

Cost Accounting- Third Year

Chapter 2

Cost Analysis

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Learning Objectives

In this lecture we will focus on:

Cost drivers

Fixed cost

Variable cost

Mixed cost analysis

Cost Purposes

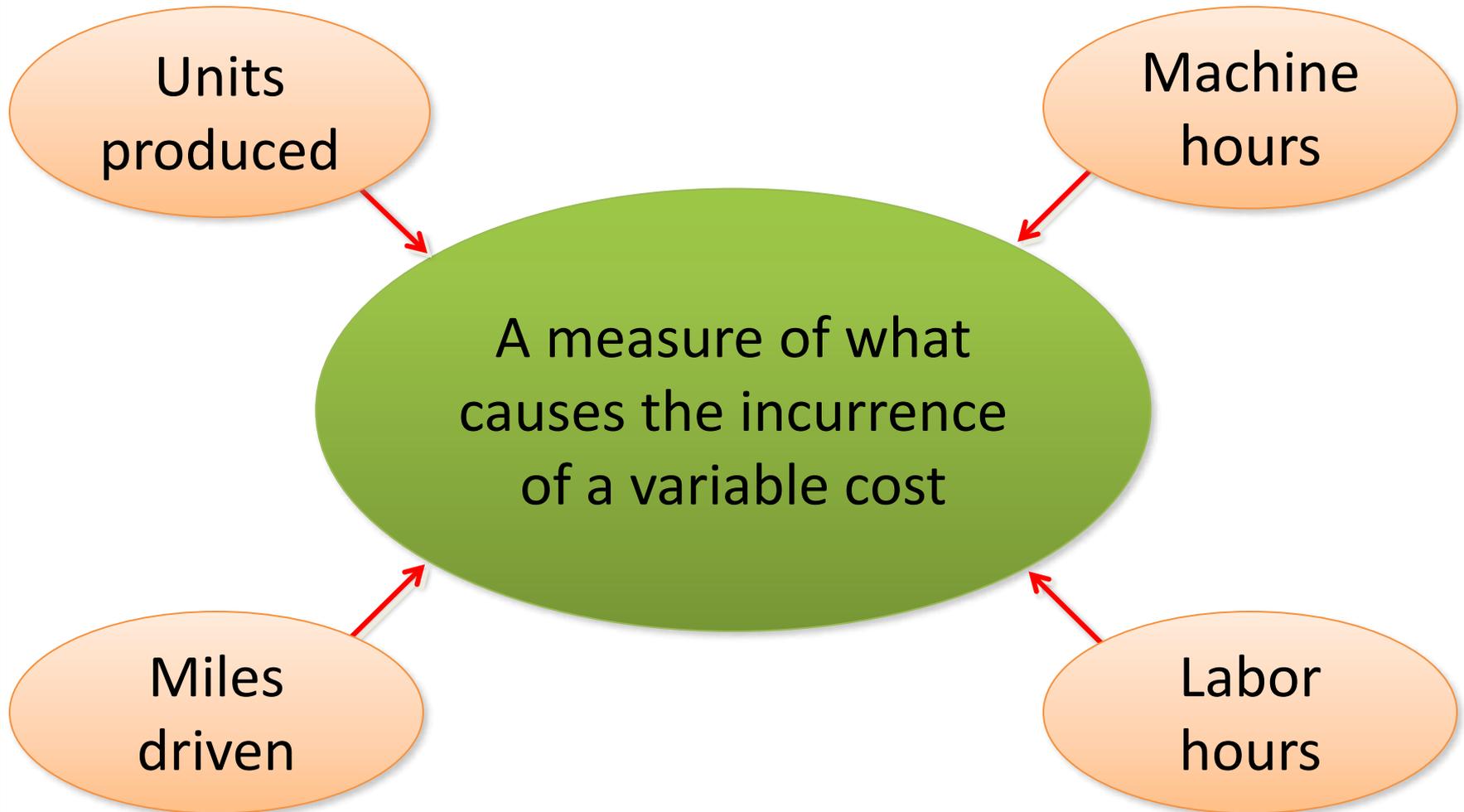
Prepare income statements

Exercises

Learning Objective 1

The Activity Base (Cost Driver)

The Activity Base (Cost Driver)

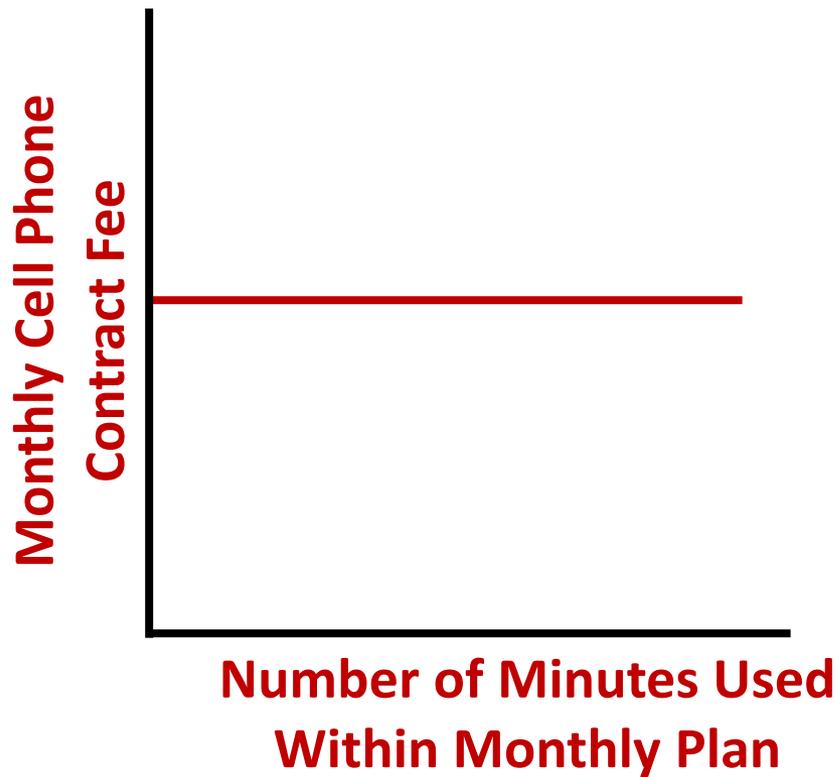


Learning Objective 2

Fixed Cost

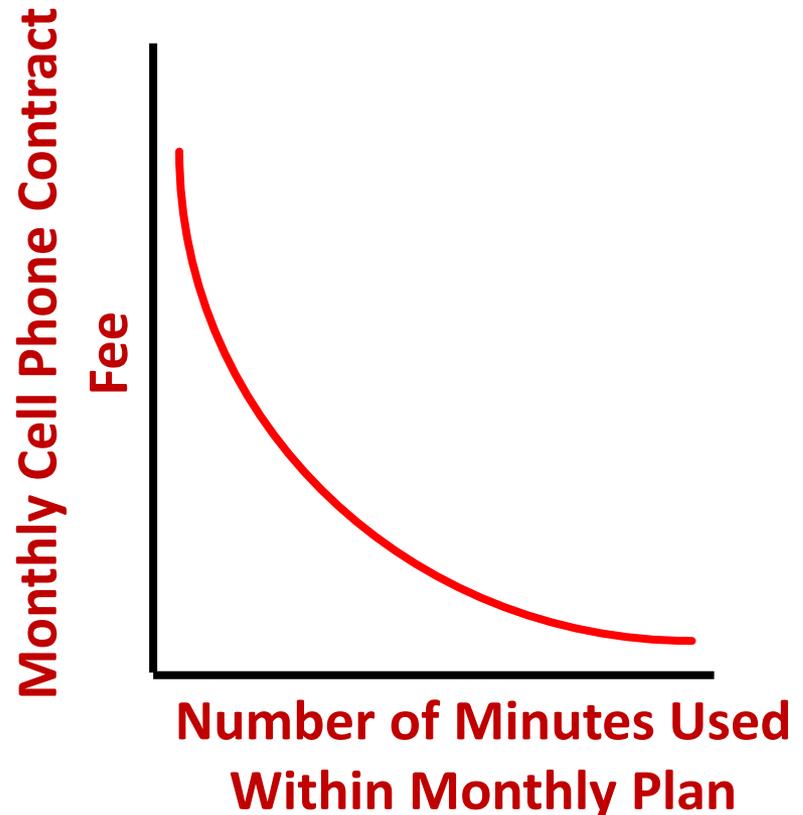
Fixed Cost

A cost that remains constant, in total, regardless of changes in the level of the activity. However, if expressed on a per unit basis, the average fixed cost per unit varies inversely with changes in activity.

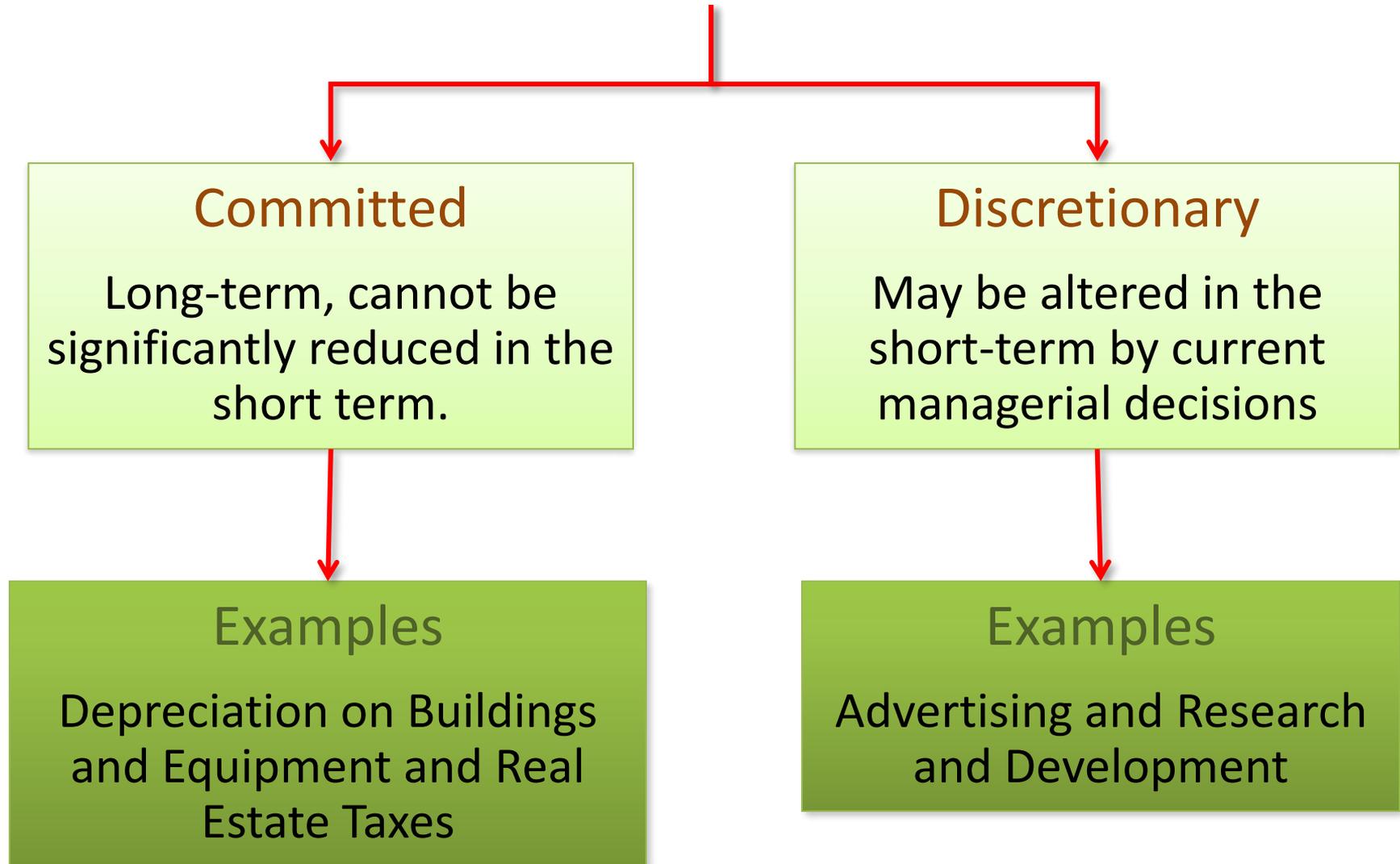


Fixed Cost Per Unit

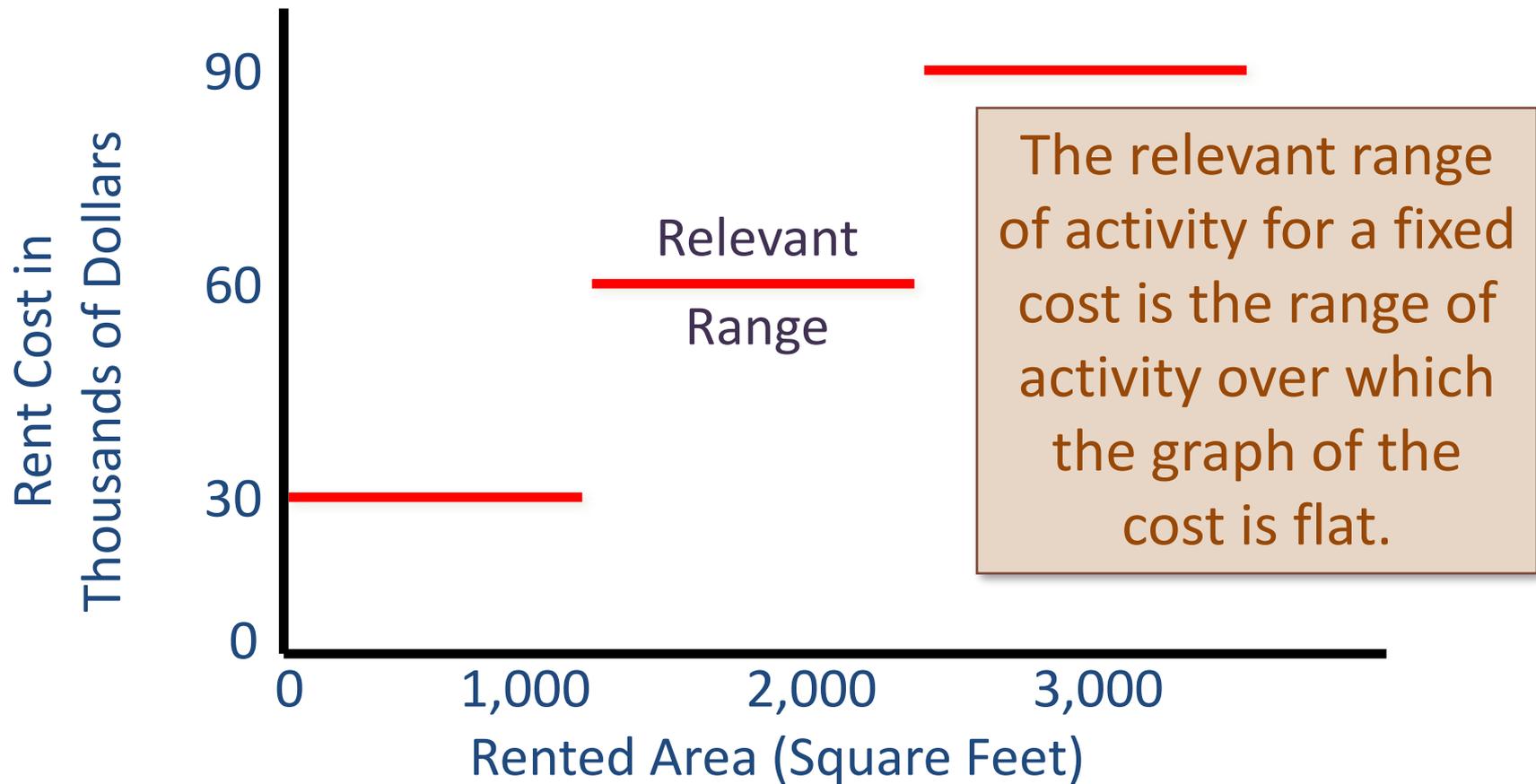
However, if expressed on a per unit basis, the average fixed cost per unit varies inversely with changes in activity.



Types of Fixed Costs



Fixed Costs and the Relevant Range



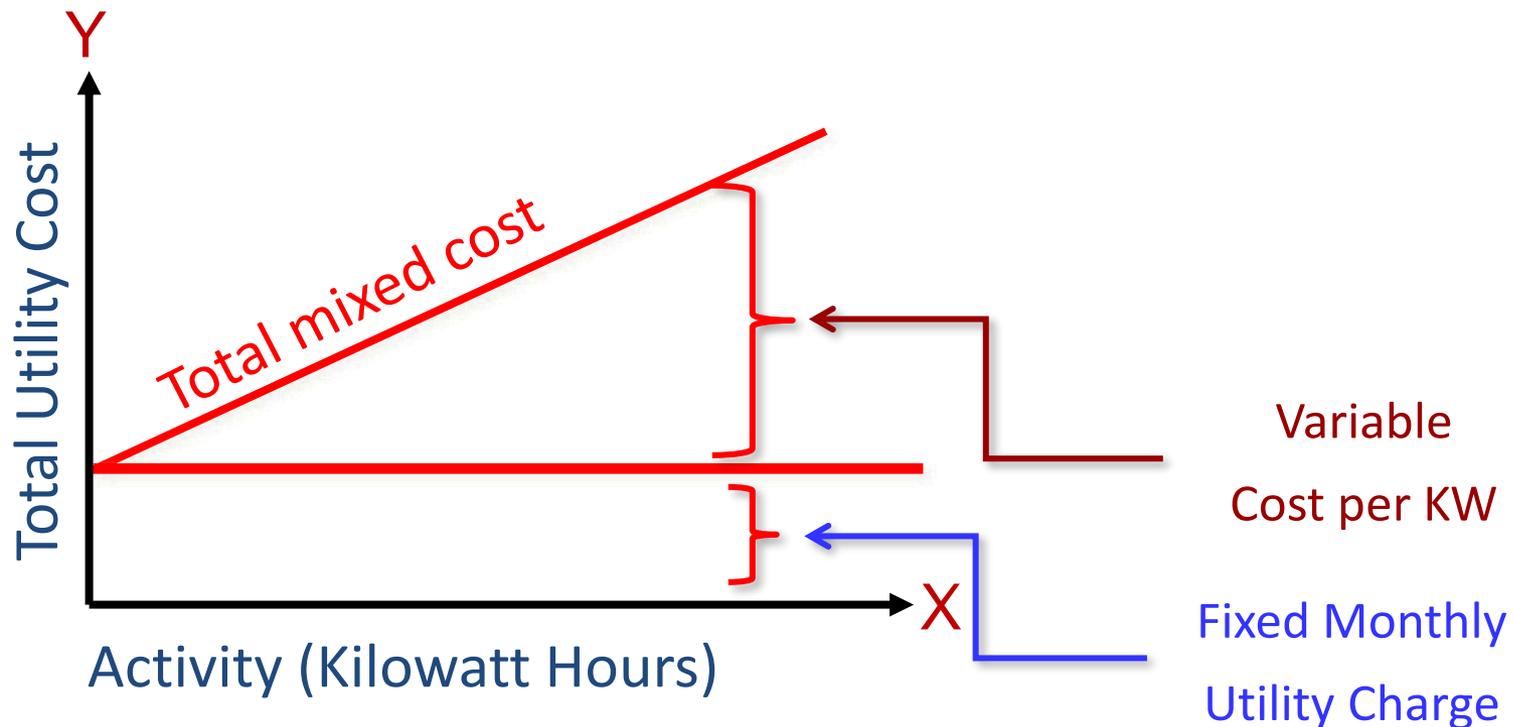
Learning Objective 3

Mixed Cost

Mixed Costs

(also called semivariable costs)

A mixed cost contains both variable and fixed elements.
Consider the example of utility cost.

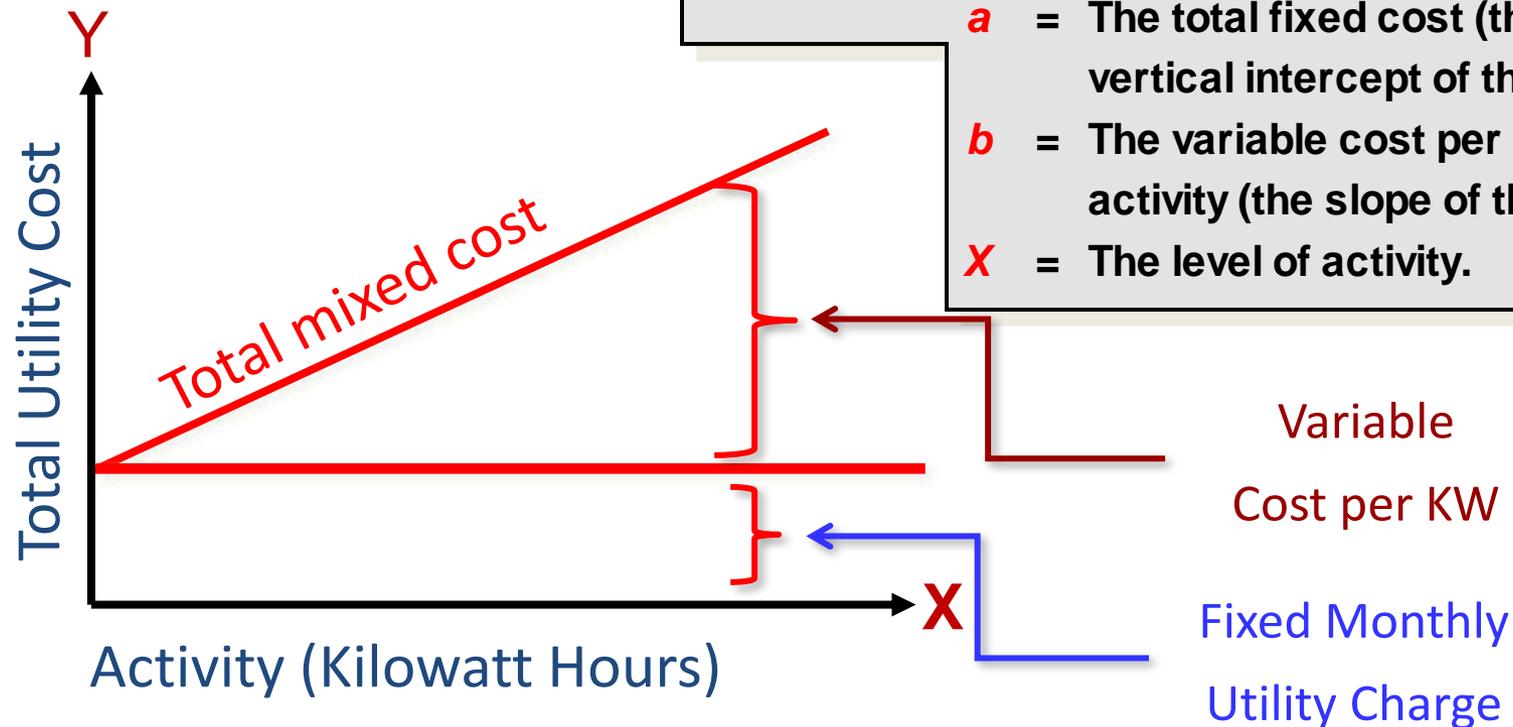


Mixed Costs

The total mixed cost line can be expressed as an equation: $Y = a + bX$

Where:

- Y = The total mixed cost.
- a = The total fixed cost (the vertical intercept of the line).
- b = The variable cost per unit of activity (the slope of the line).
- X = The level of activity.



Mixed Costs – An Example

If your fixed monthly utility charge is \$40, your variable cost is \$0.03 per kilowatt hour, and your monthly activity level is 2,000 kilowatt hours, what is the amount of your utility bill?

$$Y = a + bX$$

$$Y = \$40 + (\$0.03 \times 2,000)$$

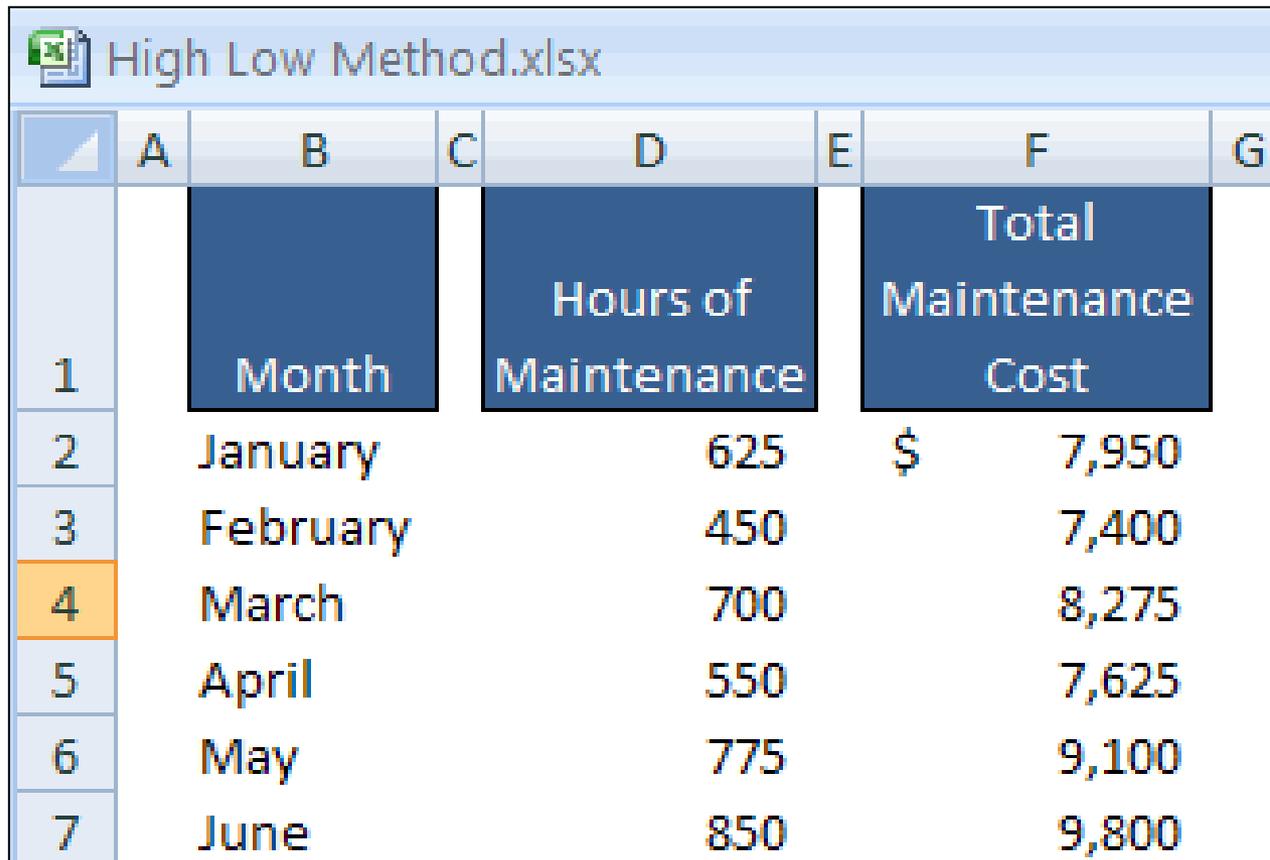
$$Y = \mathbf{\$100}$$

Learning Objective 4

Analyze a mixed cost using a scatter graph plot and the high-low method.

Scattergraph Plots – An Example

Assume the following hours of maintenance work and the total maintenance costs for six months.

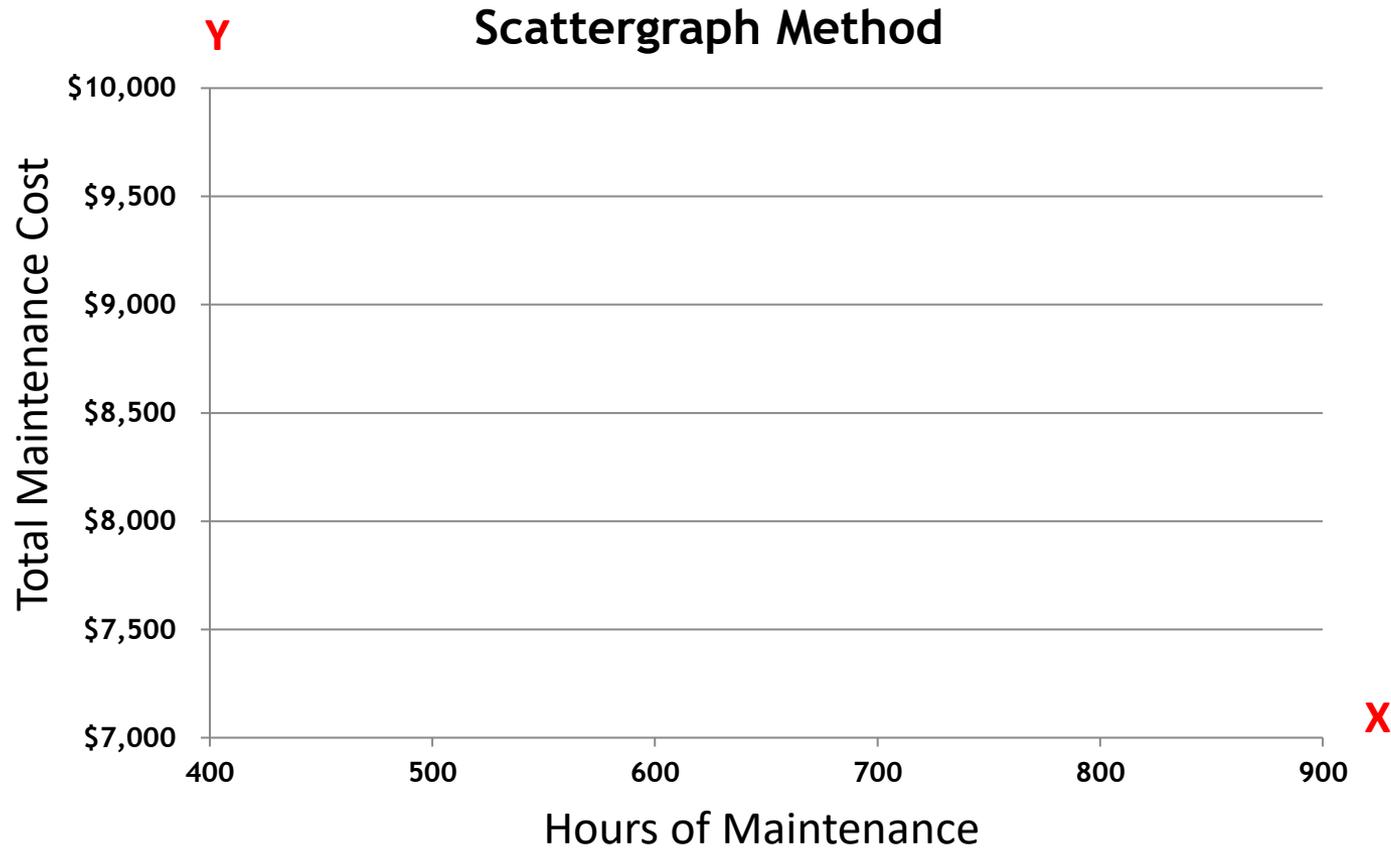


The image shows a screenshot of an Excel spreadsheet titled "High Low Method.xlsx". The spreadsheet contains a table with 7 rows and 7 columns (A-G). The table headers are: A: Month, B: Hours of Maintenance, C: Total Maintenance Cost. The data rows are: 2: January, 625, \$ 7,950; 3: February, 450, 7,400; 4: March, 700, 8,275; 5: April, 550, 7,625; 6: May, 775, 9,100; 7: June, 850, 9,800. The row for March (row 4) is highlighted in orange.

	A	B	C	D	E	F	G
1		Month		Hours of Maintenance		Total Maintenance Cost	
2		January		625		\$ 7,950	
3		February		450		7,400	
4		March		700		8,275	
5		April		550		7,625	
6		May		775		9,100	
7		June		850		9,800	

The Scattergraph Method

Plot the data points on a graph
(Total Cost Y vs. Activity X).



The High-Low Method – An Example

High Low Method.xlsx							
	A	B	C	D	E	F	G
						Total	
1		Month		Hours of		Maintenance	
				Maintenance		Cost	
2		January		625	\$	7,950	
3		February		450		7,400	
4		March		700		8,275	
5		April		550		7,625	
6		May		775		9,100	
7		June		850		9,800	
8		High		850	\$	9,800	
9		Low		450		7,400	
10		Change		400	\$	2,400	
11							

The *variable cost per hour* of maintenance is equal to the change in cost divided by the change in hours.

$$\frac{\$2,400}{400} = \$6.00/\text{hour}$$

The High-Low Method – An Example

	A	B	C	D	E	F	G
						Total	
				Hours of		Maintenance	
1		Month		Maintenance		Cost	
8		High		850	\$	9,800	
9		Low		450		7,400	
10		Change		400	\$	2,400	
11							

Total Fixed Cost = Total Cost – Total Variable Cost

Total Fixed Cost = \$9,800 – (\$6/hour × 850 hours)

Total Fixed Cost = \$9,800 – \$5,100

Total Fixed Cost = **\$4,700**

The High-Low Method – An Example

High Low Method.xlsx							
	A	B	C	D	E	F	G
						Total Maintenance Cost	
1		Month		Hours of Maintenance			
8		High		850		\$ 9,800	
9		Low		450		7,400	
10		Change		400		\$ 2,400	
11							

The Cost Equation for Maintenance

$$Y = \$4,700 + \$6.00X$$

Quick Check ✓

Sales salaries and commissions are \$10,000 when 80,000 units are sold, and \$14,000 when 120,000 units are sold. Using the high-low method, what is the **variable** portion of sales salaries and commission?

- a. \$0.08 per unit
- b. \$0.10 per unit
- c. \$0.12 per unit
- d. \$0.125 per unit

Quick Check ✓

Sales salaries and commissions are \$10,000 when 80,000 units are sold, and \$14,000 when 120,000 units are sold. Using the high-low method, what is the **variable** portion of sales salaries and commission?

- a. \$0.08 per unit
- b. \$0.10 per unit**
- c. \$0.12 per unit
- d. \$0.125 per unit

	Units	Cost
High level	120,000	\$ 14,000
Low level	80,000	10,000
Change	<u>40,000</u>	<u>\$ 4,000</u>

$$\begin{aligned} & \$4,000 \div 40,000 \text{ units} \\ & = \$0.10 \text{ per unit} \end{aligned}$$

Quick Check ✓

Sales salaries and commissions are \$10,000 when 80,000 units are sold, and \$14,000 when 120,000 units are sold. Using the high-low method, what is the **fixed** portion of sales salaries and commissions?

- a. \$ 2,000
- b. \$ 4,000
- c. \$10,000
- d. \$12,000

Quick Check ✓

Sales salaries and commissions are \$10,000 when 80,000 units are sold, and \$14,000 when 120,000 units are sold. Using the high-low method, what is the **fixed** portion of sales salaries and commissions?

a. \$ 2,000

b. \$ 4,000

c. \$10,000

d. \$12,000

$$\text{Total cost} = \text{Total fixed cost} + \text{Total variable cost}$$

$$\$14,000 = \text{Total fixed cost} + (\$0.10 \times 120,000 \text{ units})$$

$$\text{Total fixed cost} = \$14,000 - \$12,000$$

$$\text{Total fixed cost} = \$2,000$$

Least-Squares Regression Method

Software can be used to fit a regression line through the data points.

The cost analysis objective is the same: $Y = a + bX$



Least-squares regression also provides a statistic, called the R^2 , which is a measure of the goodness of fit of the regression line to the data points.

Comparing Results From the Two Methods

The two methods just discussed provide different estimates of the fixed and variable cost components of a mixed cost.

This is to be expected because each method uses differing amounts of the data points to provide estimates.

Least-squares regression provides the most accurate estimate because it uses all the data points.

EXAMPLE

§ The following costs derived from the report of the bank of Kurdistan at the following level points:

Month	Machinery worked hours	The additional cost
March	50000	174000
April	40000	150200
May	60000	197800
June	70000	221600

\$ Required//

- 1) As it's known the costs for the month June were \$221600, so how much of these costs represent the costs of maintenance?
- 2) Using the high-low level point method to find the equation of maintenance costs $y=a+bx$?
- 3) Calculate the additional costs when the activity levels become 45000 worked hours ?

Learning Objective 5

Prepare income statements for a merchandising company using the traditional and contribution formats.

The Traditional and Contribution Formats

Comparison of the Contribution Income Statement with the Traditional Income Statement

Traditional Format		Contribution Format	
Sales	\$ 100,000	Sales	\$ 100,000
Cost of goods sold	70,000	Variable expenses	60,000
Gross margin	\$ 30,000	Contribution margin	\$ 40,000
Selling & admin. expense:	20,000	Fixed expenses	30,000
Net operating income	\$ 10,000	Net operating income	\$ 10,000

Used primarily for
external reporting.

Used primarily by
management.

HOMEWORKS

Exercise 1 : YOU RECEIVE THE FOLLOWING INFORMATION REGARDING FIXED OVERHEAD COST:

Month	Units	FOH
1	1,520	\$36,375
2	1,250	38,000
3	1,750	41,750
4	1,600	42,360
5	2,350	55,080
6	2,100	48,100
7	3,000	59,000
8	2,750	56,800

Required// Use the high-low method to split its factory overhead (FOH) costs into fixed and variable components and create a cost volume

Exercise 2:

A company needs to know the expected amount of factory overheads cost it will incur in the following month.

Factory overheads cost in the previous three months was as follows:

Company expects to produce 7000 units in April.

	Cost	Units
Jan	\$30,000	6,000
Feb	\$20,000	5,000
Mar	\$25,000	4,000

Required// Calculate the expected factory overhead cost in April using the High-Low method.

Exercise 3 : High-Low Method with Inflation

Carla is a management accountant in an organization. She has been assigned the task of budgeting payroll costs for the next quarter.

Payroll information of the last 4 quarters is as follows:

Quarter	Work hours	Cost \$
1	15,000	400,0000
2	20,000	480,0000
3	18,000	440,0000
4	21,000	500,0000

The organization increments salaries and wages by 10% at the start of the 3rd quarter each year.

23,000 hours are expected to be worked in the first quarter of the next year.

Required// Calculate the budgeted payroll costs for the next quarter.