbitrarily allocate the cost of the Mercedes on that basis. More appropriately, the Mercedes should be treated as a company wide fixed cost and not allocated to any division. Similar arguments are incurred regarding the costs of the Managing Director or other senior management personnel. It may be possible to analyse their time and trace part of their salary and other associated costs to the divisions based on actual work commitments of management personnel. However, very often much of the time will be spent in carrying out wider company policy work which is not directly traceable to any one product line. Thus, part of senior management salaries may be traceable to a number of product lines, but a significant element should normally be treated as company wide costs.

It must be stressed at this point that it is not legitimate to allocate on an arbitrary basis plant wide fixed costs to individual product lines. By doing so you obscure the actual performance of particular product lines and you will make incorrect decisions on the effectiveness of managers, since their performance should be judged only on those factors that they have control over. It should be noted that pricing decisions must include a margin to cover business wide fixed costs.

The term marginal pricing is derived from this situation, where a segment will sell the product at a price that does not cover either the plant wide fixed costs nor in some cases, the product line fixed costs, but merely makes a contribution towards them. In other words, there is a positive product contribution margin that helps to defray part of the fixed costs. Marginal pricing can be sustained in the short term but in the longer term will normally lead to liquidation.

**Two Common Cases of Marginal Pricing**

Two cases of marginal pricing are commonly evidenced. The first is found when a firm wishes to establish itself in a new market. In this case the firm will often price its product down so as to attract new customers away from existing competitors. The problems with this approach are several and include:

1. A difficulty in repricing the product to its full cost since often the severe price increases necessary to recoup the full costs of production drive new customers back to the old competitors.

2. Marginal pricing is generally equated with dumping and contravenes most trade practices and is likely to incur a compensatory tariff.
3. If a product is priced down and starts to make a noticeable impact on a market then the competitors are likely to respond, thus leading to very keen pricing or even a price war. In the last situation none of the producers benefit and typically the newcomer will be unable to continue in that market anyway.

The second area where marginal pricing is commonly found is when exchange rate fluctuations occur to the extent that there is an uncompetitive price for a product in an overseas market. In this case the company may well marginal price the product so as to maintain its custom in the overseas market in the hope that the exchange rate fluctuation will be only temporary and that in a relatively short time it will move back in its favour, allowing a reasonable profit margin on that product. Technically the company may be accused of marginal pricing or dumping, but if this is only a short-term reaction to an exchange rate fluctuation then normally little will come of it. It should be noted that it is very difficult to make a good case against a firm which is suspected of marginal pricing or dumping. Much evidence is needed and it is a costly and time consuming process.

**Segmental Reporting - An Extended Example**

An example of a segmental report is given in Exhibit 9.4. The company produces three products. They are initially, at least, completely discrete and the data follow the typical format of a segmental report.

<table>
<thead>
<tr>
<th>Exhibit 9.4</th>
<th>Product A</th>
<th>Product B</th>
<th>Product C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Units</td>
<td>1,000</td>
<td>1,200</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>100,000</td>
<td>180,000</td>
<td>80,000</td>
<td>360,000</td>
</tr>
<tr>
<td>Variable Production Costs</td>
<td>50,000</td>
<td>120,000</td>
<td>20,000</td>
<td>190,000</td>
</tr>
<tr>
<td>Contribution Margin - Production</td>
<td>50,000</td>
<td>60,000</td>
<td>60,000</td>
<td>170,000</td>
</tr>
<tr>
<td>Variable Non-Production Costs</td>
<td>20,000</td>
<td>24,000</td>
<td>15,000</td>
<td>59,000</td>
</tr>
<tr>
<td>Contribution Margin - Product</td>
<td>30,000</td>
<td>36,000</td>
<td>45,000</td>
<td>111,000</td>
</tr>
<tr>
<td>Traceable Fixed Costs</td>
<td>20,000</td>
<td>40,000</td>
<td>5,000</td>
<td>65,000</td>
</tr>
<tr>
<td>Product Margin</td>
<td>10,000</td>
<td>(4,000)</td>
<td>40,000</td>
<td>46,000</td>
</tr>
<tr>
<td>Plant Wide Fixed Costs</td>
<td></td>
<td></td>
<td></td>
<td>35,000</td>
</tr>
<tr>
<td>Net Income</td>
<td></td>
<td></td>
<td></td>
<td>$11,000</td>
</tr>
</tbody>
</table>

In this example it can be seen that the company wide fixed costs of $35,000 are treated as a fixed cost and are not allocated to the individual product lines. This example will be used as a basis for several permutations and alternative questions.

The three products (A, B, and C) have a contribution margin-product of $30,000, $36,000 and $45,000 respectively. When the term contribution margin is used, it normally refers to the contribution margin-product. The contribution
margin-product is the contribution margin allowing for all variable elements of production, both revenue and costs, from which the traceable fixed costs are still to be deducted. These fixed costs are those which, if the product was withdrawn from sale, would cease to exist. Thus, if Product A was withdrawn from production, then the traceable fixed costs of $20,000 would also disappear. For example, these fixed costs could be that part of the factory rental which is tied directly to that particular product process.

When deciding whether or not to continue with a product, product margin must be used since this is the actual contribution made by a particular product to the overall profitability of the business itself. **As long as a product has a positive product margin then, all things being equal, it should be kept in production.** Any positive product margin will help defray the overall fixed cost that is faced by the business as a whole.

In the example, Product A has a product margin of $10,000, Product B a product margin of ($4,000) and Product C a product margin of $40,000. Combined, these product margins provide a total product margin of $46,000 and a net income after the deduction of plant-wide fixed costs of $11,000. Presuming that the product lines are independent then the dropping of Product B will automatically increase the net income from $11,000 to $15,000, by avoiding the $4,000 loss. It is now up to the company to investigate alternatives to Product B and consider whether that product line should be dropped, replaced or modified.

Consider, as an illustration, that you are advised by the Marketing and Production Departments that Product B could be developed into two further products, either B2 or B3, with the following details. Product B2 would sell 1,000 units at a total sales value of $165,000, with variable production costs of $100,000, the variable non-production costs would drop by $2,000 and the traceable fixed costs would be the same. Product B3 would have a sales volume of 900 units, total sales value would be $190,000 with variable production costs of $100,000, variable non-production costs of $30,000 and an increase in traceable fixed costs due to extra machinery purchase of $5,000. These data are shown in Exhibit 9.5.

<table>
<thead>
<tr>
<th></th>
<th>Product B2</th>
<th>Product B3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Units</td>
<td>1,000</td>
<td>900</td>
</tr>
<tr>
<td>Sales</td>
<td>165,000</td>
<td>190,000</td>
</tr>
<tr>
<td>Variable Production Costs</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Contribution Margin-Production</td>
<td>65,000</td>
<td>90,000</td>
</tr>
<tr>
<td>Variable Non-Production Costs</td>
<td>22,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Contribution Margin-Product</td>
<td>43,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Traceable Fixed Costs</td>
<td>40,000</td>
<td>45,000</td>
</tr>
<tr>
<td>Product Margin</td>
<td>3,000</td>
<td>15,000</td>
</tr>
</tbody>
</table>

Assuming, all other things being equal, the company would opt for Product B3 with an increased product margin over the initial product of $19,000. The new total net income for the business would then be $30,000.
This example is relatively simplistic since it lacks inter-dependence between the different product lines. Inter-dependence is often found where a company makes a range of products within a very loosely defined product group. For example, within the motor industry sales of 1300cc-1600cc motor cars will impact on sales of 1800cc-2000cc cars when the former are offered in highly ‘optioned’ packages.

Returning to the example, further research indicates that the impact of going ahead with Product B3 will be a reduction in sales of Product C of 100 units. The overall effect on Product C would be as shown in Exhibit 9.6.

**Exhibit 9.6**  
**Product C Revised**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Units</td>
<td>400</td>
</tr>
<tr>
<td>Sales</td>
<td>64,000</td>
</tr>
<tr>
<td>Variable Production Costs</td>
<td>16,000</td>
</tr>
<tr>
<td>Contribution Margin-Production</td>
<td>48,000</td>
</tr>
<tr>
<td>Variable Non-Production Costs</td>
<td>12,000</td>
</tr>
<tr>
<td>Contribution Margin-Product</td>
<td>36,000</td>
</tr>
<tr>
<td>Traceable Fixed Costs</td>
<td>5,000</td>
</tr>
<tr>
<td>Product Margin</td>
<td>$31,000</td>
</tr>
</tbody>
</table>

The product margin has decreased from $40,000 to $31,000. Thus, the move from Product B1 to B3 has resulted in an increase in income of $19,000 directly, and a reduction of $9,000 in the profitability of Product C due to the inter-dependence factor.

When businesses are decentralised it is common for a central management committee to remain in an overseeing situation. One of the principal reasons for this is to take account of such inter-dependencies and to be able to co-ordinate the firm’s activities to achieve long term efficiencies and congruence. For example, if Product B3 went ahead then the B3 product manager would presumably be well rewarded due to the efforts in gaining greater profitability. At the same time the manager for Product C may well be criticised for lack of performance in allowing the profitability to fall by $9,000, yet the fall in Product C is a direct result of the performance of Product B3 and ‘pirated’ sales from Product C.

Much of this analysis could be carried out more simply by using a contribution margin ratio less the traceable fixed costs. For example, in Product C Revised, with a contribution margin ratio of 56.25%, this ratio multiplied by 400, and then multiplied by sales price per unit of $160, would give a contribution margin of $36,000 (160 x 400 x 0.5625 = $36,000). This form of analysis is commonly undertaken when carrying out market planning and new product development in situations where it is critical that only those factors relevant to the ‘go/don’t go’ decision are evaluated. It should be noted that the segmental or contribution approach is one of the strongest tools for aiding in the management of small and medium sized businesses, where the information can be obtained and presented at relatively little cost but is highly useful. Thus, segmental reporting is an extremely
cost effective management tool.

**Accounting Presentation**

It is still relatively uncommon to receive information in the form presented in this chapter. Typically the information will be in a traditional financial statement format which will not clearly differentiate the fixed from the variable costs and may well allocate plant wide fixed costs to the individual product lines. Thus, it may often be necessary to restate the financial information in a management format. Returning to the earlier example, the information would typically be presented in financial statement form as shown in Exhibit 9.7.

**Exhibit 9.7**

<table>
<thead>
<tr>
<th>Company ABC - Financial Information</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Units</td>
<td>1,000</td>
<td>1,200</td>
<td>500</td>
</tr>
<tr>
<td>Sales</td>
<td>100,000</td>
<td>180,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Production Costs</td>
<td>50,000</td>
<td>120,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Gross Income</td>
<td>50,000</td>
<td>60,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Selling and other Non-Production Costs</td>
<td>159,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Income</td>
<td>$ 11,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The information may be more detailed, particularly in terms of selling and other non-production costs, however the overall format would be similar to the above. To convert this information into useful management information will require time and effort since one would have to evaluate the variable non-production costs and determine which fixed costs are traceable and which are not.

In many organisations the major role of the Financial Accounting Department has been to provide for the statutory obligations under the Companies Act, Income Tax Act, etc. With the advent of computers it is now much easier to provide useful and timely management information but many organisations still fail to do so; thus, it may require a great deal of persuasion to get the accounting division within an organisation to provide this sort of useful management information. In some cases, you may have to recast the information yourself and go to actual cost records to do so. Increasingly Finance Departments are realising that there exist internal clients as well as external, and that the internal users (marketing and production, for example) are more important than those with statutory rights. To determine the needs and requirements of internal users, meetings between the various groups will typically be necessary in order to draw up user requirements and objectives and also in order to create an environment for effective communication within the organisation.

**Summary**

The use of the contribution approach and segmental reporting is one of the most
useful tools available to management for the effective control and evaluation of elements of an organisation. The contribution approach should be used for decisions such as adding, modifying or dropping product lines as well as for evaluating the performance of managers. Care must be taken when determining how costs are traced to profit centres in order to exclude plant wide non-traceable costs. In many organisations the Finance Departments need to provide more useful management information and to broaden the scope of information provided, from meeting predominantly statutory requirements to recognising internal client needs for information.

**Glossary of Key Terms**

**Contribution Margin**

*Unit contribution margin* is the difference between selling price and variable production costs.

*Production contribution margin* is the revenue less the variable production costs by product line.

*Product contribution margin* is the total production contribution margin by product line, less the non-production variable costs of that product line.

**Marginal Pricing**

The practice of pricing a product so that it covers the variable costs of production and selling but makes little or no contribution to fixed costs.

**Segmental Reporting**

The analysis of an organisation’s performance by product line or product groups, avoiding aggregated analysis and focusing on contribution margin and product margin for each element.
Questions

9.1
What is the ‘contribution margin’?

9.2
Explain how contribution margins can help management decide whether a product line should be dropped or continued.

9.3
How might a contribution margin ratio analysis assist management in the decision of whether to undertake an advertising promotion for a product?

9.4
“In the decision of whether to continue, add or modify a product line, all fixed costs are irrelevant.” Is this statement true or false? Give your reasoning.

9.5
As manager of Produce Corporation Ltd you prepare the following segmental report of the performance of products X, Y and Z.

<table>
<thead>
<tr>
<th>Contribution Margins</th>
<th>1989</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
<td>Unit cont.</td>
</tr>
<tr>
<td></td>
<td>sold</td>
<td>margin</td>
</tr>
<tr>
<td>X</td>
<td>320,000</td>
<td>$4.20</td>
</tr>
<tr>
<td>Y</td>
<td>160,000</td>
<td>$6.30</td>
</tr>
<tr>
<td>Z</td>
<td>40,000</td>
<td>$0.55</td>
</tr>
<tr>
<td></td>
<td>520,000</td>
<td>$2,374,000</td>
</tr>
</tbody>
</table>

Required:

a. Comment on what this information reveals.
b. If the 1990 situation is likely to continue, what action would you like to see taken with each of the three product lines?

9.6
Management accounting reports of Disabled Aid Products Ltd include a breakdown of sales revenue and operating costs for each of the Company’s four different product lines. For the past three years the Illuminated Magnifying Glass line has shown an operating loss, and the company’s sales manager predicts that sales volume of this product is unlikely to increase in future. Sales prices cannot be
increased, as the Government views this as socially undesirable and has restricted prices on such items. On the basis of this information, should the company drop the unprofitable product line and let other companies take its market share in this product? Why or why not?

9.7 True or False?

a. The only costs relevant to production decisions are variable costs.
b. The allocation of joint costs to different production areas improves the ability of management to monitor performance.
c. While a product has a positive contribution, it is worthwhile continuing its production only while an alternative product, which would more profitably use production capacity, is not available.
d. It is potentially misleading to examine fixed costs on a per unit basis.
e. An increase in unit contribution margin does not always produce an increase in total contribution.
f. ‘Overhead’ is the name given to one class of costs which are not generally traceable to the units of production.

9.8

Farm Accessories Ltd has excess production capacity in its manufacturing plant. The Company is considering two products, product Y and product Z, as options for utilising this excess capacity. The following information shows estimated costs and selling prices directly associated with these new products.

<table>
<thead>
<tr>
<th></th>
<th>Product Y</th>
<th>Product Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs per unit:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct materials</td>
<td>$140</td>
<td>$26</td>
</tr>
<tr>
<td>Direct labour</td>
<td>$20</td>
<td>$8</td>
</tr>
<tr>
<td>Variable overhead</td>
<td>$60</td>
<td>$6</td>
</tr>
<tr>
<td>Fixed selling costs</td>
<td>$12,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>Selling Price per unit</td>
<td>$280</td>
<td>$58</td>
</tr>
</tbody>
</table>

Current fixed overhead of $32,000 per annum would not be affected by the choice made. The production division has sufficient excess capacity to produce 500 units of product Y or 2,000 units of product Z and the firm has assured markets for such volumes at the selling prices stated above.

Required:
a. Draw up projected contribution margin statements for each of products Y and Z showing the contribution margin and product margin for each.
b. On the basis of these results, which product should be added?

9.9

Sunray Swimwear Ltd has been caught out by a change in fashions. They have inventory of 8,000 swimsuits which they can no longer hope to sell at the anticipated price of $50 each. Instead they have been offered $30 each for the suits by a ‘surplus’ retailer. The standard cost per swimsuit includes the following costs:
Alternatively, Sunray Swimwear Ltd can modify the swimsuits to meet prevailing fashions at a further cost of:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>12</td>
</tr>
<tr>
<td>Direct labour</td>
<td>7</td>
</tr>
<tr>
<td>Variable overhead</td>
<td>3</td>
</tr>
<tr>
<td>Variable selling cost</td>
<td>1</td>
</tr>
<tr>
<td>Fixed overhead</td>
<td>5</td>
</tr>
</tbody>
</table>

$28 per unit

and sell them for $65 each at a high-fashion outlet.

Required:

a. What should the Company do with the swimsuits?

b. What other factors might the firm consider in deciding on a course of action?

9.10

Robinson Company produces 3 products, A, B and C. The following condensed Income Statement for 1991 shows the profit results for each product:

<table>
<thead>
<tr>
<th>($000’s)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>2,000</td>
<td>7,000</td>
<td>3,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Cost of goods sold</td>
<td>1,600</td>
<td>6,000</td>
<td>2,800</td>
<td>10,400</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>400</td>
<td>1,000</td>
<td>200</td>
<td>1,600</td>
</tr>
<tr>
<td>Administration costs</td>
<td>200</td>
<td>700</td>
<td>300</td>
<td>1,200</td>
</tr>
<tr>
<td>(allocated on sales basis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net income (loss)</td>
<td>200</td>
<td>300</td>
<td>(100)</td>
<td>400</td>
</tr>
<tr>
<td>Contribution Margin ratio</td>
<td>30%</td>
<td>40%</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Fixed costs identifiable</td>
<td>$150</td>
<td>$600</td>
<td>$250</td>
<td>$1,000</td>
</tr>
<tr>
<td>to product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Required:

a. Looking at these results Sandra Robinson (General Manager) was disappointed with product C and thought that it should be dropped. Prepare a recommendation for Ms Robinson supported by appropriate analysis covering all products.

b. Robinson Company is near full production capacity. However, a new product X has been proposed, with estimated sales of $5,000,000 per annum, a contribution margin ratio of 30%, and identifiable fixed costs of $340,000 which includes the $250,000 currently traced to product C.
plus $90,000 new fixed costs. (Although these additional fixed costs result from the manufacture of product X they nevertheless involve the upgrading of plant wide machinery, and once installed will remain no matter how long product X is produced). To produce X, product C would have to be dropped. Prepare profit forecasts for 1992 showing the product margin for the product combination of A, B and X. Should Robinson Company produce the new product?

9.11
Kiwi Canvas Company is considering replacing an existing product line with a new line, with the following relevant information:

- Additional materials cost per unit: $20
- Additional direct labour cost per unit: $30
- Existing product’s identifiable fixed costs: $18,000
- New product’s identifiable fixed costs: $22,000
- No. of units of new product to be sold: 2,500
- Selling price of new product (per unit): $80
- Total product margin of existing product: $68,000

What is the gain/loss in net income associated with the replacement product?

a. Loss of $15,000
b. Gain of $3,000
c. Gain of $21,000
d. Gain of $71,000
e. Loss of $68,000

9.12
Which of the following BEST defines ‘product margin’?

a. The contribution margin of a particular product less directly identifiable (traceable and discretionary) fixed costs.
b. The contribution margin of a particular product less non-identifiable fixed costs.
c. Selling price per unit less the variable cost per unit.
d. Net profit made on a product after all costs have been deducted from revenue.
e. The selling price per unit of a particular product multiplied by the number of units sold.

9.13
Which of the following is NOT true?

a. A product with a negative profit result may still have a positive contribution margin and product margin.
b. High fixed costs which cannot be traced to any one particular product tend to result in low contribution margins over all product lines.
c. An increase in variable costs directly impacts on the desirability of continuing a particular product line.
d. Fixed, non-traceable costs are irrelevant in choosing between alternative product lines.
e. When deciding whether to sell an existing inventory item or process it further for sale, costs previously incurred in producing that inventory item are irrelevant to the decision.
9.14
Mussel Marine Ltd are deciding whether to go into production of a new line of Scuba air tanks. They estimate that 6,000 tanks per annum is a feasible production level. Current untraceable fixed costs are $220,000 per annum and it is estimated that production of the air tanks will incur additional fixed costs of $6,000 per annum. Direct labour will be re-directed from an existing pressure gauge production division meaning that 1,200 fewer gauges (at a product margin of $40 each) will be produced. Additional labour of $15 per air tank is also required. Materials costs will be $45 per unit, and it is thought that the new product line will bear a 20% allocation of existing untraceable fixed costs.

Required:
At what minimum price must these 6,000 air-tanks be sold in order to make their production feasible?

9.15
Which of the following will produce a decline in contribution margin?

a. Price per unit falls from $12 to $10 and sales increase from 7,200 units to 8,800 units.
b. Price per unit rises from $2.20 to 2.25, variable costs rise by $0.04 per unit and sales increase from 4,000 units to 4,200 units.
c. Price per unit rises by $1.20, sales stay constant at 34,000 units, variable costs increase by $0.82 per unit and fixed costs by $27,000 per annum.
d. Traceable fixed costs rise by $6,800, selling price falls by $2.00 per unit over 53,000 units, and variable costs fall by $2.05 per unit.
e. Unit selling price rises by $5 to $37, variable costs rise by $4.20 per unit to $20, sales volume falls from 32,000 units to 27,000 units and fixed costs decrease by $10,000 per annum.

9.16
The manager of the broom division at Harold’s Household Manufacturing Ltd is distressed because the Chief Executive has proposed discontinuing the broom production line. The Chief Executive has justified his decision with several observations. Which of the following considerations may correctly influence this decision?

a. Traceable fixed production costs of the broom division have shown a large upturn over the last 12 months.
b. Administration costs have risen by 32% due to a general Company restructuring.
c. Broom production could be replaced by fly-swot production at a greater contribution margin.
d. Both a. and b. above.
e. Both a. and c. above.