

Cost-Volume-Profit Analysis

Chapter 18

Learning Objective 1

Identify how changes in volume affect costs

Types of Costs

Variable

Fixed

Mixed

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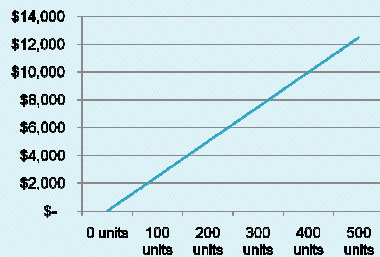
Variable Costs

- ▶ Total variable costs change in direct proportion to changes in the volume of activity
- ▶ Unit variable cost remains constant

Units produced	Direct materials cost per unit	Total direct materials cost
100	\$25	?
200	\$25	?
300	\$25	?
400	\$25	?
500	\$25	?

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Total Variable Costs



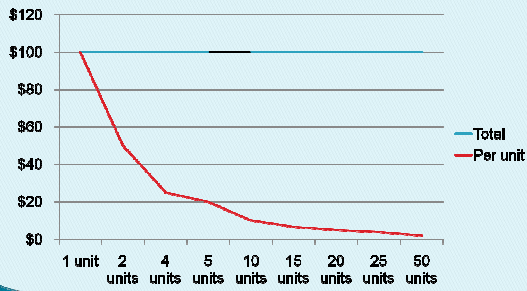
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Fixed Costs

- ▶ Do not change over wide ranges in volume
- ▶ Fixed cost per unit is inversely proportional to activity

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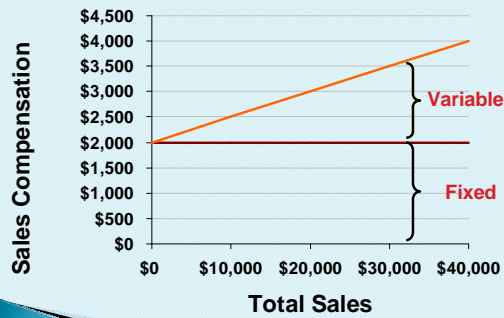
Total Fixed Costs and Fixed Costs per Unit



Mixed Costs

- Have both a fixed and variable component

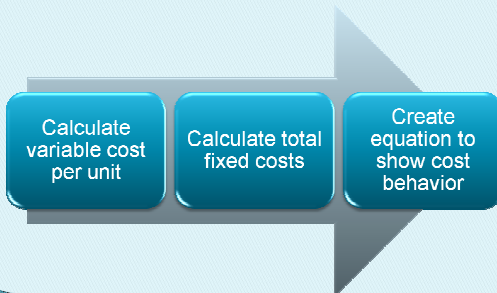
Mixed Costs



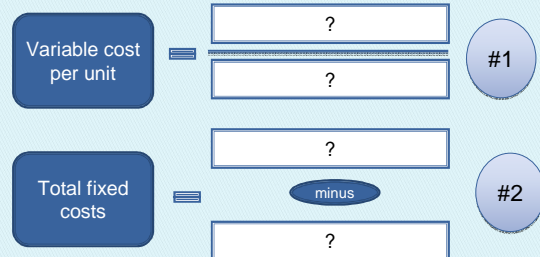
High-Low Method

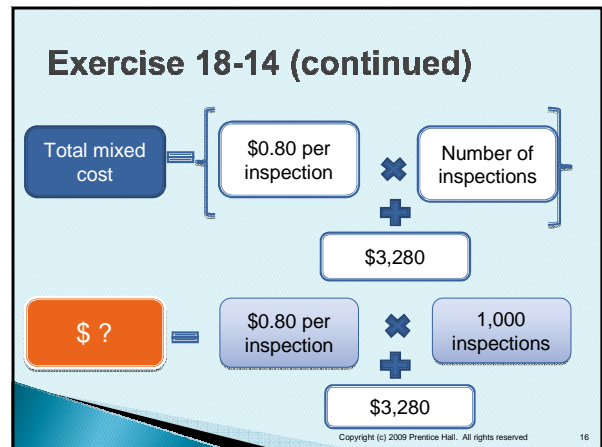
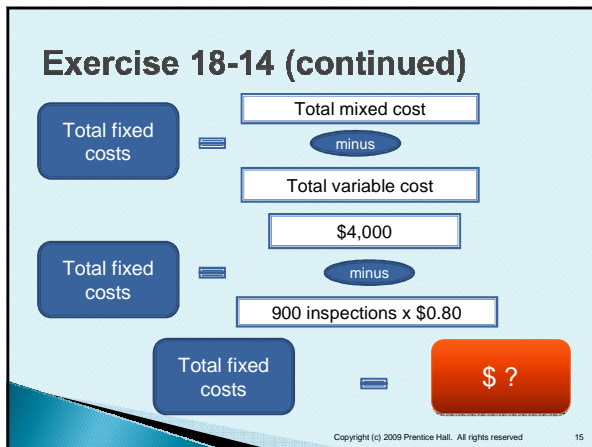
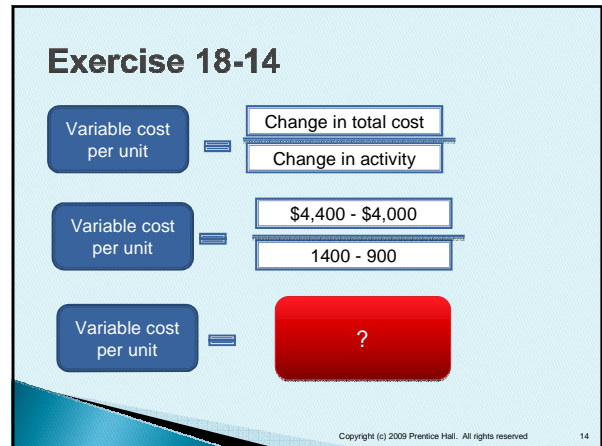
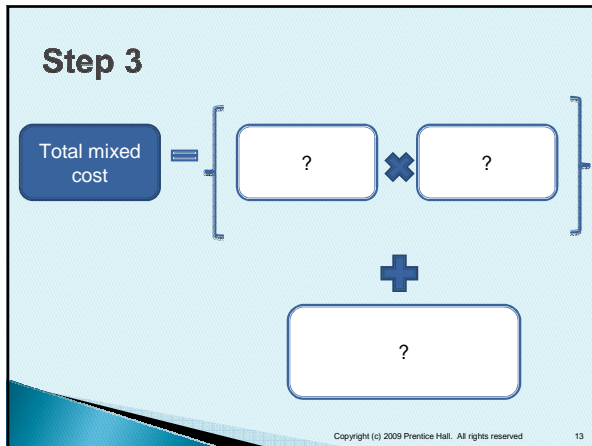
- Method to separate mixed costs into variable and fixed components
- Select the highest level and the lowest level of activity over a period of time

High-Low Method Steps



Steps 1 and 2





Relevant Range

- ▶ Band of volume
- ▶ Outside the relevant range, costs can differ

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Learning Objective 2

Use CVP analysis to compute breakeven points

Assumptions

Costs can be classified as fixed or variable.

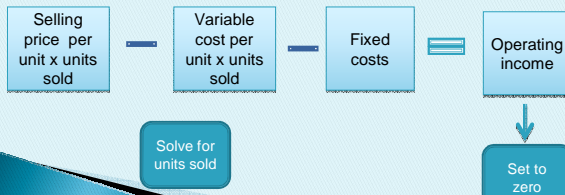
Volume is only factor that affects costs. Fixed costs don't change.

Breakeven Point

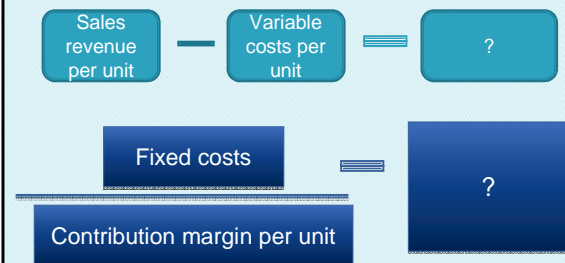
- ▶ Sales level at which operating income is zero
- ▶ Two methods:
 - Income statement approach
 - Contribution margin approach

Income Statement Approach

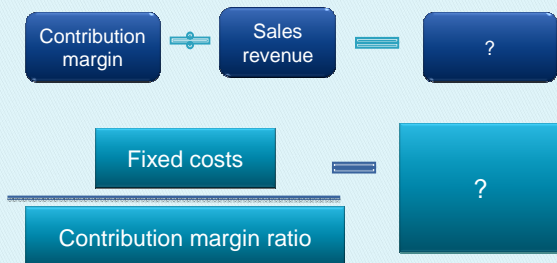
Sales – Variable costs – Fixed costs = Operating income



Contribution Margin Approach



Contribution Margin Ratio



Learning Objective 3

Use CVP analysis for profit planning, and graph the CVP relations

Plan Profits

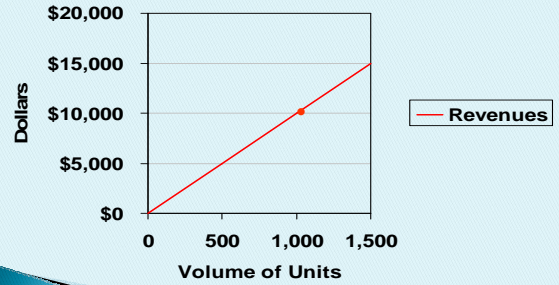
Fixed costs + Desired operating income

Contribution margin ratio

Target sales in dollars

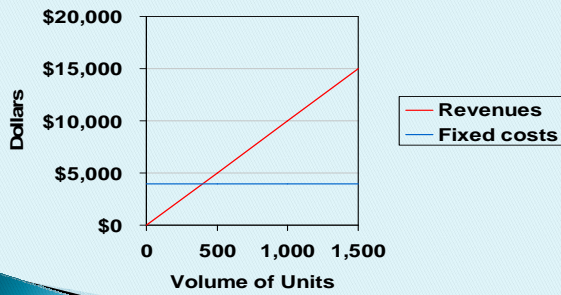
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Preparing a CVP Chart



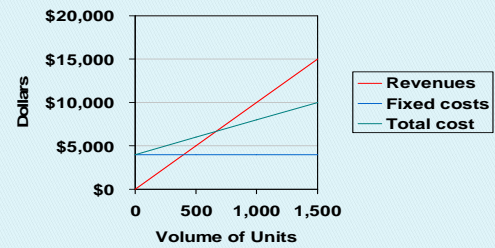
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Preparing a CVP Chart



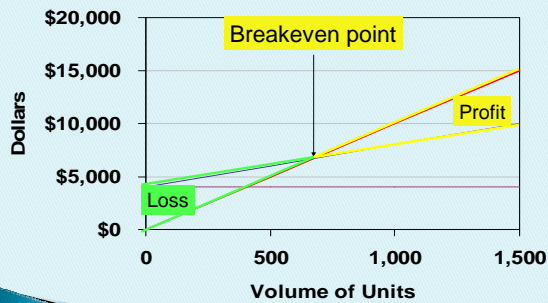
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Preparing a CVP Chart



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Preparing a CVP Chart



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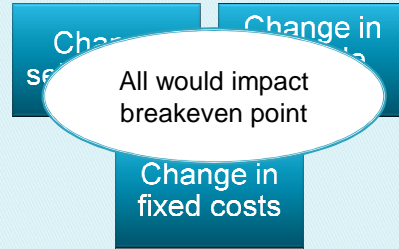
Objective 4

Use CVP methods to perform sensitivity analysis

Sensitivity Analysis

- Management tool to predict how changes in sale prices, cost or volume affects profits
- “What if?” analysis

Sensitivity Analysis



Sensitivity Analysis

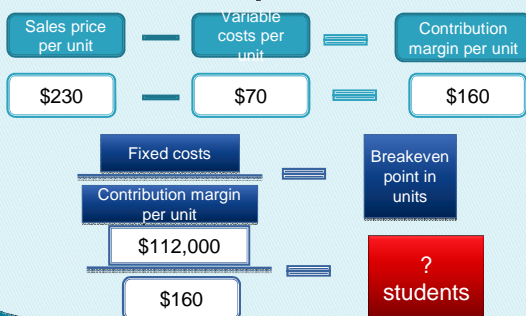
Cause	Effect	Result
Change	Contribution margin	Breakeven point
Selling price increases	?	?
Selling price decreases	?	?
Variable cost per unit increases	?	?
Variable cost per unit decreases	?	?
Fixed costs increase	?	?
Fixed costs decrease	?	?

Margin of Safety

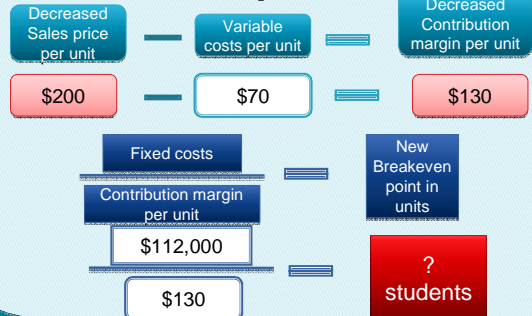
- Excess of expected sales over breakeven sales



Exercise 18-20, part 1a.



Exercise 18-20, part 1b.



Exercise 18-20, part 1c.

Sales price per unit = Decreased variable costs per unit = Increased Contribution margin per unit

\$230 - \$50 = \$180

Fixed costs = New Breakeven point in units

\$112,000 / \$180 = ? students

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Exercise 18-20, 1d.

Sales price per unit = Variable costs per unit = Contribution margin per unit

\$230 - \$70 = \$160

Decreased fixed costs = Breakeven point in units

\$102,000 / \$160 = ? students

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Learning Objective 5

Calculate the breakeven point for multiple product lines or services

Multiple Product Lines

- Selling prices and variable costs differ for each product
- Weighted-average contribution margin computed

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Steps to Computing Breakeven Point with Multiple Product Lines

- Calculate weighted average contribution margin per unit

A company has two products with the sales prices and variable costs per unit indicated in the table

	Product A	Product B	Total
Sales price per unit	\$100		
Variable costs per unit	58		
Contribution margin per unit	42		
Sales mix (units)	5	3	8
Contribution margin	210	270	480
Weighted average contribution margin			\$60

The sales mix weights are added as well as the products' contribution margins

Last year, the company sold 5,000 units of A and 3,000 units of B. This results in a sale mix of 5:3

The \$480 divided by 8 results in a weighted average contribution margin of \$60

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Steps to Computing Breakeven Point with Multiple Product Lines

- Calculate breakeven point for the package of products

Fixed costs = Weighted average contribution margin per unit

assumed \$600,000 / \$60 = ? units

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Steps to Computing Breakeven Point with Multiple Product Lines

- ▶ Calculate the breakeven point for each product line

Breakeven point Product A	$10,000 \times 5/8$? units
Breakeven point Product B	$10,000 \times 3/8$? units

End of Chapter 18