SOLUTIONS TO END-OF-CHAPTER QUESTIONS **CHAPTER 12**

❯❯ DEVELOP YOUR UNDERSTANDING

❯ Question 12.1

(a) Contribution for one unit of production and sales is the selling price less the variable costs of production.

(b) Relevant costs in decision making are the costs that will be incurred if a certain course of action is followed. Relevant costs include opportunity costs.

(c) Irrelevant costs are those costs that will not change whatever course of action is chosen. Irrelevant costs in decision making include fixed costs and sunk costs.

(d) Sunk costs are those costs incurred in the past that have no further influence on decisions to be made in the future.

(e) Opportunity cost is the cost of choosing one alternative course of action over another.

(f) Break-even point is the point at which the revenue from sales = the total costs of the business both fixed and variable. The break-even point in sales units is given by dividing the total fixed costs by the contribution per unit of sales.

(g) The margin of safety is the current sales in units – the break-even point in sales units.

(h) A target profit is the sales in units required to generate a given level of profit. This is calculated by dividing the profit required by the contribution per unit and adding the break-even number of sales units.

❯ Question 12.2

Podcaster University Press

Current profit: selling 200,000 text books at £30 each:

- Contribution per book: £30 selling price – £10 variable production costs = £20.
- Current profit: (200,000 sales × £20 contribution) – £3,000,000 fixed costs = £1,000,000.

Option 1: reduce selling price to £25 per book resulting in sales of 275,000 books:

- Contribution per book will now be: £25 selling price – £10 variable production costs = £15.
- Expected profit: (275,000 sales × £15 contribution) – £3,000,000 fixed costs = £1,125,000.

Option 2: reduce selling price to £21 per book resulting in sales of 360,000 books:

- Contribution per book now falls to: £21 selling price – £10 variable production costs = £11.
- Expected profit: (360,000 sales × £11 contribution) – £3,000,000 fixed costs = £960,000.

Option 1, reducing the selling price to £25 to sell 275,000 books per annum, will result in a higher profit whereas option 2 will result in a reduction in profit when compared with the current selling price of £30 and annual sales of 200,000 books. Therefore, Podcaster University Press should consider investigating option 1 further.

≫ TAKE IT FURTHER

≫ Question 12.3

Big Bucks University

(a) Relevant costs

- The lecturer costs are not relevant to the decision on how many students to recruit as the lecturers will be paid whether the modules run or not. The lecturer costs are thus sunk costs and irrelevant to the decision on student recruitment. If new staff were to be recruited to teach these modules, then these costs would be relevant.
- The overhead costs for each room allocated to the modules are also irrelevant as these costs will be incurred whether the courses run or not. Costs that are allocated out of central overheads do not arise from the decision to run the modules and so are not relevant.
- The book and handout costs are relevant as these will vary directly in line with the number of students recruited to each module. For every additional module student recruited, a further cost of £100 for books and handouts will be incurred. These costs, along with the directly variable income from each student recruited to each module, will be relevant to the decision of how many students to recruit to each module in order to break even.

(b) Break-even point for each module

- Contribution per student: £400 module fee – £100 variable cost = £300 contribution
- Fixed costs per module: lecturer: £60 × 60 hours = £3,600
- Fixed costs per module: central overhead costs allocated: £1,200
- Total fixed costs per module: £3,600 + £1,200 = £4,800
- Break-even point: £4,800 (fixed costs) ÷ £300 (contribution per student) = 16 students

(c) Margin of safety if 25 students are recruited to each module

- 25 students recruited
- 16 students required to break even
- Therefore, margin of safety = 25 – 16 = 9 students

(d) Profit or loss at different recruitment levels

- Profit or loss at different recruitment levels will be determined by the number of students above or below the break-even point × the contribution per student
- 14 students recruited = 2 students (14 − 16) below the break-even point
- Loss incurred if 14 students are recruited = 2 × £300 = £600
- 30 students recruited = 14 students (30 −16) above the break-even point
- Profit earned if 30 students are recruited = 14 × £300 = £4,200

(e) Break-even point if the university decides to charge £340 per student per module

- Contribution per student now falls to: £340 − £100 = £240
- Fixed costs are unchanged at £4,800
- Break-even point = £4,800 ÷ £240 = 20 students

≫ Question 12.4

Gurjit Limited

(a) Current profit made at a level of sales and production of 5,000 ink jet printers per annum

	£	£
Sales: 5,000 × £40.00		200,000
Direct materials 5,000 × £9.50	47,500	
Direct labour 5,000 × £11.25	56,250	
Direct expense 5,000 × £3.65	18,250	
Total direct costs of production	122,000	
Fixed overhead 5,000 × £5.60	28,000	
Total costs		150,000
Profit on sales and production of 5,000 ink jet printers		50,000

Solution to end-of-chapter questions **Chapter 12**

(b) Profit expected at a level of sales and production of 10,000 ink jet printers per annum

	£	£
Sales: 10,000 × £40.00		400,000
Direct materials 10,000 × £9.50	95,000	
Direct labour 10,000 × £11.25	112,500	
Direct expense 10,000 × £3.65	36,500	
Total direct costs of production	**244,000**	
Fixed overhead 5,000* × £5.60	28,000	
Total costs		272,000
Profit on sales and production of 10,000 ink jet printers		128,000

*No, this is not a misprint! Remember that fixed costs do not change, so, if the overhead absorbed is based on a level of production and sales of 5,000 units, this fixed overhead will not change if production and sales are higher. If you calculated fixed overheads to be £56,000, double the cost for 5,000 units, you should go back over the marginal v. absorption costing section of Chapter 12 to prove to yourself that fixed costs do not change over a given period, in this case one year.

(c) Profit expected at a level of sales and production of 10,000 ink jet printers per annum and purchasing the finished ink jet printers from Anand Limited

	£	£
Sales: 10,000 × £40.00		400,000
10,000 finished ink jet printers from Anand Limited	200,000	
Additional quality control costs	40,000	
Total incremental costs of the buy decision	**240,000**	
Fixed overhead 5,000 × £5.60	28,000	
Total costs		268,000
Profit on sales and production of 10,000 ink jet printers		132,000

Expected profit from this option is £132,000, which is £4,000 higher than making the printers in-house. Relevant costs to take into account in this option are the costs of buying the finished products from Anand Limited and the additional quality control costs that will be incurred to make sure that the printers delivered meet the requirements of Gurjit Limited. These incremental costs (the costs that will be incurred if this option is adopted) are £240,000, which is £4,000 lower than the total direct costs of production that Gurjit Limited will incur if the company manufactures the printers themselves.

Therefore, on cost grounds, you would advise the directors of Gurjit Limited to cease in-house production of ink jet printers and transfer production to Anand Limited.

(d) Additional factors that the directors of Gurjit Limited should take into account in this decision, other than costs and profit, and points you might have included and developed further are as follows:

• Loss of internal expertise on the transfer of production to an outside party.

• Loss of control over production of ink jet printers.

• Any interruption to Anand Limited's production of printers through, for example, strikes, will mean that the products are not reaching the market and the reputation of Gurjit Limited will suffer damage.

• Additional costs to the reputation of Gurjit Limited should the products produced by Anand Limited fall short of customers' expectations.

• The additional quality control costs are only an estimate and these might be higher than the anticipated £40,000. Any increase in these costs might be greater than the total additional £4,000 profit that the directors expect to make by outsourcing production.

• Loss of confidentiality about product design and manufacture. Anand Limited could take the product and redesign and redevelop it and start producing a more advanced version itself, leading to Gurjit Limited losing all their customers and sales.

≫ Question 12.5

Diddle Limited

Step 1: calculate the quantity of limiting factor used in the production of each product:
Clio: Material used: £30 ÷ £6 = 5 kg
Diana: Material used: £12 ÷ £6 = 2 kg
Athena: Material used: £42 ÷ £6 = 7 kg

Step 2: calculate the contribution per unit of limiting factor delivered by each product:

	Contribution per unit of key factor	Ranking
Clio	£30/5 kg per unit = £6 of contribution per unit of material used	2
Diana	£16/2 kg per unit = £8 of contribution per unit of material used	1
Athena	£35/7 kg per unit = £5 of contribution per unit of material used	3

The highest contribution per unit of key factor is delivered by Diana statues, which use just 2 kg of material in each unit and deliver a total contribution of £16 per product.

Step 3: calculate the contribution maximising production schedule:

Product	Kg of material per unit	Quantity produced	Kg of material used	Kg of material remaining	Contribution per unit	Total contribution
	kg	Units	kg	kg	£	£
Diana	2	900	1,800	1,200	16	14,400
Clio	5	198	990	210	30	5,940
Athena	7	30	210	Nil	35	1,050
Total material used (kg)			**3,000**	**Total contribution**		**21,390**

Adopting the sales director's idea of maximising production of Athenas:

- 3,000 kg of material ÷ 7 kg per unit = 428 Athenas produced with 4 kg of material left over.
- Contribution from 428 Athenas = 428 × £35 = £14,890, well below the contribution maximising schedule above.
- As demand for Athenas is limited to 200 units, this would also mean that contribution for the month would only be 200 × £35 = £7,000 with 228 Athenas left unsold at the end of the month.