

INFO 7225

MODULE 2

Managerial Accounting (1)
Introduction; Building Blocks

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1,000

Q3

Q4



LEARNING OBJECTIVES

After completing these three topics, you should be able to

- Distinguish between financial and managerial accounting;
- Identify the major items in the income statement of various types of firms;
- Understand the COGS in a manufacturing company;
- Determine and recognize the fixed and variable components of costs;
- Identify cost behaviors and apply them to the business environment;
- Explain the concept of contribution margin and apply it to breakeven analysis;
- Calculate and interpret a company's margin of safety and operating leverage.

KEY TERMS

- Distinguish between financial and managerial accounting;
- Identify the major items in the income statement of various types of firms;
- Understand the COGS in a manufacturing company;
- Determine and recognize the fixed and variable components of costs;
- Identify cost behaviors and apply them to the business environment;
- Explain the concept of contribution margin and apply it to breakeven analysis;
- Calculate and interpret a company's margin of safety and operating leverage.

THREE PRIMARY RESPONSIBILITIES OF MANAGEMENT

- Involves setting goals and forming the plans to achieve those goals.
- Financial (e.g., budgeting) and non-financial

- Involves the monitoring of the planning objectives that were put into place.
- Purpose: help in planning functions and to facilitate coordination within the organization

- Determines whether plans are being followed and whether progress is being made as planned toward the fulfillment of organizational goals and objectives.
- Also involves taking corrective measures in case of deviations identified in the course of action.

Financial and Managerial Accounting Comparative

COMMUNICATION THROUGH REPORTING	FINANCIAL ACCOUNTING	MANAGERIAL ACCOUNTING
Users of reports	External users: stockholders, creditors, regulators	Internal users: managers, officers, and other employees
Types of reports	Financial statements: balance sheet, income statement, cash-flow statement, etc.	Internal reports: job cost sheet, cost of goods manufactured, production cost report, etc.
Frequency of reports	Quarterly; annually	As frequently as needed
Purpose of reports	Helps those external users make decisions: credit terms, investment, and other decisions	Assists the internal users in the planning and control decision-making process
Focus of reports	Pertains to company as a whole Uses GAAP structure Composed from a multitude or combination of other more individual data	Pertains to departments, sections of the business Very detailed reporting No GAAP constraints
Nature of reports	Monetary	Monetary and nonmonetary information
Verification of reports	Audited by CPA	No independent audits



Costs Incurred for Different Types of Business

Costs Incurred for Different Types of Business

Type of Business	Costs Incurred
Business	<ul style="list-style-type: none">• Direct labor• Plant and equipment• Manufacturing overhead• Raw materials
Business	<ul style="list-style-type: none">• Lease on retail space• Merchandise inventory• Retail sales staff
Business	<ul style="list-style-type: none">• Billing and collections• Computer network equipment• Professional staff

Table 2.1 Some costs, such as raw materials, are unique to a particular type of business. Other costs, such as billing and collections, are common to most businesses, regardless of the type.

Example 1 WELCH & GRAHAM, ATTORNEYS AT LAW

Income Statement

For the Year Ended December 31, 2017

Service Revenue		\$ 1,500,000
Operating Expenses		
Administrative Salaries	\$ 150,000	
Attorney Salaries	750,000	
Office Expenses	12,000	
Office Rent	20,000	
Paralegal Salaries	100,000	
Office Utilities Expenses	<u>12,500</u>	
Total Operating Expenses		\$ 1,044,500
Operating Income		<u>\$ 455,500</u>

Example 2

EA1. LO 2.1 Magio Company manufactures kitchen equipment used in hospitals. They distribute their products directly to the customer and, for the year ending 2019, they reported the following revenues and expenses. Use this information to construct an income statement for the year 2019.

Sales revenue	\$985,000
Cost of goods sold	489,000
Operating expenses	245,000

Example 3

EA3. LO 2.1 Canine Couture is a specialty dog clothing boutique that sells clothing and clothing accessories for dogs. In 2019, they had gross revenue from sales totaling \$86,500. Their operating expenses for this same period were \$27,500. If their Cost of Goods Sold (COGS) was 24% of gross revenue, what was their net operating income for the year?



Costs of Goods Sold (COGS) in a Manufacturing Company

COGS for a Merchandising Firm

Beginning Inv.

Cost of Goods

Ending Inventory

Cost of Goods

COGS for a Manufacturing Firm

Beginning Inv.

Cost of Goods

Ending Inventory

Cost of Goods

KEY TERMS

Cost of goods sold

Expense account that houses all costs associated with getting a product ready for sale

Cost of goods manufactured

Manufacturing costs incurred less the ending work in process inventory

Manufacturing costs

Total of all costs expended in the manufacturing process; generally consists of direct material, direct labor, and manufacturing overhead

Determining COGS for a Merchandising Firm

KOELLER MANUFACTURING Schedule of Cost of Goods Sold For the Month Ended March 31, 2017	
Beginning Finished Goods Inventory	\$ 65,000
+ Cost of Goods Manufactured	<u>95,000</u>
Goods Available for Sale	160,000
- Ending Finished Goods Inventory	<u>58,000</u>
Cost of Goods Sold	<u><u>\$102,000</u></u>

KOELLER MANUFACTURING Schedule of Cost of Goods Manufactured For the Month Ended March 31, 2017	
Work in Process Inventory (beginning balance)	\$ 75,000
Current Manufacturing Costs:	
Direct Material	\$15,000
Direct Labor	25,000
Manufacturing Overhead	<u>23,000</u>
Total Manufacturing Costs	<u>63,000</u>
Total Cost of Work in Process	<u>138,000</u>
- Work in Process, ending balance	<u>43,000</u>
Cost of Goods Manufactured	<u><u>\$ 95,000</u></u>

Materials Inventory (beginning balance)
+ Net Material Purchases
= Materials Available for Use
- Materials Inventory (ending balance)
= Direct Materials Used in Production

KEY TERMS

Direct labor

Labor directly related to the manufacturing of the product or the production of a service

Direct materials

Materials used in the manufacturing process that can be traced directly to the product

Manufacturing overhead

Costs incurred in the production process that are not economically feasible to measure as direct material or direct labor costs; examples include indirect material, indirect labor, utilities, and depreciation

Manufacturing Overhead

- Costs that support production but are not direct materials or direct labor are considered overhead.
- Manufacturing overhead has three components:

1) Indirect materials

Materials used in production but not traced to specific products because the net informational value from the time and effort to trace the cost to each individual product produced is impossible or inefficient.

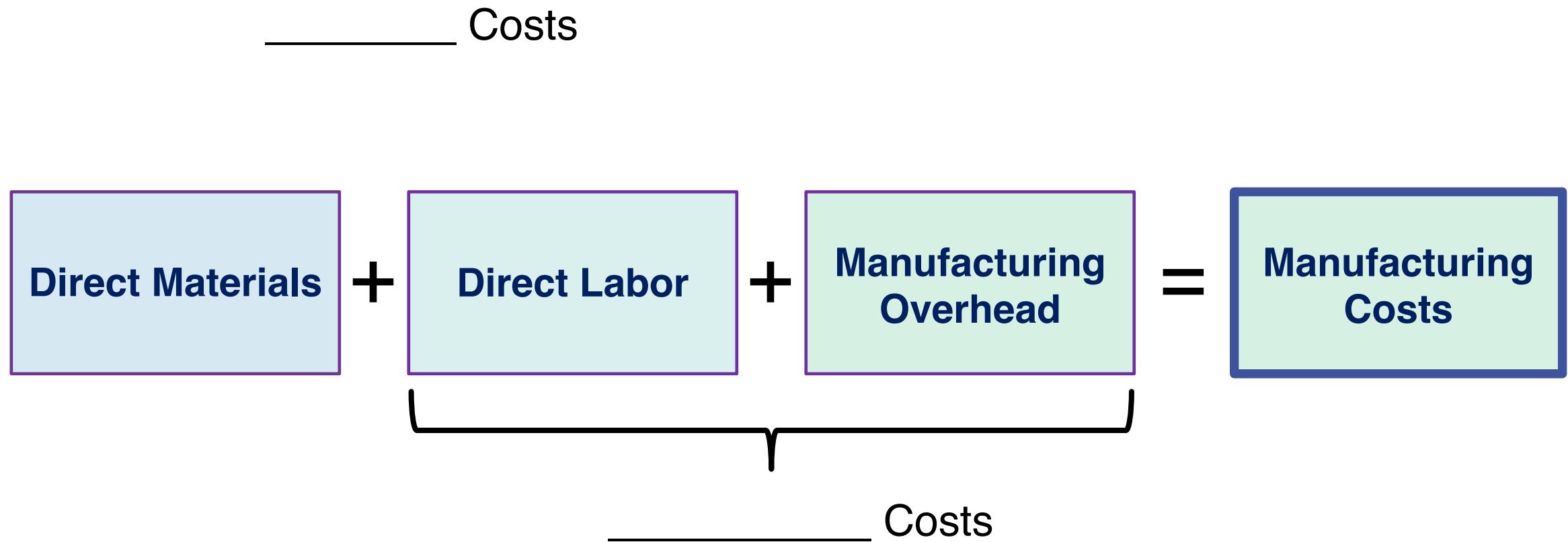
2) Indirect labor

Labor costs of those employees associated with the manufacturing process, but whose contributions are not directly traceable to the final product, and

3) Overhead

Costs that are necessary for production but not efficient to assign to individual product production. Examples of typical overhead costs are insurance, production facility electricity, warehouse rent, and depreciation of equipment.

Manufacturing Costs (also called Product Costs)



KEY TERMS

Prime costs

direct material expenses and direct labor costs

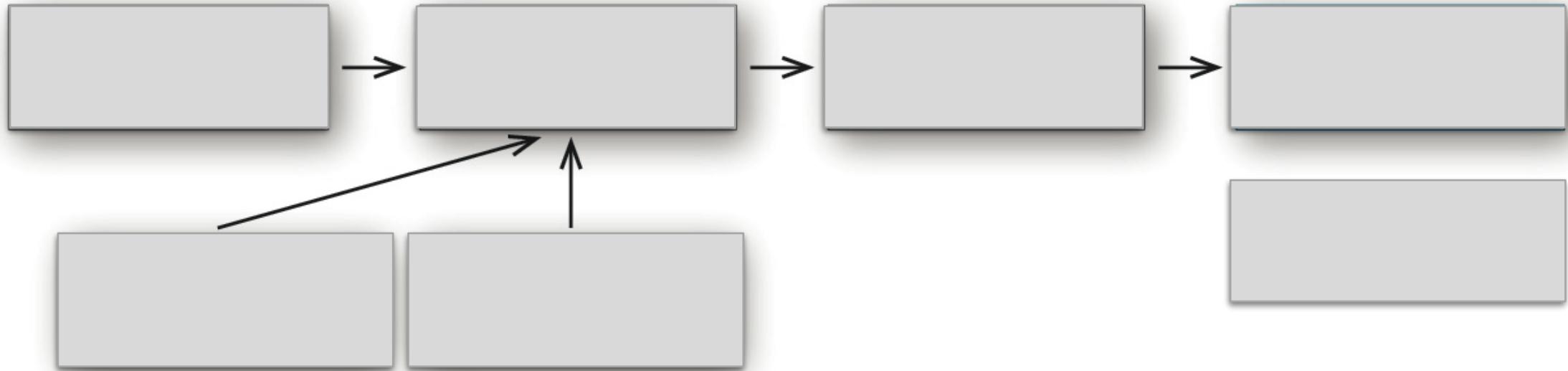
Conversion costs

Total of labor and overhead for a product; the costs that “convert” the direct material into the finished product

Period costs

Typically related to a particular time period instead of attached to the production of an asset; treated as an expense in the period incurred (examples include many sales and administrative expenses)

Flow of Materials from Raw Materials to Finished Goods



WHAT IS A WORK-IN-PROGRESS (WIP)?

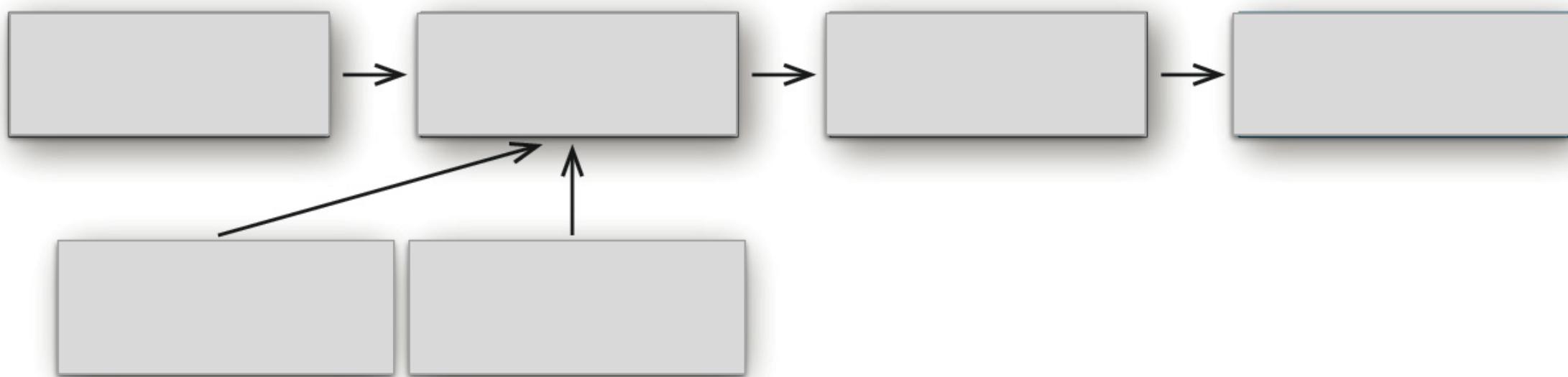
- The term work-in-progress (WIP) is a production and supply-chain management term describing partially finished goods awaiting completion.
- WIP refers to the raw materials, labor, and overhead costs incurred for products that are at various stages of the production process.
- WIP is a component of the inventory asset account on the balance sheet. These costs are subsequently transferred to the finished goods account and eventually to the cost of sales.

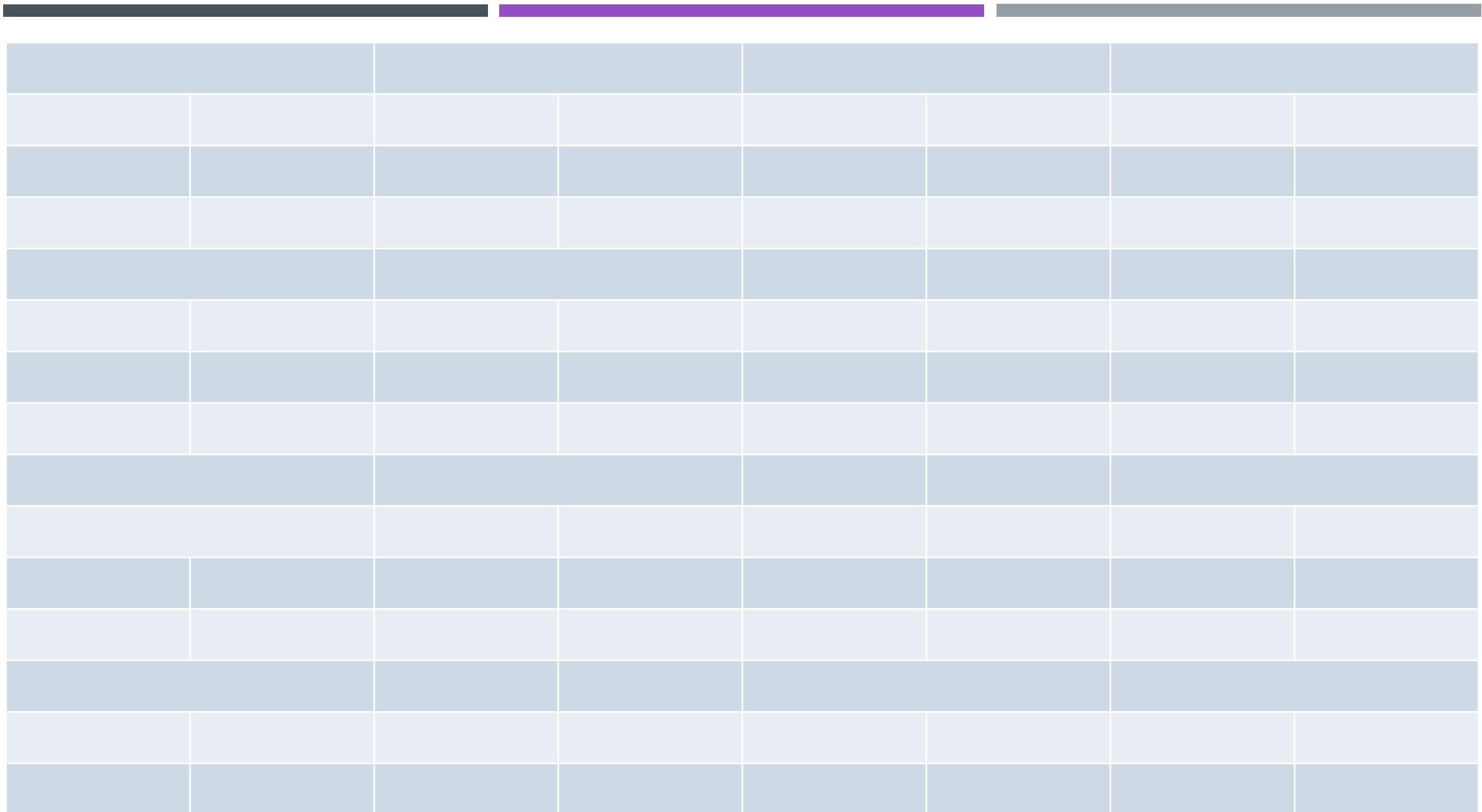
WHAT IS A WORK-IN-PROGRESS (WIP)?

- The WIP figure reflects only the value of those products in some intermediate production stages.
- This excludes the value of raw materials not yet incorporated into an item for sale.
- The WIP figure also excludes the value of finished products being held as inventory in anticipation of future sales.
- A WIP is different from a finished good which refers to a product that is ready to be sold to the consumer.

(<https://www.investopedia.com/terms/w/workinprogress.asp>)

Flow of Materials from Raw Materials to Finished Goods





Example Overhead Item	Debit	Credit
Indirect Labor	Factory Overhead	Salaries Payable
Indirect Material	Factory Overhead	Inventory or Supplies
Factory Insurance	Factory Overhead	Prepaid Insurance
Factory Depreciation	Factory Overhead	Accumulated Depreciation
Taxes/Utilities	Factory Overhead	Taxes or Utilities Payable

06-30-X3	Factory Overhead		100,000	
	Salaries Payable			50,000
	Supplies			15,000
	Prepaid Insurance			5,000
	Accumulated Depreciation			11,000
	Taxes Payable			9,000
	Utilities Payable			10,000
	<i>To record various factory overhead costs</i>			

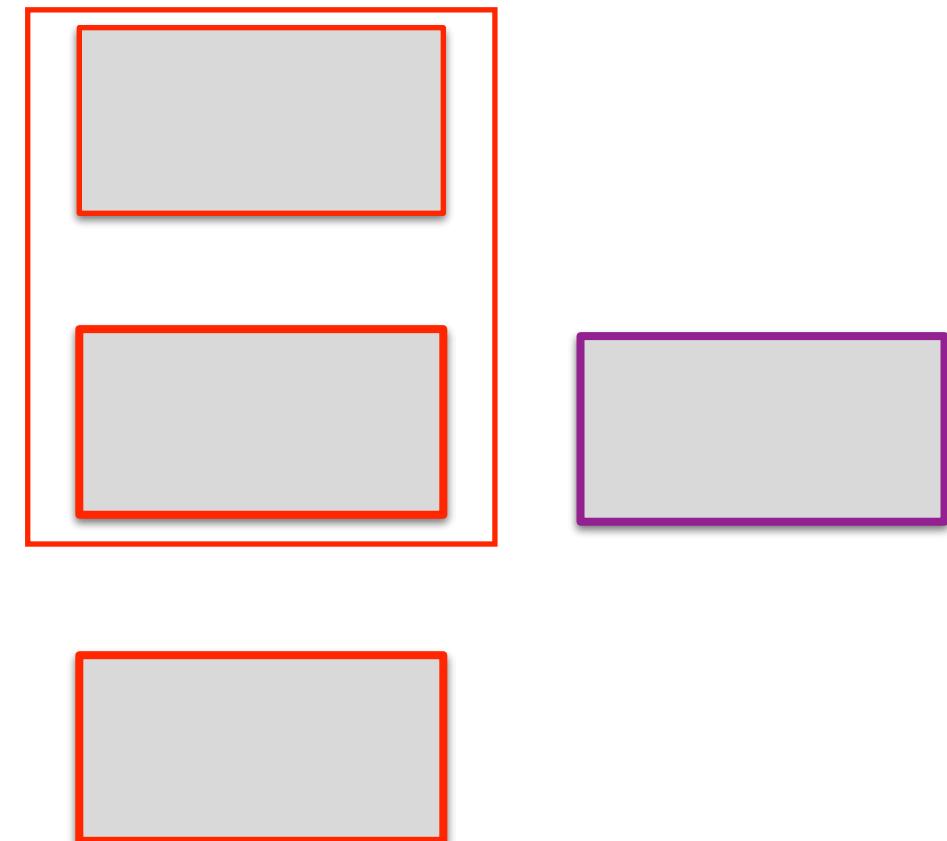
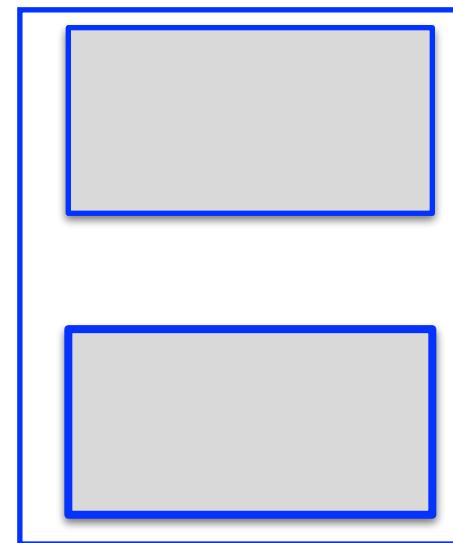
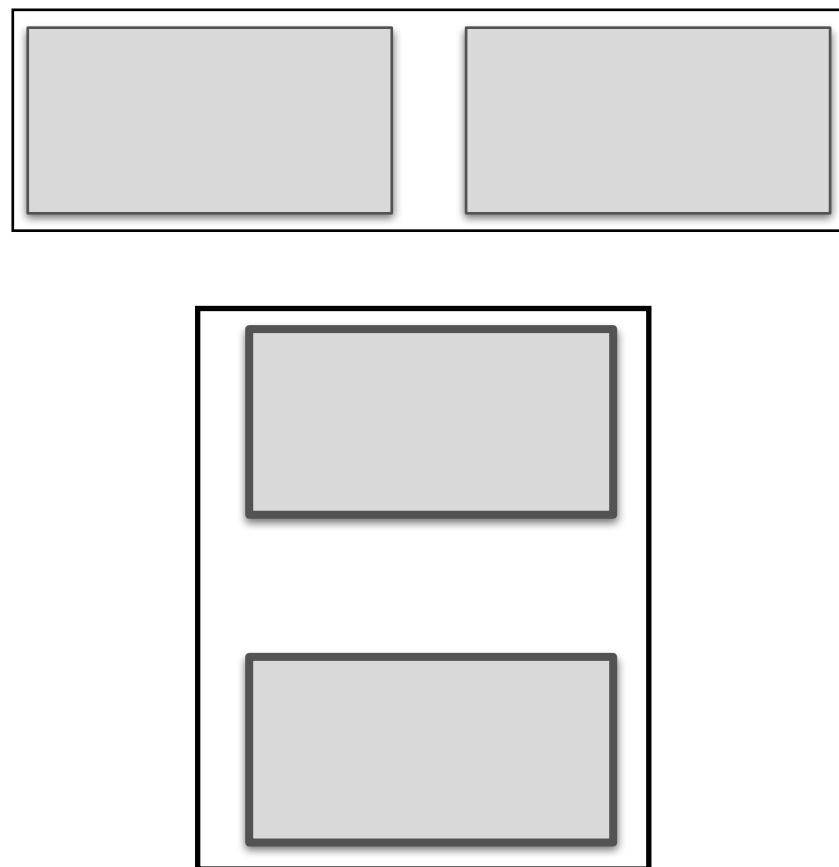
Flow of Materials from Raw Materials to Finished Goods

Raw Materials

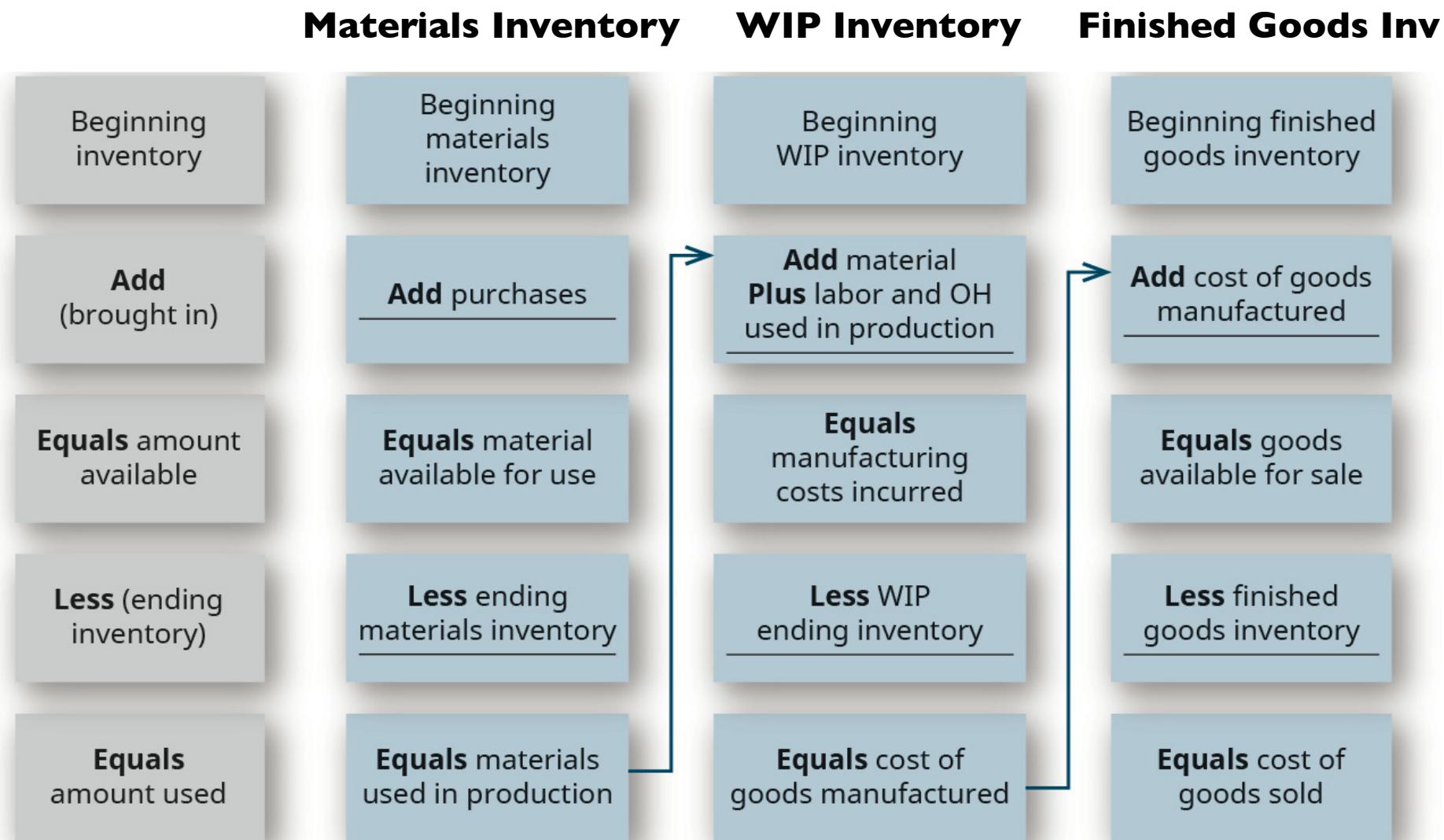
Work-in-process

Finished Goods

COGS



Cost of Inventory Accounts



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MODULE 2

Managerial Accounting (2)

Cost Behavior Patterns

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Identify and Apply Basic Cost Behavior Patterns

Fixed Costs

Costs remain the same regardless of production volume (e.g., rent, warehousing, insurance, equipment)

Variable Costs

Costs directly tied to volume output (e.g., sales commissions, shipping/delivery fees)

DIFFERENT TYPES OF COSTS

- Associated with the acquisition or production of goods and products
- Typically related to a particular time period instead of attached to the production of an asset;
- Treated as an expense in the period incurred (examples include many sales and administrative expenses)
- Don't vary with changing output.
- Even if your output changes or you don't produce anything, costs stay the same.
- Might include the cost of building a factory, insurance and legal bills.

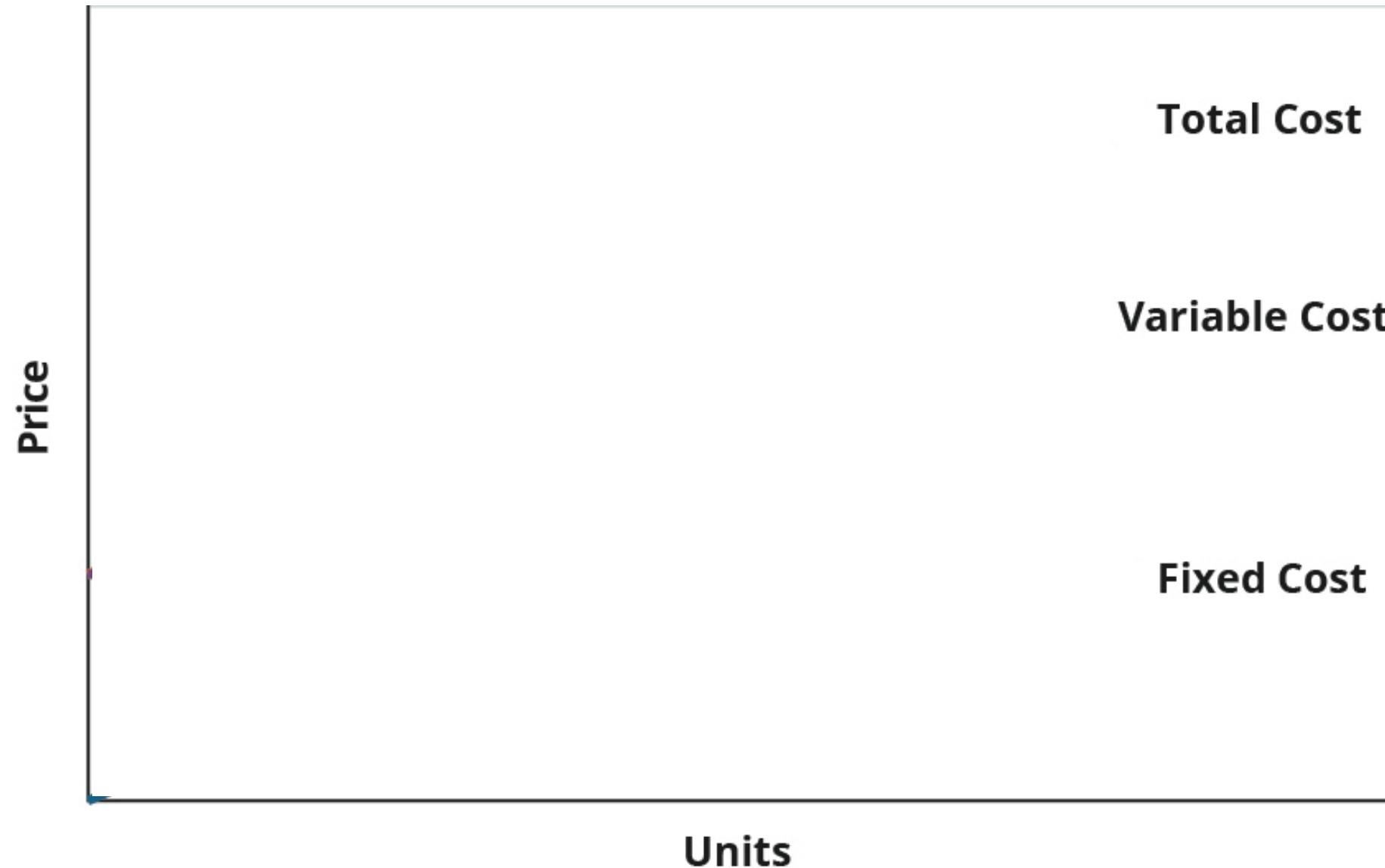
DIFFERENT TYPES OF COSTS

- Depend on the output produced.
- For example, if you produce more cars, you need use more raw materials such as metal.

- Labor might be an example of such cost.
- If you produce more cars, you need to employ more workers; this is a variable cost. However, even if you didn't produce any cars, you may still need some workers to look after an empty factory.

- The cost of producing an extra unit.
- If the total cost of 3 units is \$1550, and the total cost of 4 units is \$1900. The ~ cost of the 4th unit = \$_____.

Total Cost as the Sum of Total Fixed Costs and Total Variable Costs



Tony's T-Shirts Cost Options

	Cost	Type of Cost ?	Relevant Range
Lease on Screen-Printing Machine	\$2,000 per month		0–2,000 T-shirts per month
Employee	\$10 per hour		20 shirts per hour
Tony's Salary	\$2,500 per month		N/A
Screen-Printing Ink	\$0.25 per shirt		N/A
Building Rent	\$1,500 per month		2 screen-printing machines and 2 employees

Functions of Cost Equations

Cost Information for Eagle Electronics

Cost Incurred	Fixed or Variable ?	Cost
Lease on manufacturing equipment		\$50,000 per year
Supervisor salary		\$75,000 per year
Direct materials		\$50 per unit
Direct labor		\$20 per unit

1. Determine total fixed costs: $\$ \underline{\hspace{2cm}} + \$ \underline{\hspace{2cm}} = \$ \underline{\hspace{2cm}}$
2. Determine variable costs per unit: $\$ \underline{\hspace{1cm}} + \$ \underline{\hspace{1cm}} = \$ \underline{\hspace{1cm}}$
3. Complete the cost equation (# of units = x): $Y = \$ \underline{\hspace{2cm}} + \$ \underline{\hspace{1cm}} x$

Example

EA8. LO 2.2 Suppose that a company has fixed costs of \$18 per unit and variable costs \$9 per unit when 15,000 units are produced. What are the fixed costs per unit when 12,000 units are produced?

Summary of Fixed and Variable Cost Behaviors

Cost	In Total	Per Unit
Variable Cost	Changes in response to the level of activity	Remains fixed per unit regardless of the level of activity
Fixed Cost	Does not change with the level of activity, within the relevant range, but does change when the relevant range changes	Changes based upon activity within the relevant range: <ul style="list-style-type: none"><li data-bbox="1359 879 2408 923">• Increased activity _____ per-unit cost;<li data-bbox="1359 937 2306 980">• Decreased activity _____ per-unit cost.

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MODULE 2

Managerial Accounting (3)

Break-even Analysis

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Contribution Margin and Break-even Analysis

Contribution margin (CM) analysis

Given:

Unit price = \$100

Unit CM =

Unit VC = \$80

CM ratio =

of units sold = 1,000

Total CM =

Find:

Total CM = ?

Total CM =

Given:

Unit price = \$100

Unit VC = \$80

Target total CM = \$26,000

Target CM =

Find:

Sales target =

Sales target = ?

Example 1

Pertinent information	Contribution margin income statement 100 units sold	Contribution margin income statement 200 units sold
Sales price per unit	\$ 25	Sales revenue \$
Variable costs:		Variable costs per unit $(\$15 + 0.50) \times 100 \text{ units}$
Per shirt cost	15	Contribution margin
Per shirt commission	0.50	Fixed costs
Fixed costs:		Net operating income \$
Kiosk rental	300	
Salary	400	

THINK IT THROUGH (Example 2)

Deciding Between Orders

You are evaluating orders from two new customers, but you will only be able to accept one of the orders without increasing your fixed costs. Management has directed you to choose the one that is most profitable for the company. Customer A is ordering 500 units and is willing to pay \$200 per unit, and these units have a contribution margin of \$60 per unit. Customer B is ordering 1,000 units and is willing to pay \$140 per unit, and these units have a contribution margin ratio of 40%. Which order do you select and why?

	Customer A	Customer B



Break-Even Analysis

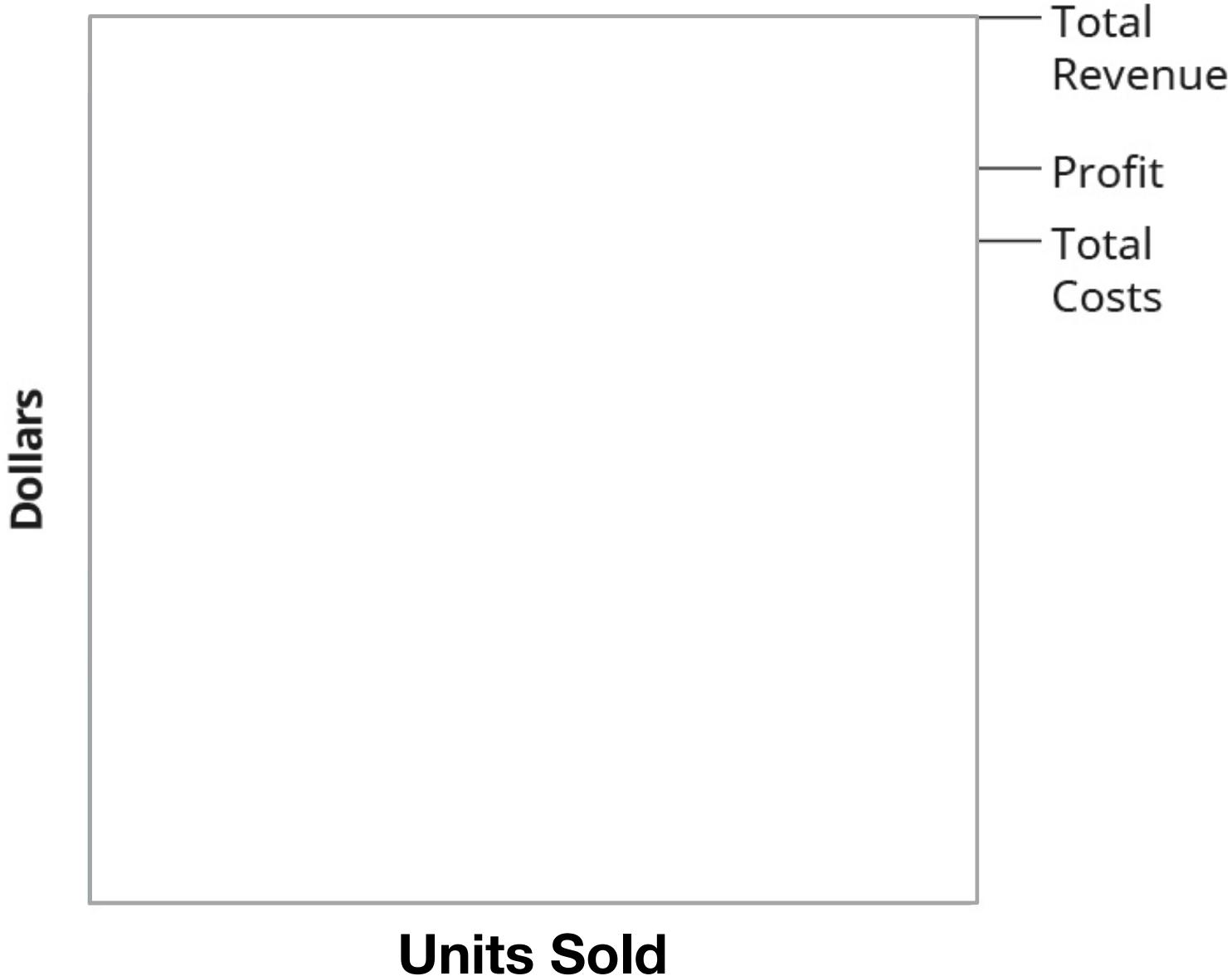
Break-Even Analysis: Introduction

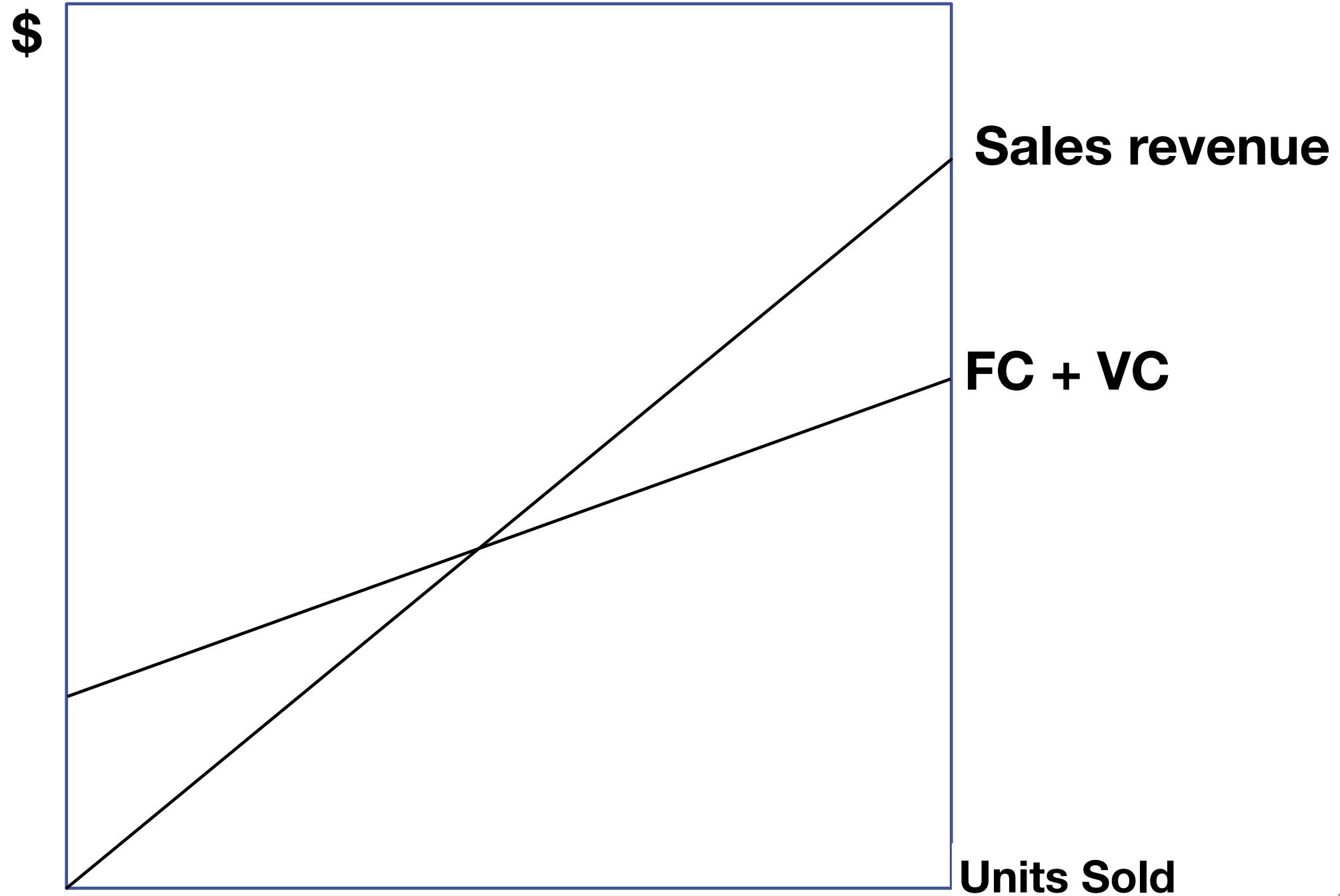
HICKS MANUFACTURING		
Blue Jay Model		
For Year Ended December 31, 2019		
Sales Price per Unit	\$	100
Variable Cost per Unit		20
Contribution Margin per Unit		80
Total Fixed Cost per Month		\$18,000

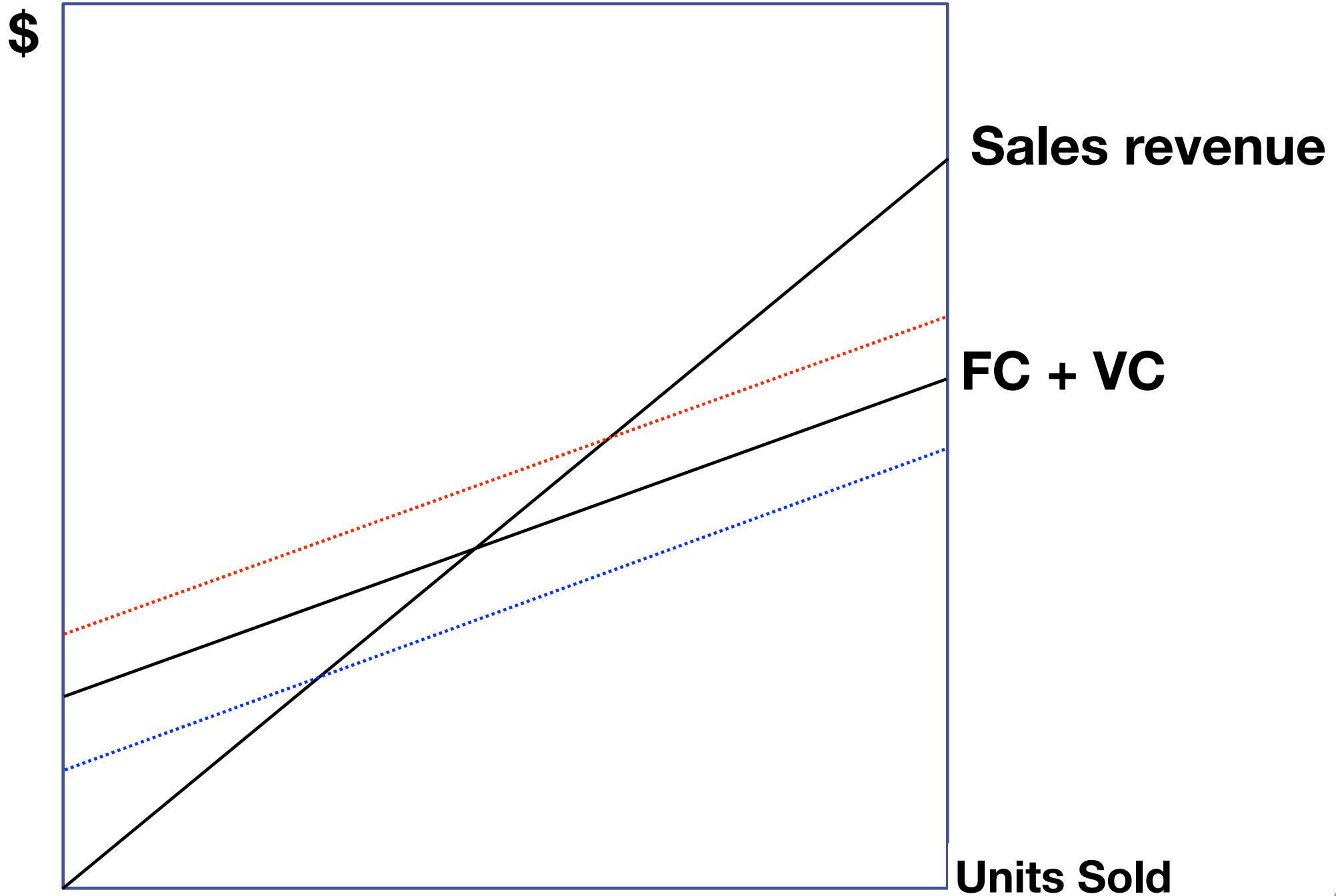
Target NOI = \$50,000; sales target = ?

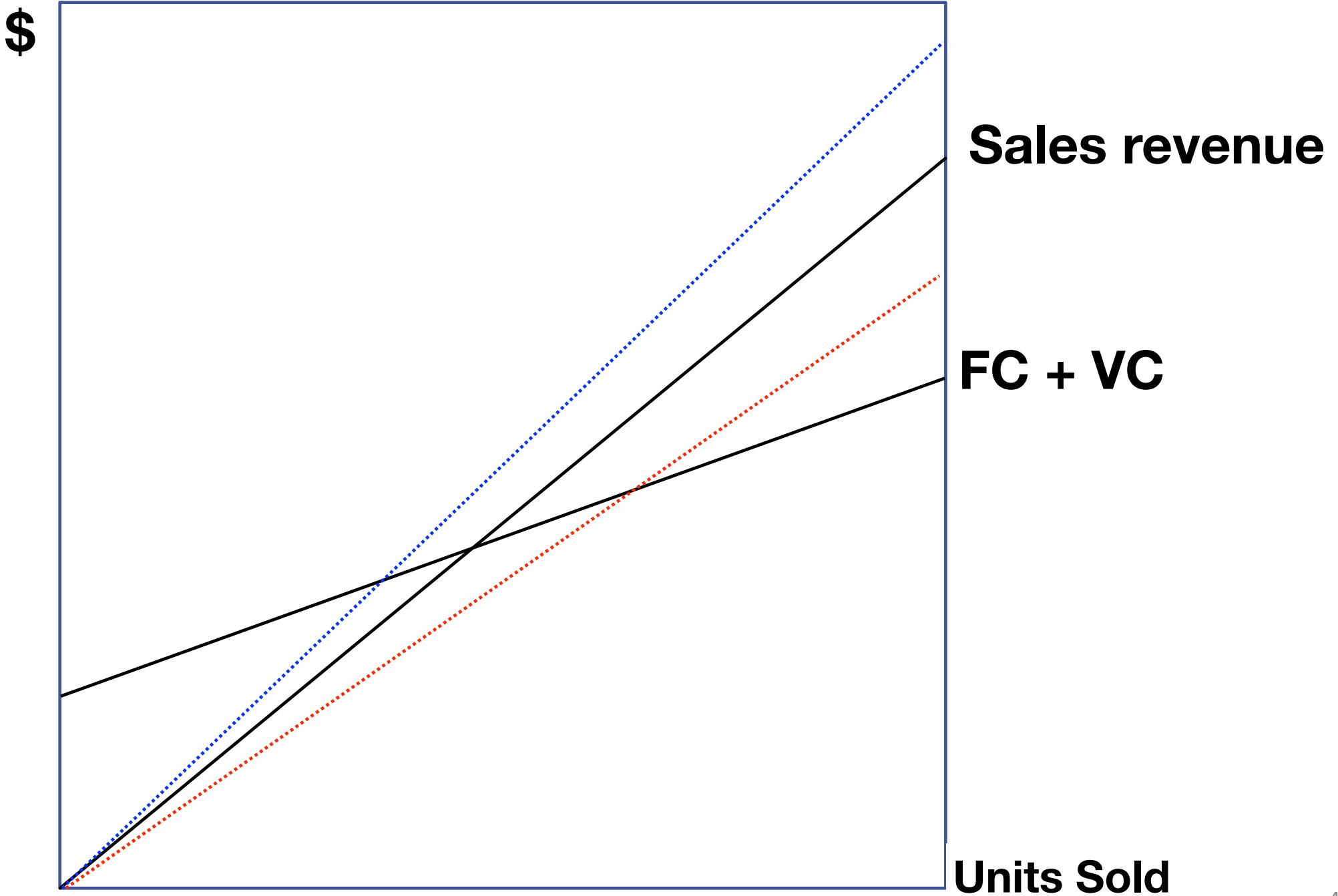
Net operating income =

Break-Even Point









Break-Even Analysis: in-class Exercise

Change in Sales Price

The owner of Back Door has one of her employees conduct a survey of the other coffee shops in the area and finds that they are charging \$0.75 more for espresso drinks. As a result, the owner wants to determine what would happen to operating income if she increased her price by just \$0.50 and sales remained constant, so she performs the following analysis:

Price Change Analysis		
	With Current Price	With New Price
Sales Price per Unit	\$ 3.75	\$ 4.25
Variable Cost per Unit	\$ 1.50	\$ 1.50
Contribution Margin per Unit	\$ 2.25	
Fixed Costs	\$2,475	
Break-even (in units)		
Break-Even (in dollars)		
Contribution Margin Income Statement Current Price versus New Price		
Unit Sales, Expected	1,500	1,500
Sales		
Variable Costs		
Contribution Margin		
Fixed Costs		
Net Operating income		

Break-Even Analysis: in-class Exercise

Change in Fixed Cost

Back Door Café's lease is coming up for renewal. The owner calls the landlord to indicate that she wants to renew her lease for another 5 years. The landlord is happy to hear she will continue renting from him but informs her that the rent will increase \$225 per month. She is not certain that she can afford an additional \$225 per month and tells him she needs to look at her numbers and will call him back. She pulls out her CVP spreadsheet and adjusts her monthly fixed costs upwards by \$225. Assume that the example uses the original \$3.75 per unit sales price. The results of her analysis of the impact of the rent increase on her annual net income are:

Fixed Cost Change Analysis		
	With Current Price	With Increased Fixed Cost
Sales Price per Unit	\$ 3.75	\$ 3.75
Variable Cost per Unit	\$ 1.50	\$ 1.50
Contribution Margin per Unit	\$ 2.25	\$ 2.25
Fixed Costs	\$2,475	\$2,700
Break-even in Units		
Break-even in Dollars		
Monthly Contribution Margin Income Statement Current Fixed Costs versus Increased Fixed Costs		
Unit Sales, Expected	1,500	1,500
Sales		
Variable Costs		
Contribution Margin		
Fixed Costs		
Net Operating income		

Summary

Generalizations Regarding Changes in Break-Even Point from a Change in One Variable

Condition	Break-even Point	Contribution Margin	Need fewer or more sales to break even?
Sales Price Increases			
Sales Price Decreases			
Variable Costs Increase			
Variable Costs Decrease			
Fixed Costs Increase			
Fixed Costs Decrease			

SUMMARY

- Contribution margin can be used to calculate how much of every dollar is available to cover _____ and contribute to _____.
- Contribution margin can be expresses on a _____ basis, as a _____, or in _____.
- Break-even analysis is a tool that almost any business can use for _____ and _____ process. It helps to identify a _____ that is necessary before an organization starts to generate a profit.



Margin of Safety

Margin of Safety Analysis: Example

What is the target sales volume for a company with cost structure shown below if it needs a margin of safety of \$10,000?

Sales Price per Unit	\$ 90
Variable Cost per Unit	\$ 40
Contribution Margin per Unit	\$ 50
Fixed Costs	\$ 85,000
Break-Even (in units)	1700
Contribution Margin per Unit	\$ 50
Selling Price per Unit	\$ 90
Contribution Margin Ratio	55.55%
Break-Even (in dollars, rounded)	\$153,000

Margin of Safety Analysis: in-class Exercise

When sales volume = 2,500 units, margin of safety = ?

Sales Price per Unit	\$ 90	
Variable Cost per Unit	\$ 40	
Contribution Margin per Unit	\$ 50	
Fixed Costs	\$ 85,000	
Break-Even (in units)	1700	
Contribution Margin per Unit	\$ 50	
Selling Price per Unit	\$ 90	
Contribution Margin Ratio	55.55%	
Break-Even (in dollars, rounded)	\$153,000	



Operating Leverage

Financial Leverage versus Operating Leverage

1. **Financial leverage:** changes in a firm's _____ structure

DuPont formula (aka strategic profit model):

$$\text{ROE} = \text{NI}/\text{SE}$$

$$= (\text{NI}/\text{Revenue}) \times (\text{Revenue}/\text{Total assets}) \times ((\text{L}+\text{E})/\text{E})$$

$$= (\text{NI}/\text{Revenue}) \times (\text{Revenue}/\text{Total assets}) \times (\text{L}/\text{E}+1)$$

$$= \text{Net profit margin} \times \text{Asset turnover} \times \text{Financial leverage}$$

Company A ($\text{E} = \$1,000 \text{ M}$; $\text{L} = \$\text{_____}$): $\text{ROE} =$

Company B ($\text{E} = \$1,000 \text{ M}$; $\text{L} = \$\text{_____}$): $\text{ROE} =$

Company C ($\text{E} = \$1,000 \text{ M}$; $\text{L} = \$\text{_____}$): $\text{ROE} =$

2. **Operating leverage:** changes in a firm's _____ structure

Operating Leverage Example 1

Sales (10,000 units x \$10 SP)	\$100,000
Variable Costs (10,000 units x \$4 VC)	40,000
Contribution Margin	60,000
Fixed Costs	25,000
Net Operating	35,000

Effect of Changing \$10,000 of FC to VC

Sales (10,000 units x \$10 SP)	\$100,000
Variable Costs	
Contribution Margin	
Fixed Costs	
Net Operating income	

Effect of Changing \$10,000 of VC to FC

Sales (10,000 units x \$10 SP)	\$100,000
Variable Costs	
Contribution Margin	
Fixed Costs	
Net Operating income	

Operating Leverage Example 2

(\$ in millions)	Low Operating Leverage Example			High Operating Leverage Example		
	Base	Upside	Downside	Base	Upside	Downside
Unit Sold (mm)	10	15	5	10	15	5
Selling price per unit (\$)	50	50	50	25	25	25
Sales revenue						
Variable costs per unit	20	20	20	2.50	2.50	2.50
Total variable costs (TVC)						
Contribution margin (CM)						
CM ratio						
Fixed costs (FC)	50	50	50	100	100	100
Operating income (OI)						
FC/TVC ratio						
OI/Sales ratio						
% OI change vs. base						

SUMMARY

- **Margin of safety:** businesses determine a margin of safety (sales dollars beyond the break-even point). The higher the margin of safety is, the _____ the risk is of not breaking even and incurring a loss.
- **Operating leverage:** the higher the level of fixed costs, the _____ the level of risk. However, as sales volumes increase, the payoff is typically _____ with higher fixed costs than with higher variable costs. In other words, the higher the risk the _____ the payoff.



Thank you!

Questions?