



FOTAMAT

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COST – VOLUME – PROFIT RELATIONSHIP

Profits are affected by:

1. selling price.
2. sales volume.
3. unit variable costs.
4. mixed of products sold.

Cost-volume-profit analysis (CVP)

Company Contribution income statement For the month of June		
	total	Per unit
Sales (400 units)	100,000	250
Variable expense	(60,000)	(150)
Contribution margin	40,000	100
Fixed expense	(35,000)	
Net operating income (loss)	5,000	

Contribution income statement Sales of 1 unit		
	total	Per unit
Sales (1 unit)	250	250
Variable expense	(150)	(150)
Contribution margin	100	100
Fixed expense	(35,000)	
Net operating income (loss)	(34,900)	

- breakeven point: is the level of sales at which profit is zero.

Contribution income statement Sales of 350 unit		
	total	Per unit
Sales (350 units)		250
Variable expense		(150)
Contribution margin		100
Fixed expense	(35,000)	
Net operating income (loss)		

Contribution income statement		
	Sales of 351 unit	Sales of 0 unit
Sales (400 units)		
Variable expense		
Contribution margin		
Fixed expense	(35,000)	(35,000)
Net operating income (loss)		

- أي حبة بيع فوق نقطة ال BE بتحقق ربح بقيمة ال CM per unit
- في حالة عدم بيع ولا حبة, الخسارة = Fixed expense
- Profits= (sales - variable expense) - fixed expense
- profits=
- profits at 351 units=

1) Sorin Inc., a company that produces and sells a single product, has provided its contribution format income statement for January.

Sales (4,200 units)	\$ 155,400
Variable expenses	<u>100,800</u>
Contribution margin	54,600
Fixed expenses	<u>42,400</u>
Net operating income	\$ <u>12,200</u>

If the company sells 4,600 units, its total contribution margin should be closest to:

- A) \$54,600
 B) \$59,800
 C) \$69,400
 D) \$13,362

2) Schister Systems uses the following data in its Cost-Volume-Profit analyses:

	Total
Sales	\$ 400,000
Variable expenses	<u>280,000</u>
Contribution margin	120,000
Fixed expenses	<u>100,000</u>
Net operating income	\$ <u>20,000</u>

What is total contribution margin if sales volume increases by 20%?

- A) \$80,000
 B) \$158,400
 C) \$200,000
 D) \$144,000

3) Carver Corporation produces a product which sells for \$40. Variable manufacturing costs are \$18 per unit. Fixed manufacturing costs are \$5 per unit based on the current level of activity, and fixed selling and administrative costs are \$4 per unit. A selling commission of 15% of the selling price is paid on each unit sold. The contribution margin per unit is:

- A) \$7
 B) \$17
 C) \$22
 D) \$16

4) Nocum Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (3,000 units)	\$ 120,000
Variable expenses	90,000
Contribution margin	<u>30,000</u>
Fixed expenses	21,000
Net operating income	<u>\$ 9,000</u>

If sales decline to 2,900 units, the net operating income would be closest to:

- A) \$29,000
 B) \$1,000
 C) \$8,700
 D) \$8,000

5) Escareno Corporation has provided its contribution format income statement for June. The company produces and sells a single product.

Sales (8,400 units)	\$ 764,400
Variable expenses	445,200
Contribution margin	<u>319,200</u>
Fixed expenses	250,900
Net operating income	<u>\$ 68,300</u>

If the company sells 8,200 units, its total contribution margin should be closest to:

- A) \$301,000
 B) \$311,600
 C) \$319,200
 D) \$66,674

6) Coultrap Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (3,000 units)	\$ 180,000
Variable expenses	117,000
Contribution margin	<u>63,000</u>
Fixed expenses	48,300
Net operating income	<u>\$ 14,700</u>

The contribution margin per unit is closest to:

- A) \$21.00
 B) \$60.00
 C) \$39.00
 D) \$4.90

7) Decaprio Inc. produces and sells a single product. The company has provided its contribution format income statement for June.

Sales (8,800 units)	\$ 528,000
Variable expenses	290,400
Contribution margin	<u>237,600</u>
Fixed expenses	211,700
Net operating income	<u>\$ 25,900</u>

If the company sells 9,200 units, its net operating income should be closest to:

- A) \$27,077
 B) \$49,900
 C) \$36,700
 D) \$25,900

8) Warrix Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (3,000 units)	\$	120,000
Variable expenses		90,000
Contribution margin		30,000
Fixed expenses		27,000
Net operating income	\$	3,000

If sales increase to 3,020 units, the increase in net operating income would be closest to:

- A) \$800.00
- B) \$20.00
- C) \$600.00
- D) \$200.00

9) Thomason Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (1,000 units)	\$	40,000
Variable expenses		<u>30,000</u>
Contribution margin		10,000
Fixed expenses		<u>7,000</u>
Net operating income	\$	<u>3,000</u>

If the variable cost per unit increases by \$1, spending on advertising increases by \$2,000, and unit sales increase by 50 units, the net operating income would be closest to:

- A) \$450
- B) \$1,000
- C) \$2,150
- D) \$9,450

10) Duve Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (2,000 units)	\$	40,000
Variable expenses		<u>24,000</u>
Contribution margin		16,000
Fixed expenses		<u>11,200</u>
Net operating income	\$	<u>4,800</u>

If the selling price increases by \$4 per unit and the sales volume decreases by 200 units, the net operating income would be closest to:

- A) \$7,200
- B) \$12,800
- C) \$10,400
- D) \$11,520

11) The following information pertains to Nova Co.'s cost-volume-profit relationships:

Breakeven point in units sold		1,000
Variable expenses per unit	\$	500
Total fixed expenses	\$	150,000

How much will be contributed to net operating income by the 1,001st unit sold?

- A) \$650
- B) \$500
- C) \$150
- D) \$0

12) Keoungtai Corporation produces and sells a single product. The company has provided its contribution format income statement for October.

Sales (4,600 units)	\$ 266,800
Variable expenses	<u>179,400</u>
Contribution margin	87,400
Fixed expenses	<u>62,200</u>
Net operating income	<u>\$ 25,200</u>

If the company sells 4,500 units, its total contribution margin should be closest to:

- A) \$85,500
- B) \$24,652
- C) \$87,400
- D) \$81,600

13) Lister Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (3,000 units)	\$ 90,000
Variable expenses	<u>58,500</u>
Contribution margin	31,500
Fixed expenses	<u>21,000</u>
Net operating income	<u>\$ 10,500</u>

If sales increase to 3,040 units, the increase in net operating income would be closest to:

- A) \$420.00
- B) \$140.00
- C) \$1,200.00
- D) \$780.00

14) A cement manufacturer has supplied the following data:

Tons of cement produced and sold	680,000
Sales revenue	\$ 2,788,000
Variable manufacturing expense	\$ 1,156,000
Fixed manufacturing expense	\$ 760,000
Variable selling and administrative expense	\$ 272,000
Fixed selling and administrative expense	\$ 294,000
Net operating income	\$ 306,000

What is the company's unit contribution margin?

- A) \$0.45 per unit
- B) \$2.10 per unit
- C) \$2.00 per unit
- D) \$4.10 per unit

15) A cement manufacturer has supplied the following data:

Tons of cement produced and sold	680,000
Sales revenue	\$ 2,788,000
Variable manufacturing expense	\$ 1,156,000
Fixed manufacturing expense	\$ 760,000
Variable selling and administrative expense	\$ 272,000
Fixed selling and administrative expense	\$ 294,000
Net operating income	\$ 306,000

If the company increases its unit sales volume by 4% without increasing its fixed expenses, then total net operating income should be closest to:

- A) \$12,240
- B) \$318,240
- C) \$360,400
- D) \$311,973

A tile manufacturer has supplied the following data for Q 16 and 17

Boxes of tiles produced and sold		520,000
Sales revenue	\$	2,132,000
Variable manufacturing expense	\$	650,000
Fixed manufacturing expense	\$	464,000
Variable selling and administrative expense	\$	260,000
Fixed selling and administrative expense	\$	312,000
Net operating income	\$	446,000

16) What is the company's unit contribution margin?

- A) \$0.86 per unit
- B) \$2.35 per unit
- C) \$4.10 per unit
- D) \$1.75 per unit

17) If the company increases its unit sales volume by 3% without increasing its fixed expenses, then total net operating income should be closest to:

- A) \$459,380
- B) \$453,667
- C) \$13,380
- D) \$482,660

18) A tile manufacturer has supplied the following data:

Boxes of tiles produced and sold		520,000
Sales revenue	\$	2,132,000
Variable manufacturing expense	\$	650,000
Fixed manufacturing expense	\$	464,000
Variable selling and administrative expense	\$	260,000
Fixed selling and administrative expense	\$	312,000
Net operating income	\$	446,000

The company's contribution margin ratio is closest to:

- A) 42.7%
- B) 57.3%
- C) 45.8%
- D) 21.0%

19) Jilk Inc.'s contribution margin ratio is 58% and its fixed monthly expenses are \$36,000. Assuming that the fixed monthly expenses do not change, what is the best estimate of the company's net operating income in a month when sales are \$103,000?

- A) \$23,740
- B) \$59,740
- C) \$67,000
- D) \$7,260

20) Gayne Corporation's contribution margin ratio is 12% and its fixed monthly expenses are \$84,000. If the company's sales for a month are \$738,000, what is the best estimate of the company's net operating income? Assume that the fixed monthly expenses do not change.

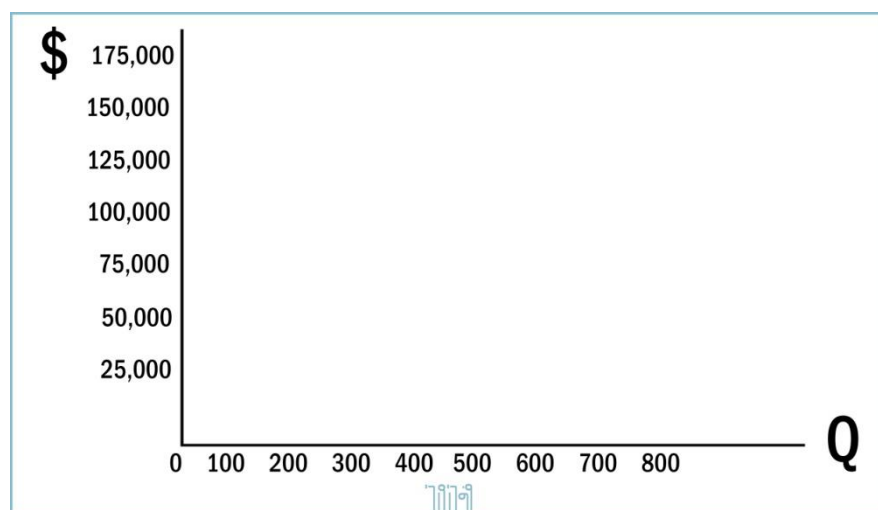
- A) \$565,440
- B) \$654,000
- C) \$88,560
- D) \$4,560

21) Creswell Corporation's fixed monthly expenses are \$29,000 and its contribution margin ratio is 56%. Assuming that the fixed monthly expenses do not change, what is the best estimate of the company's net operating income in a month when sales are \$95,000?

- A) \$12,800
- B) \$24,200
- C) \$53,200
- D) \$66,000

2

CVP relationship in graphic form



Contribution margin ratio

- Contribution margin ratio =
- profit= CM ratio * sales - fixed costs
- CM ratio = 1 - V.expense ratio
- calculate the ratios:

	Per unit	Percent of sales
Selling price	250	
Variable expense	150	
Contribution margin	100	

1) Kelchner Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (3,000 units)	\$	180,000
Variable expenses		<u>108,000</u>
Contribution margin		72,000
Fixed expenses		<u>62,400</u>
Net operating income	\$	<u>9,600</u>

The contribution margin ratio is closest to:

- A) 67%
- B) 40%
- C) 33%
- D) 60%

2) Stauffer Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (8,000 units)	\$	320,000
Variable expenses		<u>192,000</u>
Contribution margin		128,000
Fixed expenses		<u>118,400</u>
Net operating income	\$	<u>9,600</u>

The variable expense ratio is closest to:

- A) 60%
- B) 40%
- C) 67%
- D) 33%

3

change in fixed cost and sales volume

the sales manager wants to increase the advertising budget by 10,000\$ and by that he anticipates that the total sales will increase to 520 units.

You as accountant, will agree on that or not and why?

Contribution income statement				
	Current sales	Sales with additional advertising budget	difference	Percent of sales
Sales (400 units)	100,000			
Variable expense	60,000			
Contribution margin	40,000			
Fixed expense	(35,000)			
Net operating income	5,000			

change in variable cost and sales volume

the sales manager anticipates that the sales units will increase to 480 units if the product's quality increases. If the quality increases, the CM will be decreased by 10\$.

You as accountant, will agree on that or not and why?

1) Data concerning Dorazio Corporation's single product appear below:

	Per Unit	Percent of Sales	
Selling price	\$ 160	100	%
Variable expenses	48	30	%
Contribution margin	\$ 112	70	%

Fixed expenses are \$87,000 per month. The company is currently selling 1,000 units per month. Management is considering using a new component that would increase the unit variable cost by \$28. Since the new component would increase the features of the company's product, the marketing manager predicts that monthly sales would increase by 400 units. What should be the overall effect on the company's monthly net operating income of this change?

- A) increase of \$5,600
- B) increase of \$33,600
- C) decrease of \$5,600
- D) decrease of \$33,600

2) Kuzio Corporation produces and sells a single product. Data concerning that product appear below:

	Per Unit	Percent of Sales	
Selling price	\$ 130	100	%
Variable expenses	78	60	%
Contribution margin	\$ 52	40	%

The company is currently selling 6,000 units per month. Fixed expenses are \$263,000 per month. The marketing manager believes that a \$5,000 increase in the monthly advertising budget would result in a 140 unit increase in monthly sales. What should be the overall effect on the company's monthly net operating income of this change?

- A) increase of \$2,280
- B) increase of \$7,280
- C) decrease of \$5,000
- D) decrease of \$2,280

3) How much will a company's net operating income change if it undertakes an advertising campaign given the following data:

Cost of advertising campaign	\$ 25,000	
Variable expense as a percentage of sales		42 %
Increase in sales	\$ 60,000	

- A) \$200 increase
- B) \$25,200 increase
- C) \$15,000 increase
- D) \$9,800 increase

4) Data concerning Lemelin Corporation's single product appear below:

	Per Unit	Percent of Sales	
Selling price	\$ 230	100%	
Variable expenses	115	50%	
Contribution margin	\$ 115	50%	

The company is currently selling 7,000 units per month. Fixed expenses are \$581,000 per month.

The marketing manager believes that an \$11,000 increase in the monthly advertising budget would result in a 100 unit increase in monthly sales. What should be the overall effect on the company's monthly net operating income of this change?

- A) decrease of \$11,000
- B) increase of \$11,500
- C) decrease of \$500
- D) increase of \$500

change in fixed cost, sales price and sales volume

the sales manager wants to decrease the selling price by 20\$ and increase the advertising budget by 15,000\$ thus, the sales units will increase to be 600 units.

You as accountant, will agree on that or not and why?

change in variable cost, fixed cost and sales volume

the sales manager wants to cut the salesperson's salary, 6,000\$, and give him instead a commission of 15\$ per sale. By this, the anticipated sales units are 460 units.

You as accountant, will agree on that or not and why?

change in selling price

the company has an order of 150 units more than their regular sales units, these extra units will be produced within the relevant range.

If the company want a profit of 3000\$, how much should they sell the unit?

*إذا ال fixed cost تأثر عندنا, مفروض نحلل على ال operating net income ما نوقف بس لي ال CM.

1) Data concerning Lemelin Corporation's single product appear below:

	Per Unit	Percent of Sales
Selling price	\$ 230	100%
Variable expenses	115	50%
Contribution margin	\$ 115	50%

The company is currently selling 7,000 units per month. Fixed expenses are \$581,000 per month.

Management is considering using a new component that would increase the unit variable cost by \$3. Since the new component would increase the features of the company's product, the marketing manager predicts that monthly sales would increase by 200 units. What should be the overall effect on the company's monthly net operating income of this change?

- A) decrease of \$22,400
- B) decrease of \$1,400
- C) increase of \$22,400
- D) increase of \$1,400

The marketing manager would like to introduce sales commissions as an incentive for the sales staff. The marketing manager has proposed a commission of \$20 per unit. In exchange, the sales staff would accept a decrease in their salaries of \$113,000 per month. (This is the company's savings for the entire sales staff.) The marketing manager predicts that introducing this sales incentive would increase monthly sales by 300 units. What should be the overall effect on the company's monthly net operating income of this change?

- A) decrease of \$224,500
- B) increase of \$107,000
- C) increase of \$1,500
- D) increase of \$806,500

The marketing manager would like to cut the selling price by \$18 and increase the advertising budget by \$37,000 per month. The marketing manager predicts that these two changes would increase monthly sales by 1,600 units. What should be the overall effect on the company's monthly net operating income of this change?

- A) increase of \$118,200
- B) increase of \$302,200
- C) decrease of \$118,200
- D) decrease of \$7,800

2) Warbler Gift's reported the following information for the sales of their single product:

	Total	Per Unit
Sales	\$ 300,000	\$ 10
Variable expenses	180,000	6
Contribution margin	120,000	\$ 4
Fixed expenses	100,000	
Net operating income	\$ 20,000	

Warbler's salesmen have proposed to decrease the selling price by 50 cents per unit. How many units will need to be sold for Warbler to earn at least the same net operating income?

- A) 5,715 units
- B) 36,000 units
- C) 34,286 units
- D) 28,572 units

3) Thornbrough Corporation produces and sells a single product with the following characteristics:

	Per Unit	Percent of Sales
Selling price	\$ 220	100%
Variable expenses	44	20%
Contribution margin	\$ 176	80%

The company is currently selling 7,000 units per month. Fixed expenses are \$901,000 per month.

Management is considering using a new component that would increase the unit variable cost by \$11. Since the new component would increase the features of the company's product, the marketing manager predicts that monthly sales would increase by 500 units. What should be the overall effect on the company's monthly net operating income of this change?

- A) increase of \$82,500
- B) decrease of \$5,500
- C) decrease of \$82,500
- D) increase of \$5,500

The marketing manager would like to cut the selling price by \$18 and increase the advertising budget by \$53,000 per month. The marketing manager predicts that these two changes would increase monthly sales by 1,000 units. What should be the overall effect on the company's monthly net operating income of this change?

- A) decrease of \$105,000
- B) increase of \$149,000
- C) increase of \$105,000
- D) decrease of \$21,000

The marketing manager would like to introduce sales commissions as an incentive for the sales staff. The marketing manager has proposed a commission of \$11 per unit. In exchange, the sales staff would accept a decrease in their salaries of \$65,000 per month. (This is the company's savings for the entire sales staff.) The marketing manager predicts that introducing this sales incentive would increase monthly sales by 300 units. What should be the overall effect on the company's monthly net operating income of this change?

- A) increase of \$1,269,500
- B) increase of \$37,500
- C) increase of \$61,700
- D) decrease of \$92,500

4) Sjostrom Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (7,000 units)	\$ 280,000
Variable expenses	182,000
Contribution margin	98,000
Fixed expenses	84,000
Net operating income	\$ 14,000

If the selling price increases by \$3 per unit and the sales volume decreases by 600 units, the net operating income would be closest to:

- A) \$24,800
- B) \$35,000
- C) \$19,200
- D) \$32,000

If the variable cost per unit increases by \$10, spending on advertising increases by \$1,500, and unit sales increase by 15,800 units, the net operating income would be closest to:

- A) \$12,500
- B) \$114,100
- C) \$91,200
- D) \$5,700

5

Target profit analysis

Selling price = 250\$	Fixed cost = 35,000\$
Variable cost per unit = 150\$	CM ratio = 40%

Calculate the units to be sold to attain a profit of 40,000\$.

Calculate the required sales to attain a profit of 40,000\$.

1) To obtain the dollar sales volume necessary to attain a given target profit, which of the following formulas should be used?

- A) $(\text{Fixed expenses} + \text{Target net profit}) / \text{Total contribution margin}$
- B) $(\text{Fixed expenses} + \text{Target net profit}) / \text{Contribution margin ratio}$
- C) $\text{Fixed expenses} / \text{Contribution margin per unit}$
- D) $\text{Target net profit} / \text{Contribution margin ratio}$

2) Tropp Corporation sells a product for \$10 per unit. The fixed expenses are \$420,000 per month and the unit variable expenses are 60% of the selling price. What sales would be necessary in order for Tropp to realize a profit of 10% of sales?

- A) \$1,050,000
- B) \$945,000
- C) \$1,400,000
- D) \$840,000

3) Ferkil Corporation manufactures a single product that has a selling price of \$100 per unit. Fixed expenses total \$225,000 per year, and the company must sell 5,000 units to break even. If the company has a target profit of \$67,500, sales in units must be:

- A) 6,000 units
- B) 5,750 units
- C) 7,925 units
- D) 6,500 units

Data for Q 4+5: Maziarz Corporation produces and sells a single product. Data concerning that product appear below:

Selling price per unit	\$	220.00
Variable expense per unit		72.60
Fixed expense per month	\$	548,328

4) Assume the company's target profit is \$14,000. The unit sales to attain that target profit is closest to:

- A) 7,746 units
- B) 2,556 units
- C) 4,706 units
- D) 3,815 units

5) Assume the company's target profit is \$16,000. The dollar sales to attain that target profit is closest to:

- A) \$564,328
- B) \$1,710,085
- C) \$1,038,898
- D) \$842,281

6) Corporation X sold 25,000 units of product last year. The contribution margin per unit was \$2, and fixed expenses totaled \$40,000 for the year. This year fixed expenses are expected to increase to \$45,000, but the contribution margin per unit will remain unchanged at \$2. How many units must be sold this year to earn the same net operating income as was earned last year?

- A) 22,500
- B) 27,500
- C) 35,000
- D) 2,500

7) Junior Bodway, Inc., has provided the following budgeted data:

Sales		10,000 units
Selling price	\$	50 per unit
Variable expense	\$	30 per unit
Fixed expense	\$	180,000

How many units would the company have to sell in order to have a net operating income of \$40,000?

- A) 20,000 units
- B) 9,000 units
- C) 11,000 units
- D) 7,333 units

8) The contribution margin ratio of Mountain Corporation's only product is 52%. The company's monthly fixed expense is \$296,400 and the company's monthly target profit is \$7,000. The dollar sales to attain that target profit is closest to:

- A) \$570,000
- B) \$157,768
- C) \$583,462
- D) \$154,128

9) Data concerning Bedwell Enterprises Corporation's single product appear below:

Selling price per unit	\$	160.00
Variable expenses per unit	\$	65.60
Fixed expense per month	\$	387,040

The unit sales to attain the company's monthly target profit of \$17,000 is closest to:

- A) 6,159
- B) 4,280
- C) 2,525
- D) 4,321

10) Highjinks, Inc., has provided the following budgeted data:

Sales		20,000 units
Selling price	\$	100 per unit
Variable expense	\$	70 per unit
Fixed expense	\$	450,000

How many units would the company have to sell in order to have a net operating income equal to 5% of total sales dollars?

- A) 18,000 units
- B) 20,000 units
- C) 15,333 units
- D) 14,286 units

11) Product Y sells for \$15 per unit, and has variable expenses of \$9 per unit. Fixed expenses total \$300,000 per year. How many units of Product Y must be sold each year to yield an annual profit of \$90,000?

- A) 50,000 units
- B) 65,000 units
- C) 15,000 units
- D) 43,333 units

12) Logsdon Corporation produces and sells a single product whose contribution margin ratio is 63%. The company's monthly fixed expense is \$720,720 and the company's monthly target profit is \$28,000. The dollar sales to attain that target profit is closest to:

- A) \$471,694
- B) \$454,054
- C) \$1,188,444
- D) \$1,144,000

13) Valdez Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (6,000 units)	\$ 240,000
Variable expenses	<u>180,000</u>
Contribution margin	60,000
Fixed expenses	<u>54,000</u>
Net operating income	<u>\$ 6,000</u>

The number of units that must be sold to achieve a target profit of \$24,000 is closest to:

- A) 30,000 units
- B) 7,800 units
- C) 13,800 units
- D) 24,000 units

6

Selling price = 250\$	Fixed cost = 35,000\$
Variable cost per unit = 150\$	CM ratio = 40%

break even analysis

compute the break-even point in units:

compute the break-even point in dollars:

the margin safety

the margin safety is the excess of budgeted or actual sales dollars over the break-even volume of sales dollars. it is the amount by which sales can drop before losses are incurred.

Selling price = 250\$	Fixed cost = 35,000\$
Variable cost per unit = 150\$	CM ratio = 40%

compute the margin safety in units:

compute the margin safety in dollars in dollars:

compute the margin safety in dollars in percentage:

1) Mossfeet Shoe Corporation is a single product firm. The company is predicting that a price increase next year will not cause unit sales to decrease. What effect would this price increase have on the following items for next year?

	Contribution Margin Ratio	Break-even Point
A)	Increase	Decrease
B)	Decrease	Decrease
C)	Increase	No effect
D)	Decrease	No effect

- A) Choice A
 B) Choice B
 C) Choice C
 D) Choice D

2) Sabv Corporation's break-even-point in sales is \$675,000, and its variable expenses are 75% of sales. If the company lost \$24,000 last year, sales must have amounted to:

- A) \$651,000
 B) \$579,000
 C) \$603,000
 D) \$471,000

3) Break-even analysis assumes that:

- A) Total revenue is constant.
 B) Unit variable expense is constant.
 C) Unit fixed expense is constant.
 D) Selling prices must fall in order to generate more revenue.

4) Which of the following would not affect the break-even point?

- A) number of units sold
 B) variable expense per unit
 C) total fixed expense
 D) selling price per unit

5) Northern Pacific Fixtures Corporation sells a single product for \$28 per unit. If variable expenses are 65% of sales and fixed expenses total \$9,800, the break-even point is:

- A) \$15,077
 B) \$18,200
 C) \$9,800
 D) \$28,000

6) Variable expenses for Alpha Corporation are 40% of sales. What are sales at the break-even point, assuming that fixed expenses total \$150,000 per year:

- A) \$250,000
 B) \$375,000
 C) \$600,000
 D) \$150,000

7) Moyas Corporation sells a single product for \$20 per unit. Last year, the company's sales revenue was \$300,000 and its net operating income was \$24,000. If fixed expenses totaled \$96,000 for the year, the break-even point in unit sales was:

- A) 12,000 units
 B) 9,900 units
 C) 15,000 units
 D) 14,100 units

8) Last year Easton Corporation reported sales of \$480,000, a contribution margin ratio of 25% and a net loss of \$16,000. Based on this information, the break-even point was:

- A) \$435,000
- B) \$544,000
- C) \$506,000
- D) \$600,000

9) If a company increases its selling price by \$2 per unit due to an increase in its variable labor cost of \$2 per unit, the break-even point in units will:

- A) decrease.
- B) increase.
- C) not change.
- D) change but direction cannot be determined.

10) Black Corporation's sales are \$600,000, its fixed expenses are \$150,000, and its variable expenses are 60% of sales. The margin of safety is:

- A) \$90,000
- B) \$190,000
- C) \$225,000
- D) \$240,000

11) Awtis Corporation has a margin of safety percentage of 20% based on its actual sales. The break-even point is \$500,000 and the variable expenses are 60% of sales. Given this information, the actual profit is:

- A) \$65,000
- B) \$55,000
- C) \$50,000
- D) \$41,500

12) Mason Corporation's selling price was \$20 per unit. Fixed expenses totaled \$54,000, variable expenses were \$14 per unit, and the company reported a profit of \$9,000 for the year. The break-even point for Mason Corporation is:

- A) 10,500 units
- B) 4,500 units
- C) 8,500 units
- D) 9,000 units

13) Given the following data:

Selling price per unit	\$	2.00
Variable production cost per unit	\$	0.30
Fixed production cost	\$	3,000
Sales commission per unit	\$	0.20
Fixed selling expenses	\$	1,500

The break-even point in dollars is:

- A) \$6,000
- B) \$4,500
- C) \$2,647
- D) \$4,000

14) Derst Inc. sells a particular textbook for \$140. Variable expenses are \$25 per book. At the current volume of 6,000 books sold per year the company is just breaking even. Given these data, the annual fixed expenses associated with the textbook total:

- A) \$400,000
- B) \$690,000
- C) \$840,000
- D) \$150,000

15) Bear Publishing sells a nature guide. The following information was reported for a typical month:

	Total	Per Unit
Sales	\$ 17,600	\$ 16.00
Variable expenses	9,680	
Contribution margin	7,920	
Fixed expenses	3,600	
Net operating income	\$ 4,320	

What is Bear's current break-even point in unit and dollars?

- A) 1,100 units and \$17,600
- B) 1,100 units and \$8,000
- C) 8,000 units and \$500
- D) 500 units and \$8,000

16) Mio Canoe Livery rents canoes and transports canoes and customers to and from their canoe trip on a local river. The trip is priced at \$20 per person and has a CM ratio of 30%. Mio's fixed expenses are \$84,000. Last year, sales were \$400,000 and profit was \$36,000. How many units need to be sold to break-even, and how many need to be sold to earn a profit of \$42,000?

- A) 1,800 and 2,100
- B) 6,000 and 8,143
- C) 14,000 and 21,000
- D) 4,200 and 6,300

17) Sufra Corporation is planning to sell 100,000 units for \$8.00 per unit and will break even at this level of sales. Fixed expenses will be \$300,000. What are the company's variable expenses per unit?

- A) \$5.00
- B) \$4.00
- C) \$3.00
- D) \$4.50

18) A company makes a single product that it sells for \$16 per unit. Fixed costs are \$76,800 per month and the product has a contribution margin ratio of 40%. If the company's actual sales are \$224,000, its margin of safety is:

- A) \$32,000
- B) \$96,000
- C) \$128,000
- D) \$192,000

19) Creswell Corporation's fixed monthly expenses are \$29,000 and its contribution margin ratio is 56%. Assuming that the fixed monthly expenses do not change, what is the best estimate of the company's net operating income in a month when sales are \$95,000?

- A) \$12,800
- B) \$24,200
- C) \$53,200
- D) \$66,000

20) If sales volume increases and all other factors remain constant, then the:

- A) contribution margin ratio will increase.
- B) break-even point will decrease.
- C) margin of safety will increase.
- D) net operating income will decrease.

21) Evan's Electronics Boutique sells a digital camera. The following information was reported for the digital camera last month:

Sales	\$ 17,600
Variable expenses	9,680
Contribution margin	<u>7,920</u>
Fixed expenses	3,600
Net operating income	<u>\$ 4,320</u>

Evan's margin of safety in dollars and percentage are closest to:

- A) \$8,000 and 83%
- B) \$9,600 and 120%
- C) \$8,000 and 45%
- D) \$9,600 and 55%

Data for Q 22+23: Nussbaum Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (9,000 units)	\$ 180,000
Variable expenses	<u>117,000</u>
Contribution margin	63,000
Fixed expenses	<u>56,700</u>
Net operating income	<u>\$ 6,300</u>

22)The break-even point in unit sales is closest to:

- A) 0 units
- B) 5,850 units
- C) 8,100 units
- D) 8,685 units

23)The break-even point in dollar sales is closest to:

- A) \$162,000
- B) \$117,000
- C) \$0
- D) \$173,700

Data for Q 24+25: Golebiewski Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (5,000 units)	\$ 150,000
Variable expenses	<u>112,500</u>
Contribution margin	37,500
Fixed expenses	<u>35,250</u>
Net operating income	<u>\$ 2,250</u>

24)The margin of safety in dollars is closest to:

- A) \$2,250
- B) \$9,000
- C) \$35,250
- D) \$37,500

25)The margin of safety percentage is closest to:

- A) 2%
- B) 24%
- C) 75%
- D) 6%

CVP consideration in cost structure

- if sales tend to increase in the future, it is better to weight more on fixed expense.
- If sales tend to decrease in the future, it is better to weight more on variable expense.

Operating leverage

Is a measure of how sensitive net operating income is to a given percentage change in dollar sales.

	A	B
Sales (400 units)	100,000	100,000
Variable expense	(60,000)	(30,000)
Contribution margin	40,000	70,000
Fixed expense	(30,000)	(60,000)
Net operating income	10,000	10,000

Calculate the operating leverage for each one:

Calculate the percentage change in net operating income if sales increased by 10%.

1) Shambo Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (3,000 units)	\$ 60,000
Variable expenses	42,000
Contribution margin	<u>18,000</u>
Fixed expenses	13,200
Net operating income	<u>\$ 4,800</u>

Using the degree of operating leverage, the estimated percent increase in net operating income as the result of a 20% increase in sales is closest to:

- A) 75.00%
 B) 1.60%
 C) 250.00%
 D) 5.33%

2) A company that makes organic fertilizer has supplied the following data:

Bags produced and sold	200,000
Sales revenue	\$ 1,560,000
Variable manufacturing expense	\$ 660,000
Fixed manufacturing expense	\$ 448,000
Variable selling and administrative expense	\$ 180,000
Fixed selling and administrative expense	\$ 214,000
Net operating income	\$ 58,000

The company's degree of operating leverage is closest to:

- A) 1.27
 B) 26.90
 C) 3.45
D) 12.41

3) Rushenberg Corporation's operating leverage is 10.8. If the company's sales increase by 14%, its net operating income should increase by about:

- A) 151.2%
 B) 14.0%
 C) 77.1%
 D) 10.8%

4) Sales at East Corporation declined from \$100,000 to \$80,000, while net operating income declined by 300%. Given these data, the company must have had an operating leverage of:

- A) 15
 B) 2.7
 C) 30
 D) 12

5) Iverson Corporation's variable expenses are 60% of sales. At a \$400,000 sales level, the degree of operating leverage is 5. If sales increase by \$40,000, the new degree of operating leverage will be (rounded):

- A) 3.67
 B) 2.86
 C) 5.25
 D) 5.00

- 6) If the degree of operating leverage is 4, then a one percent change in quantity sold should result in a four percent change in:
- A) unit contribution margin.
 B) revenue.
 C) variable expense.
D) net operating income.

7) Hopi Corporation expects the following operating results for next year:

Sales	\$	400,000	
Margin of safety	\$	100,000	
Contribution margin ratio		75	%
Degree of operating leverage		4	

What is Hopi expecting total fixed expenses to be next year?

- A) \$75,000
 B) \$100,000
 C) \$200,000
D) \$225,000

8) A \$2.00 increase in a product's variable expense per unit accompanied by a \$2.00 increase in its selling price per unit will:

- A) decrease the degree of operating leverage.
 B) decrease the contribution margin.
C) have no effect on the break-even volume.
 D) have no effect on the contribution margin ratio.

9) Bois Corporation has provided its contribution format income statement for January.

Sales	\$	426,400
Variable expenses		<u>260,000</u>
Contribution margin		166,400
Fixed expenses		<u>120,900</u>
Net operating income	\$	<u>45,500</u>

If the company's sales increase by 7%, its net operating income should increase by about:

- A) 26%
 B) 7%
 C) 66%
 D) 11%

10) Sebree Corporation has provided the following contribution format income statement. Assume that the following information is within the relevant range.

Sales (7,000 units)	\$	280,000
Variable expenses		<u>168,000</u>
Contribution margin		112,000
Fixed expenses		<u>105,600</u>
Net operating income	\$	<u>6,400</u>

Using the degree of operating leverage, the estimated percent increase in net operating income as the result of a 5% increase in sales is closest to:

- A) 0.29%
B) 87.50%
 C) 0.11%
 D) 218.75%

8

Structuring sales commissions:

- تدخل مع ال COGS و تأثر على ال CM.
- من الأفضل ربطها بال CM و ليس بال sales.

Sales mix and break-even point:

Calculate the break-even point for each product

	A		B		Total	
	Amount	Percent	Amount	Percent	Amount	Percent
Sales	20,000	100%	80,000	100%	100,000	100%
Variable expense	(15,000)	75%	(40,000)	50%	(55,000)	55%
Contribution margin	50,000	25%	40,000	50%	45,000	45%
Fixed expense					(27,000)	
Net operating income					180,000	

Assumptions of CVP analysis:

1-Selling price is constant

2-Costs are linear and can be constantly divided into variable and fixed elements

3-In multiproduct companies, the sales mix is constant

4-In manufacturing companies, inventories do not change, the number of units produced is equal to the number of units sold

1) Which of the following is an assumption underlying standard CVP analysis?

- A) In multiproduct companies, the sales mix is constant.
- B) In manufacturing companies, inventories always change.
- C) The price of a product or service is expected to change as volume changes.
- D) Fixed expenses will change as volume increases.

2) The following data are available for the Phelps Corporation for a recent month:

	Product A	Product B	Product C	Total
Sales	\$ 150,000	\$ 130,000	\$ 90,000	\$ 370,000
Variable expenses	91,000	104,000	27,000	222,000
Contribution margin	\$ 59,000	\$ 26,000	\$ 63,000	148,000
Fixed expenses				55,000
Net operating income				\$ 93,000

The break-even sales for the month for the company is closest to:

- A) \$91,667
- B) \$203,000
- C) \$148,000
- D) \$137,500

3) A company sells two products—J and K. The sales mix is expected to be \$3 of sales of Product K for every \$1 of sales of Product J. Product J has a contribution margin ratio of 40% whereas Product K has a contribution margin ratio of 50%. Annual fixed expenses are expected to be \$120,000. The overall break-even point for the company in dollar sales is expected to be closest to:

- A) \$196,000
- B) \$200,000
- C) \$252,632
- D) \$263,420

4) Roddam Corporation produces and sells two products. Data concerning those products for the most recent month appear below:

	Product K09E	Product G17B
Sales	\$ 28,000	\$ 38,000
Variable expenses	\$ 11,200	\$ 8,600

The fixed expenses of the entire company were \$41,970. If the sales mix were to shift toward Product K09E with total dollar sales remaining constant, the overall break-even point for the entire company:

- A) would increase.
- B) could increase or decrease.
- C) would not change.
- D) would decrease.

5) Steffen Corporation has three products with the following characteristics:

	Product A	Product B	Product C
Monthly sales in dollars	\$ 120,000	\$ 160,000	\$ 200,000
Contribution margin ratio	20 %	40 %	16 %

The overall contribution margin ratio for the company as a whole is closest to:

- A) 35.3%
- B) 75.0%
- C) 25.0%
- D) 28.5%

6) Newham Corporation produces and sells two products. In the most recent month, Product R10L had sales of \$28,000 and variable expenses of \$6,440. Product X96N had sales of \$22,000 and variable expenses of \$7,560. The fixed expenses of the entire company were \$32,710. The break-even point for the entire company is closest to:

- A) \$32,710
- B) \$45,431
- C) \$46,710
- D) \$17,290

7) Flesch Corporation produces and sells two products. In the most recent month, Product C90B had sales of \$24,000 and variable expenses of \$6,480. Product Y45E had sales of \$29,000 and variable expenses of \$11,010. The fixed expenses of the entire company were \$32,280. If the sales mix were to shift toward Product C90B with total dollar sales remaining constant, the overall break-even point for the entire company:

- A) would decrease.
- B) would increase.
- C) could increase or decrease.
- D) would not change.

8) Ingram Corporation produces and sells two products. In the most recent month, Product R38T had sales of \$20,000 and variable expenses of \$7,400. Product X08S had sales of \$39,000 and variable expenses of \$6,170. The fixed expenses of the entire company were \$41,160.

If the sales mix were to shift toward Product R38T with total sales remaining constant, the overall break-even point for the entire company:

- A) would not change.
- B) would increase.
- C) would decrease.
- D) could increase or decrease

Data for Q 9+10: Dietrick Corporation produces and sells two products. Data concerning those products for the most recent month appear below:

	Product B32L	Product K84B
Sales	\$ 46,000	\$ 27,000
Variable expenses	\$ 13,800	\$ 14,670

Fixed expenses for the entire company were \$42,550.

9)The break-even point for the entire company is closest to:

- A) \$42,550
- B) \$71,020
- C) \$69,754
- D) \$30,450

10)If the sales mix were to shift toward Product B32L with total sales remaining constant, the overall break-even point for the entire company:

- A) could increase or decrease.
- B) would decrease.
- C) would not change.
- D) would increase.

9

E5-1

Whirly corporation's contribution margin format income statement for the most recent month is shown below:

	total	Per unit
Sales (10,000 units)	350,000\$	35
Variable expense	200,000	20
Contribution margin	150,000	15
Fixed expense	135,000	
Net operating income	15,000	

Required: (consider each case independently)

1-what would be the revised net operating income per month if the sales volume increases by 100 units?

2-what would be the revised net operating income per month id the sales volume decreased by 100 units?

3-what would be the revised net operating income per month if the sales volume is 9,000 units?

E5-4

Last month when holiday creations, Inc., sold 50,000 units, total sales were 200,000\$, total variable expense were 120,000\$, and fixed expense were 65,000\$.

Required:

1-what is the company's contribution margin ratio?

2- what is the estimated change in the company's net operating income if it can increase total sales by 1,000 \$?

E5-5

Data for Hermann corporations are shown below:

	Per unit	Percent of sales
Selling price	\$ 90	%100
Variable expense	63	%70
Contribution margin	27	%30

Fixed expenses are \$ 30,000 per month and the company is selling 2,000 units per month.

Required:

1-how much will net operating income increase (decrease) per month if the monthly advertising budget increases by 5,000\$ and monthly sales increases by \$ 9,000?

2-refere to the original data. How much will net operating income increase (decrease) per month if the company uses higher quality components that increase the variable expense by \$ 2 per unit and increase unit sales by 10%?

E5-6

Mauro products distributes a single product, a woven basket whose selling price is 15\$ per unit and whose variable expense is 12\$ per unit. The company's monthly fixed expense is 4,200\$.

Required:

1-calculate the company's break-even point un unit sales.

2-calculate the company's breakeven point in dollar sales.

3- if the company's fixed expense increase by 600\$, what would become the new break even point in unit sales and in dollar sales?

E5-7

Lin corporations has a single product whose selling price is 120\$ per unit and whose variable expense is 80\$ per unit. The company's monthly fixed expense is 50,000\$.

Required:

1-calculate the unit sales needed to attain a target profit of 10,000\$.

2-calculate the dollar sales needed to attain a target profit of 15,000\$.

E5-8

Molander corporation is distributor of a sun umbrella used at resort hotels. Data concerning the next month's budget appears below:

Selling price per unit	\$30
Variable expense per unit	\$20
Fixed expense per month	\$7,500
Units sales per month	1,000

Required:

1-what is the company's margin of safety.

2-what is the company's margin of safety as a percentage of its sales?

11

E5-9

Engberg company installs lawn sod in home yard. The company's most recent monthly contribution margin format income statement follows:

	amount	Percent of sales
sales	\$ 80,000	100%
Variable expense	32,000	40%
Contribution margin	48,000	60%
Fixed expense	38,000	
Net operating income	10,000	

Required:

1-what is the company's degree of operating leverage?

2- using the degree of operating leverage, estimate the impact of net operating income of a 5% increase in sales.

3-verify your estimate from part (2) above by constructing a new contribution format income statement for the company assuming a 5% increase in sales.

E5-10

Lucido products markets two computers games: Claimjumper and Makeover. A contribution format income statement for a recent month for the new games appears below:

	claimjumper	Makeover	total
Sales	30,000	70,000	100,000
Variable expense	20,000	50,000	70,000
Contribution margin	10,000	20,000	30,000
Fixed expense			24,000
Net operating income			6,000

Required:

1-what is the overall contribution margin ratio for the company?

2-what is the company's overall break-even point?

3-verify the overall break-even point for the company by constructing a contribution format income statement showing the appropriate levels of sales for the two products.

12

The analysis of mixed costs:

1. Account analysis.
2. the engineering approach.
3. the high low method.
4. least squares regression analysis.

Example: the financial manager of a hospital wants to control the maintenance expense which includes both variable and fixed costs, he asked for some data:

Month	Activity level - patient days	Maintenance cost incurred
January	5,600	\$7,900
February	7,100	\$8,500
March	5,000	\$7,400
April	6,500	\$8,200
May	7,300	\$9,100
June	8,000	\$9,800
July	6,200	\$7,800

- Scatter graph plot method of cost analysis:

1	The engineering approach to the analysis of mixed costs involves a detailed statistical analysis of cost behavior using methods that minimize the squared errors.	FALSE
2	A major advantage of the high-low method of cost estimation is that it omits all data from the analysis other than the lowest and highest costs.	FALSE
3	The highest and lowest costs are always used to analyze a mixed cost under the high-low method.	FALSE
4	The high and low points used in the high-low method tend to be unusual and therefore the cost formula for the mixed cost may not accurately represent all of the data.	TRUE
5	In a scatter graph of cost and activity, activity is the <i>independent</i> variable because it causes variations in the cost.	TRUE

13High and low method:

Variable cost = slope of the line = $\frac{Y_2 - Y_1}{X_2 - X_1}$

Cost at the high level of activity – cost at the low level of activity

high activity level – low activity level

Variable cost=

Fixed costs=

$Y = A + BX$

defects in high low method:

1. It uses only 2 data point, which is not enough to produce accurate data.
2. The periods with the highest and lowest tend to be unusual.
3. Cost formula that is estimated solely using data from these unusual periods may misrepresent the true cost behavior during normal periods.

The least squares regression method will generally be more accurate

EX. 2-5 (HIGH LOW METHOD)

the cheyenne Hotel in Vail, Colorado, has accumulated records of the total electrical costs of the hotel and the number of occupancy-days over the last year. An occupancy-day represents a room rented out for one day. The hotel's business is highly seasonal, with peaks occurring during the ski season in the summer.

Month	Occupancy Days	Electrical Costs
January	1,736	\$4,127
February	1,904	\$4,207
March	2,356	\$5,083
April	960	\$2,857
May	360	\$1,871
June	744	\$2,696
July	2,108	\$4,670
August	2,406	\$5,148
September	840	\$2,691
October	124	\$1,588
November	720	\$2,454
December	1,364	3,529

Required:

1- using the high-low method, estimate the fixed costs of electricity per month and the variable cost of electricity per occupancy-day. Round off the fixed cost to the nearest whole dollar and the variable cost to the nearest whole cent.

1	Managers can use a variety of methods to estimate the fixed and variable components of a mixed cost. In account analysis, an account is classified as either variable or fixed based on the analyst's prior knowledge of how the cost in the account behaves.	TRUE
2	The least-squares regression method computes the regression line that minimizes the sum of the squared deviations from the plotted points to the line.	TRUE
3	The R^2 (i.e., R-squared) tells us the percentage of the variation in the <i>dependent</i> variable (cost) that is explained by variation in the <i>independent</i> variable (activity).	TRUE
4	The R^2 (i.e., R-squared) varies from 0% to 100%, and the lower the percentage, the better the fit of the data to a straight line.	FALSE
5	A quick look at a scattergraph of cost versus activity can reveal that there is little relation between the cost and the activity or that the relation is something other than a simple straight line. In such cases, least square regression is highly recommended for estimating fixed and variable costs.	FALSE
6	Least-squares regression selects the values for the intercept and slope of a straight line that minimize the sum of the errors.	FALSE

1) Which of the following statements is true when referring to the high-low method of cost analysis?

A) The high-low method has no major weaknesses.

B) The high-low method is very hard to apply.

C) In essence, the high-low method draws a straight line through two data points.

D) The high-low method uses all of the available data to estimate fixed and variable costs.

2) Larker Brothers, Inc., used the high-low method to derive its cost formula for electrical power cost. According to the cost formula, the variable cost per unit of activity is \$4 per machine-hour. Total electrical power cost at the high level of activity was \$19,200 and at the low level of activity was \$18,400. If the high level of activity was 3,300 machine hours, then the low level of activity was:

A) 3,100 machine hours

B) 3,200 machine hours

C) 3,000 machine hours

D) 2,900 machine hours

3) In describing the cost formula equation, $Y = a + bX$, which of the following is correct:

A) "Y" is the independent variable.

B) "a" is the variable cost per unit.

C) "a" and "b" are valid for all levels of activity.

D) in the high-low method, "b" equals the change in cost divided by the change in activity.

4) Maintenance costs at a Straiton Corporation factory are listed below:

	Machine- Hours	Maintenance Cost
March	3,627	\$ 54,384
April	3,588	\$ 53,980
May	3,637	\$ 54,453
June	3,638	\$ 54,491
July	3,572	\$ 53,843
August	3,611	\$ 54,196
September	3,644	\$ 54,550
October	3,609	\$ 54,181
November	3,669	\$ 54,767

Management believes that maintenance cost is a mixed cost that depends on machine-hours. Use the high-low method to estimate the variable and fixed components of this cost. Compute the variable component first and round off to the nearest whole cent. Compute the fixed component second and round off to the nearest whole dollar. These estimates would be closest to:

- A) \$0.10 per machine-hour; \$54,382 per month
- B) \$15.00 per machine-hour; \$54,316 per month
- C) \$9.12 per machine-hour; \$21,309 per month
- D) \$9.53 per machine-hour; \$19,801 per month**

5) A soft drink bottler incurred the following factory utility cost: \$9,246 for 5,200 cases bottled and \$8,997 for 4,900 cases bottled. Factory utility cost is a mixed cost containing both fixed and variable components. The variable factory utility cost per case bottled is closest to:

- A) \$1.81
- B) \$1.78
- C) \$1.84
- D) \$0.83**

15

PROBLEM 2-16.

Morrisey and brown, Ltd. of Sydney is a merchandising company that is sole distributor of a product that is increasing in popularity among Australian consumers. The company's income statements for the three most recent months follow:

Morrisey&brown, Ltd.			
Income statements			
For the three months ended September 30			
	July	August	September
Sales in units	<u>4,000</u>	<u>4,500</u>	<u>5,000</u>
Sales	400,000	450,000	500,000
Cost of goods sold	<u>240,000</u>	<u>270,000</u>	<u>300,000</u>
Gross margin	160,000	180,000	200,000
selling and administrative expense:			
Advertising expense	21,000	21,000	21,000
Shipping expense	34,000	36,000	38,000
Salaries and commissions	78,000	84,000	90,000
Insurance expense	6,000	6,000	6,000
Depreciation expense	<u>15,000</u>	<u>15,000</u>	<u>15,000</u>
Total selling and administrative expense	<u>154,000</u>	<u>162,000</u>	<u>170,000</u>
Net operating income	6,000	18,000	30,000

Required:

- 1-identify each of the company's expenses as either variable, fixed or mixed.
- 2-using the high low method, separates each mixed expense into variable and fixed elements.
- 3-Redo the company's income statement at the 5,000 unit level of activity using the contribution format.

1) The following data pertains to activity and utility cost for two recent periods:

Activity level (units)	15,000	12,000
Utility cost	\$ 24,750	\$ 21,000

Utility cost is a mixed cost with both fixed and variable components. Using the high-low method, the cost formula for utility cost is:

- A) $Y = \$1.65 X$
- B) $Y = \$1.75 X$
- C) $Y = \$3,750 + \$1.75 X$
- D) $Y = \$6,000 + \$1.25 X$**

2) The Blaine Corporation is a highly automated manufacturer. At an activity level of 6,000 machine setups, total overhead costs equal \$240,000. Of this amount, depreciation totals \$80,000 (all fixed) and lubrication totals \$72,000 (all variable). The remaining \$88,000 of the total overhead cost consists of utility cost (mixed). At an activity level of 9,000 setups, utility cost totals \$112,000.

Assume that the relevant range includes all of the activity levels mentioned in this problem.

The variable cost per setup for utilities is most likely closest to:

- A) \$ 8.00 per setup**
- B) \$12.44 per setup
- C) \$ 4.00 per setup
- D) \$14.66 per setup

The total fixed overhead costs for Blaine Corporation are most likely closest to:

- A) \$112,000
- B) \$120,000**
- C) \$ 40,000
- D) \$ 80,000

If 7,800 setups are projected for the next period, total expected overhead cost would be closest to:

- A) \$156,000
- B) \$236,000
- C) \$214,400
- D) \$276,000**

3) Compton Corporation is a wholesale distributor of educational CD-ROMs. The company's records indicate the following:

	This Year	Last Year
Units Sold	250,000	200,000
Sales	\$ 1,250,000	\$ 1,000,000
Cost of goods sold	<u>875,000</u>	<u>700,000</u>
Gross margin	375,000	300,000
Selling and administrative expenses	<u>222,000</u>	<u>210,000</u>
Net operating income	<u>\$ 153,000</u>	<u>\$ 90,000</u>

Using the high-low method of analysis, what are the company's estimated variable selling and administrative expenses per unit?

- A) **\$0.24**
- B) \$4.17
- C) \$0.88
- D) \$0.96

Using the high-low method of analysis, what are the company's estimated total fixed selling and administrative expenses per year?

- A) \$60,000
- B) \$174,000
- C) \$150,000
- D) **\$162,000**

What is the company's contribution margin for this year?

- A) **\$315,000**
- B) \$(667,500)
- C) \$375,000
- D) \$213,000

4) Callander Corporation is a wholesaler that sells a single product. Management has provided the following cost data for two levels of monthly sales volume. The company sells the product for \$140.50 per unit.

Sales volume (units)	6,000	7,000
Cost of sales	\$ 497,400	\$ 580,300
Selling and administrative costs	\$ 273,600	\$ 294,700

The best estimate of the total monthly fixed cost is:

- A) \$875,000
- B) **\$147,000**
- C) \$771,000
- D) \$823,000

The best estimate of the total variable cost per unit is:

- A) \$82.90
- B) \$128.50
- C) **\$104.00**
- D) \$125.00

The best estimate of the total contribution margin when 6,300 units are sold is:

- A) \$75,600
- B) \$97,650
- C) \$362,880
- D) **\$229,950**

5) Babuca Corporation has provided the following production and total cost data for two levels of monthly production volume. The company produces a single product.

Production volume	5,000units	6,000 units
Direct materials	\$ 103,500	\$ 124,200
Direct labor	\$ 282,500	\$ 339,000
Manufacturing overhead	\$ 667,000	\$ 679,800

The best estimate of the total monthly fixed manufacturing cost is:

- A) \$1,098,000
- B) \$1,053,000
- C) \$1,143,000
- D) \$603,000**

The best estimate of the total variable manufacturing cost per unit is:

- A) \$90.00**
- B) \$77.20
- C) \$12.80
- D) \$20.70

The best estimate of the total cost to manufacture 5,300 units is closest to:

- A) \$1,116,180
- B) \$1,062,915
- C) \$1,080,000**
- D) \$1,009,650

6) The management of Casablanca Manufacturing Corporation believes that machine-hours is an appropriate measure of activity for overhead cost. Shown below are machine-hours and total overhead costs for the past six months:

	Machine- Hours	Overhead Cost
Jan	150,000	\$ 339,000
Feb	140,000	\$ 339,000
Mar	160,000	\$ 350,000
Apr	130,000	\$ 319,500
May	170,000	\$ 362,500
Jun	200,000	\$ 400,000

Assume that the relevant range includes all of the activity levels mentioned in this problem

If Casablanca expects to incur 185,000 machine hours next month, what will the estimated total overhead cost be using the high-low method?

- A) \$212,750
- B) \$359,750
- C) \$382,750**
- D) \$381,700

What is Casablanca's independent variable?

- A) the year
- B) the machine hours**
- C) the total overhead cost
- D) the relevant range

$$\text{Unit CM} = \text{SP} - \text{VC}$$

$$\text{Profit} = (\text{SP} - \text{VC}) * \text{Q} - \text{Fixed expense}$$

$$\text{BE (units)} = \frac{\text{Fixed costs}}{\text{Unit CM}}$$

$$\text{BE (sales)} = \frac{\text{Fixed costs}}{\text{CM\%}}$$

$$\text{Sales in Q required to attain target profit} = \frac{\text{Fixed costs} + \text{target profit}}{\text{Unit CM}}$$

$$\text{Sales in \$ required to attain target profit} = \frac{\text{Fixed costs} + \text{target profit}}{\text{CM \%}}$$

$$\text{Safety margin} = \text{Actual sales} - \text{BE sales}$$

$$\text{Safety margin \%} = \frac{\text{Actual sales} - \text{BE sales}}{\text{Actual sales}}$$

$$\text{Operating leverage} = \frac{\text{CM}}{\text{Net income}}$$

$$\text{increase in net operating income} = \text{increase in sales} * \text{operating leverage}$$

THE END
Good luck