Chapter 3 – CVP Analysis Exam Prep Handout

1. You have been provided with the following information:

$45,000 / $15

units 1 3,000 − 500 = 2500

	Per Unit	Total
Sales	$15	$45,000
Less variable expenses	9	27,000
Contribution margin	6	18,000
Less fixed expenses		12,000
Operating profit		$ 6,000

15,000 − 12,000 = 3,000

15,000 − 3000 = 9,000

9,000 − 3,000 = 6,000

If sales decrease by 500 units, how much will fixed costs have to be reduced by to maintain the current operating profit of $6,000?

A. $9,000.
B. $7,500.
C. $6,000.
D. $3,000.

1. You have been provided with the following information:

	Per Unit	*Total*
Sales	$15	$45,000
Less variable expenses	9	27,000
Contribution margin	6	18,000
Less fixed expenses		12,000
Operating profit		$ 6,000

If sales decrease by 500 units, how much will fixed costs have to be reduced by to maintain the current operating profit of $6,000?

A. $9,000.
B. $7,500.
C. $6,000.
D. $3,000.

$45,000/$15 = 3,000 units - 500 units = 2,500 units x ($15 - $9) = $15,000 - $12,000 = $3,000 new profit. To maintain current profit level of $6,000 fixed costs will have to be reduced by $3,000.

AACSB: Analytic
AICPA FN: Decision Making
Blooms: Analyze
Difficulty: 3 Hard
Learning Objective: 03-01 Use cost-volume-profit (CVP) analysis to analyze decisions.
Topic Area: CVP Example

2. James Company has a margin of safety percentage of 20%. The break-even point is $200,000 and the variable costs are 45% of sales. Given this information, the operating profit is:

A. $27,500.
B. $18,000.
C. $22,500.
D. $22,000.

$$\frac{(\text{Actual Sales} - \text{BE Sales})}{\text{Actual Sales}} = 20\%$$

$$\text{Actual Sales} \times \frac{\text{Actual Sales} - 200{,}000}{\text{Actual Sales}} = 20\% \times \text{Actual Sales}$$

$$1.0\ \text{Actual Sales} - 200{,}000 = .2\ \text{Actual Sales}$$

$$+200{,}000 = +200{,}000$$
$$-.2\ \text{Actual Sales} \qquad -.2\ \text{Actual Sales}$$

$$\frac{.8\ \text{Actual Sales}}{.8} = \frac{200{,}000}{.8}$$

Actual Sales = $250,000

%		BE	Actual
100	$	200,000	250,000
45	VC		
55	CM	110,000	137,500
	FC	110,000	110,000
	NI	0	$27,500 NI
		BE	

2. James Company has a margin of safety percentage of 20%. The break-even point is $200,000 and the variable costs are 45% of sales. Given this information, the operating profit is:

A. $27,500.
B. $18,000.
C. $22,500.
D. $22,000.

$200,000 ÷ (1 - .20) = $250,000; ($250,000 - 200,000) × (1 - .45) = $27,500.

AACSB: Analytic
AICPA FN: Measurement
Blooms: Apply
Difficulty: 3 Hard
Learning Objective: 03-02 Understand the effect of cost structure on decisions.
Topic Area: Margin of Safety

3. JJ Motors Inc. employs 45 sales personnel to market its line of luxury automobiles. The average car sells for $23,000, and a 6 percent commission is paid to the salesperson. JJ Motors is considering a change to the commission arrangement where the company would pay each salesperson a salary of $2,000 per month plus a commission of 2 percent of the sales made by that salesperson. The amount of total monthly car sales at which JJ Motors would be indifferent as to which plan to select is:

A. $2,250,000.
B. $3,000,000.
C. $1,500,000.
D. $1,250,000.
E. $4,500,000.

%	Old Structure		New Structure	%
100%		S		100%
6%	(.06 S)	VC	(.02 S)	2%
94%		CM		98%
		FC	($2000 x 45 salespersons)	
		NI		

Indifference Point $\Rightarrow$ $.06S = .02S + (\$2000 \times 45)$

$.04S = 90{,}000$

$S = \$2{,}250{,}000$

3. JJ Motors Inc. employs 45 sales personnel to market its line of luxury automobiles. The average car sells for $23,000, and a 6 percent commission is paid to the salesperson. JJ Motors is considering a change to the commission arrangement where the company would pay each salesperson a salary of $2,000 per month plus a commission of 2 percent of the sales made by that salesperson. The amount of total monthly car sales at which JJ Motors would be indifferent as to which plan to select is:

A. $2,250,000.
B. $3,000,000.
C. $1,500,000.
D. $1,250,000.
E. $4,500,000.

($2,000 × 45) + (.02)(total revenue) = (.06)(total revenue); $90,000 + .02TR = .06TR; $90,000 = .04TR; TR = $90,000/.04 = $2,250,000.

AACSB: Analytic
AICPA FN: Decision Making
Blooms: Analyze
Difficulty: 3 Hard
Learning Objective: 03-04 Incorporate taxes; multiple products; and alternative cost structures into the CVP analysis.
Topic Area: Alternative Cost Structures

E3-28 Basic Decision Analysis Using CVP

Balance, Inc., is considering the introduction of a new energy snack with the following price and cost characteristics:

Sales price	$	1.00 per unit
Variable costs		0.20 per unit
Fixed costs		400,000 per month

Assume that the company plans to sell 600,000 units per month. Consider requirements (*b*), (*c*), and (*d*) independently of each other.

Required

a. What will be the operating profit?

b. What is the impact on operating profit if the sales price decreases by 10 percent? Increases by 20 percent?

c. What is the impact on operating profit if variable costs per unit decrease by 10 percent? Increase by 20 percent?

d. Suppose that fixed costs for the year are 10 percent lower than projected, and variable costs per unit are 10 percent higher than projected. What impact will these cost changes have on operating profit for the year? Will profit go up? Down? By how much?

	Original		(b1)		(b2)	
Units	1	600,000	1	600,000	1	600,000
Sales	$1.00	$600,000	**$0.90**	$540,000	**$1.20**	$720,000
Var Costs	$0.20	$120,000	**$0.20**	$120,000	**$0.20**	$120,000
CM	$0.80	$480,000	**$0.70**	$420,000	**$1.00**	$600,000
Fixed Costs	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Op. Profit		**$80,000**		$20,000		$200,000
Impact on Original Op. Profit			**decrease by $60,000**		**increase by $120,000**	

	Original		(c1)		(c2)	
Units	1	600,000	1	600,000	1	600,000
Sales	$1.00	$600,000	**$1.00**	$600,000	**$1.00**	$600,000
Var Costs	$0.20	$120,000	**$0.18**	$108,000	**$0.24**	$144,000
CM	$0.80	$480,000	**$0.82**	$492,000	**$0.76**	$456,000
Fixed Costs	$400,000	$400,000	$400,000	$400,000	$400,000	$400,000
Op. Profit		**$80,000**		$92,000		$56,000
Impact on Original Op. Profit			**increase by $12,000**		**decrease by $24,000**	

	Original		(d)
Units	1	600,000	600,000
Sales	$1.00	$600,000	$600,000
Var Costs	$0.20	$120,000	**($0.20X1.1)X600,000**
CM	$0.80	$480,000	$468,000
Fixed Costs	$400,000	$400,000	**(0.9)X400,000**
Op. Profit		**$80,000**	$108,000
Impact on Original Op. Profit			**increase by $28,000**

E 3-28 (30 min.) Basic Decision Analysis Using CVP: Balance, Inc.

a. Profit = ($1.00 – $0.20) × 600,000 – $400,000
..... = $80,000

b. 10% price decrease. Now P = $0.90

Profit = ($0.90 – $0.20) x 600,000 – $400,000

= $20,000 Profit decreases by $60,000

20% price increase. Now P = $1.20

Profit = ($1.20 – $0.20) x 600,000 – $400,000

= $200,000 Profit increases by $120,000

c. 10% variable cost decrease. Now V = $0.18

Profit = ($1.00 – $0.18) x 600,000 – $400,000

= $92,000 Profit increases by $12,000

20% variable cost increase. Now V = $0.24

Profit = ($1.00 – $0.24) x 600,000 – $400,000

= $56,000 Profit decreases by $24,000

d. Profit = ($1.00 – $0.22) x 600,000 – $360,000

= $108,000 Profit increases by $28,000

E 3-30. Analysis of Cost Structure

The Dollar Store's cost structure is dominated by variable costs with a contribution margin ratio of .30 and fixed costs of $30,000. Every dollar of sales contributes 30 cents toward fixed costs and profit. The cost structure of a competitor, One-Mart, is dominated by fixed costs with a higher contribution margin ratio of .80 and fixed costs of $280,000. Every dollar of sales contributes 80 cents toward fixed costs and profit. Both companies have sales of $500,000 for the month.

Required

a. Compare the two companies' cost structures using the format shown in Exhibit 3.5 as follows:

	Lo-Lev Company (1,000,000 units)		Hi-Lev Company (1,000,000 units)	
	Amount	Percentage	Amount	Percentage
Sales	$1,000,000	100	$1,000,000	100
Variable costs	750,000	75	250,000	25
Contribution margin	$ 250,000	25	$ 750,000	75
Fixed costs	50,000	5	550,000	55
Operating profit	$ 200,000	20	$ 200,000	20
Break-even point	200,000 units		733,334 units	
Contribution margin per unit	$0.25		$0.75	

b. Suppose that both companies experience a 15 percent increase in sales volume.

By how much would each company's profits increase?

Next page →

E 3-30 (30 min.) Analysis of Cost Structure: The Dollar Store vs. One-Mart.

a.

	Dollar Store		One-Mart	
	Amount	Percentage	Amount	Percentage
Sales	$500,000	100%	$500,000	100%
Variable cost	350,000	70	100,000	20
Contribution margin	$150,000	30%	$400,000	80%
Fixed costs	30,000	6	280,000	56
Operating profit	$120,000	24%	$120,000	24%

b. Dollar Store's profits increase by $22,500 [= .30 x ($500,000 x .15)] and One Mart's profits increase by $60,000 [= .80 x ($500,000 x .15)].

E 3-36. Multiproduct CVP Analysis

Rio Coffee Shoppe sells two coffee drinks, a regular coffee and a latte. The two drinks have the following prices and cost characteristics:

	Regular Coffee	Latte
Sales price (per cup)	$1.50	$2.50
Variable costs (per cup)	0.70	1.30

The monthly fixed costs at Rio are $6,720. Based on experience, the manager at Rio knows that the store sells 60 percent regular coffee and 40 percent lattes.

Required

How many cups of regular coffee and lattes must Rio sell every month to break even?

	Reg Coffee	Latte
S	1.50	2.50
VC	0.70	1.30
CM	0.80	1.20
	x 60%	x 40%
Weighted Average	0.48	+ 0.48 = $0.96 CM per unit

	1
S	
VC	
CM	$0.96
FC	$6,720
NI	

$$\text{BE Units} = \frac{\text{FC}}{\text{CM per unit}} = \frac{\$6{,}720}{\$0.96} = 7000 \text{ cups.}$$

Reg Coffee → 7,000 x 60% = 4,200 cups.

Latte → 7,000 x 40% = 2,800 cups.

E 3-36 (20 min.) Multiproduct CVP Analysis: Rio Coffee Shoppe.

First, compute the weighted-average contribution margin per unit:

= $0.96 = 60% x ($1.50 – $0.70) + 40% x ($2.50 – $1.30)

The total number of cups of regular coffee and lattes (X) to break even is:

Profit = (P – V)X – F
$0 = $0.96 X – $6,720
X = 7,000 cups
= 4,200 (= 60% x 7,000) cups of coffee and
2,800 (= 40% x 7,000) lattes