

COMMERCE MENTORSHIP PROGRAM


# FINAL REVIEW SESSION


## COMM 294



PREPARED BY  
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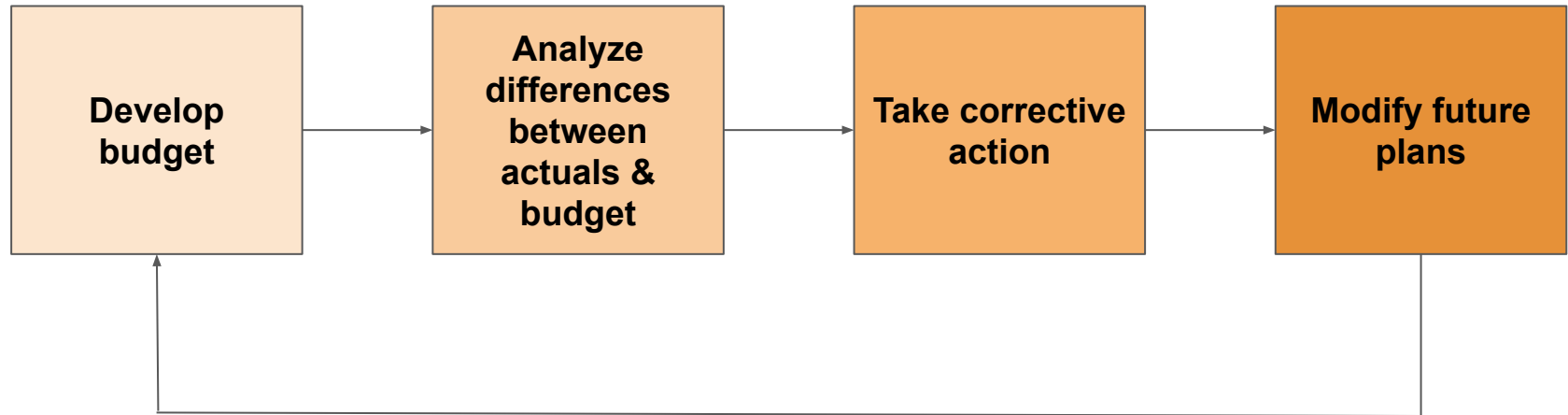
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# Topic 1:

## Standard Costs & Balanced Scorecard



# Budgetary Control Process



# Static VS Flexible Budget

## Static Budget

- Projection of budget data at a **single level of activity** before actual activity occurs
- **Only effective** if actual level of activity closely approximates budgeted activity level, or if costs are predominantly fixed

## Flexible Budget

- Projection of budget data at **various levels of activity** (E.g. Marriott Hotels can budget revenues and net income on the basis of 60%, 80%, and 100% of room occupancy)
- Much more effective for evaluating overall performance and variances

Barton Robotics Manufacturing Overhead Static Budget Report For the Year Ended December 31, 2022			
	Budget	Actual	Difference Favorable - F Unfavorable - U
Production in units	10,000	12,000	
Costs			
Indirect materials	\$ 250,000	\$ 295,000	\$ 45,000 U
Indirect labor	260,000	312,000	52,000 U
Utilities	190,000	225,000	35,000 U
Depreciation	280,000	280,000	0
Property taxes	70,000	70,000	0
Supervision	50,000	50,000	0
	\$1,100,000	\$1,232,000	\$132,000 U

Barton Robotics Manufacturing Overhead Flexible Budget Report For the Year Ended December 31, 2022			
	Budget	Actual	Difference Favorable - F Unfavorable - U
Production in units	12,000	12,000	
Variable costs			
Indirect materials (\$25)	\$ 300,000	\$ 295,000	\$5,000 F
Indirect labor (\$26)	312,000	312,000	0
Utilities (\$19)	228,000	225,000	3,000 F
Total variable costs	840,000	832,000	8,000 F
Fixed costs			
Depreciation	280,000	280,000	0
Property taxes	70,000	70,000	0
Supervision	50,000	50,000	0
Total fixed costs	400,000	400,000	0
Total costs	\$1,240,000	\$1,232,000	\$8,000 F



# Intro to Standard Costs

## What are standard costs?

- Predetermined unit costs: the typical, normal cost for something
- Estimated per unit, as opposed to budgets which are estimated as totals
- Used to determine variances between **actual costs** and **expected costs**

## Setting Standard Costs

Determine **standards** for **DM, DL and MOH** to **determine standard cost per unit**

Accumulate **actual amounts** over the year

Calculate **variances** (differences between actual costs and standard costs)

# Intro to Variances

$$\text{Variance} = \text{Flexible Budget} - \text{Actual Results}$$

## Favourable Variances (-)

- Actual Costs < Budgeted Costs
- Actual Income > Budgeted Income

## Unfavourable Variances (+)

- Actual Costs > Budgeted Costs
- Actual Income < Budgeted Income

	Static Budget	Flexible Budget	Actual Results	Variance
Production in Units	10,000 units	12,000 units	12,000 units	
Variable Costs				
Indirect Materials (\$25)	\$ 250,000	\$ 300,000	\$ 295,000	\$ 5,000 F
Indirect Labour (\$26)	260,000	312,000	312,000	0
Utilities (\$19)	190,000	228,000	225,000	3,000 F
Total Variable Costs	\$ 700,000	\$ 840,000	\$ 832,000	\$ 8,000 F
Fixed Costs				
Depreciation	\$ 280,000	\$ 280,000	\$ 280,000	\$ 0
Property Taxes	70,000	70,000	70,000	0
Supervision	50,000	50,000	50,000	0
Total Fixed Costs	\$ 400,000	\$ 400,000	\$ 400,000	\$ 0
Total Costs	\$ 1,100,000	\$ 1,240,000	\$ 1,232,000	\$ 8,000 F

$$\text{Total Variance} = \text{Materials Variance} + \text{Labour Variance} + \text{Overhead Variance}$$



# Variance Formula Notation

AH: Actual Hours Used	SH: Standard Hours
AP: Actual Price	SP: Standard Price
AQ: Actual Quantity	SQ: Standard Quantity
AR: Actual Rate Per Hour	SR: Standard Rate Per Hour

**Standard = Budgeted / Expected**





# Direct Material Variances

Total Variance = **Materials Variance** + Labour Variance + Overhead Variance

AP: Actual Price	SP: Standard Price
AQ: Actual Quantity	SQ: Standard Quantity

<b>Material Price Variance</b>	$MPV = AQ_{\text{purchased}} \times (AP - SP)$
--------------------------------	--

<b>Material Quantity Variance</b>	$MQV = SP \times (AQ - SQ)$
-----------------------------------	-----------------------------

AQ x AP	AQ x SP	SQ x SP
↙	↓	↘
Material Price Variance	Material Quantity Variance	

<b>Total Materials Variance</b>	$(AQ \times AP) - (SQ \times SP)$
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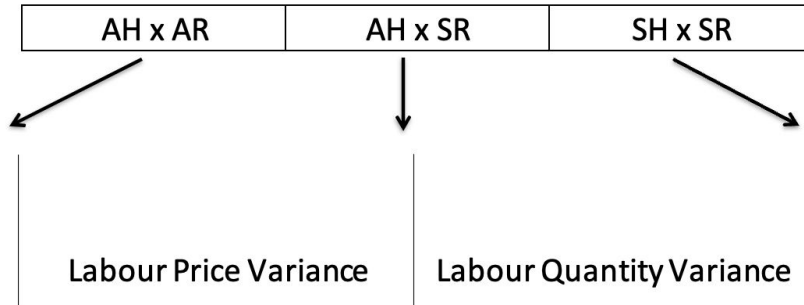
# Direct Labour Variances

Total Variance = Materials Variance + **Labour Variance** + Overhead Variance

AH: Actual Hours Used	SH: Standard Hours
AR: Actual Rate Per Hour	SR: Standard Rate Per Hour

<b>Labour Price Variance</b>	$LPV = AH \times (AR - SR)$
------------------------------	-----------------------------

<b>Labour Quantity Variance</b>	$LQV = SR \times (AH - SH)$
---------------------------------	-----------------------------



<b>Total Labour Variance</b>	$(AH \times AR) - (SH \times SR)$
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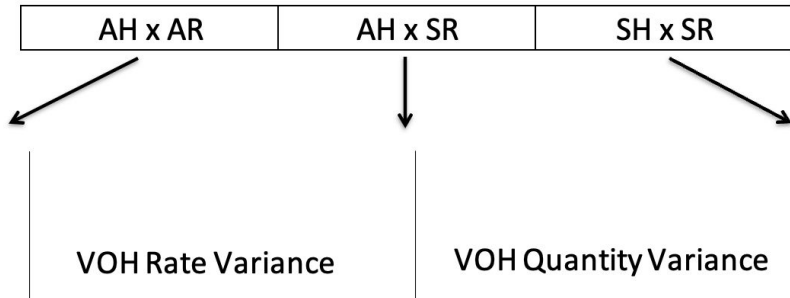
# Manufacturing Overhead Variances

**Total Variance = Materials Variance + Labour Variance + Overhead Variance**

AH: Actual Hours Used	SH: Standard Hours
AR: Actual Rate Per Hour	SR: Standard Rate Per Hour

<b>Variable OH Rate Var.</b>	<b><math>VORV = AH \times (AR - SR)</math></b>
------------------------------	--

<b>Variable OH Quantity Var.</b>	<b><math>VOQV = SR \times (AH - SH)</math></b>
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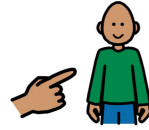
<b>Total Overhead Variance</b>	<b><math>(AH \times AR) - (SH \times SR)</math></b>
--------------------------------	---



# Variance Equation Summary

**Total Variance = Materials Variance + Labour Variance + Overhead Variance**

<b>Material Price Variance</b>	$MPV = AQ_{\text{purchased}} \times (AP - SP)$	<b>Material Quantity Variance</b>	$MQV = SP \times (AQ - SQ)$
	<b>Total Materials Variance</b>	$(AQ \times AP) - (SQ \times SP) \text{ or } MPV + MQV$	
<b>Labour Price Variance</b>	$LPV = AH \times (AR - SR)$	<b>Labour Quantity Variance</b>	$LQV = SR \times (AH - SH)$
	<b>Total Labour Variance</b>	$(AH \times AR) - (SH \times SR) \text{ or } LPV + LQV$	
<b>Variable OH Rate Var.</b>	$VORV = AH \times (AR - SR)$	<b>Variable OH Quantity Var.</b>	$VOQV = SR \times (AH - SH)$
	<b>Total OH Variance</b>	$(AH \times AR) - (SH \times SR) \text{ or } VORV + VOQV$	



your turn

# Practice Problem #1

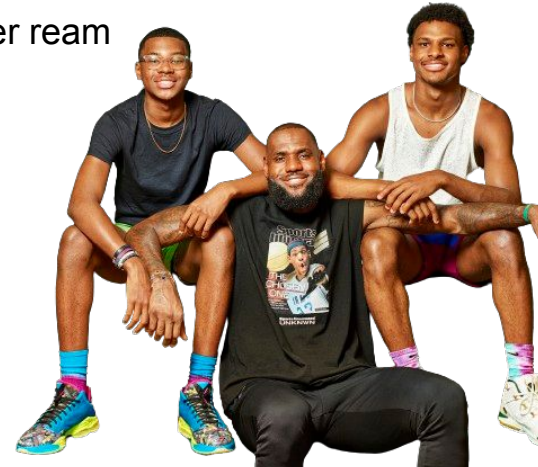
Lebron James Jersey Co. (LJJ Co.) produces high-quality authentic NBA jerseys. Bryce James, the controller, is looking to calculate the end-of-month variances to see how the company has been performing.

In April, LJJ Co. produced and sold 10,000 jerseys using 1,000 reams of polyester and 19,000 hours of labour. Total labour costs were \$221,000.

Bryce James originally thought each jersey would use 0.2 reams of polyester and 3 hours of labour. He expected that the company would purchase polyester at a rate of \$5 per ream and pay workers at a rate of \$10 per hour.

Help Bryce calculate:

1. The Material Quantity Variance
2. The Labour Price Variance



# Practice Problem #1



$$MQV = SP * (AQ - SQ)$$

$$SP = \$5/\text{ream}; AQ = 1000 \text{ reams}; SQ = 10\text{k jerseys} * 0.2 = 2000 \text{ reams}$$

$$MQV = 5 * (1\text{k} - 2\text{k}) = \$5,000 \text{ Favourable (F)}$$

Actual quantity for 10k jerseys was less than expected! Woohoo!

$$LPV = AH * (AR - SR)$$

$$AH = 19\text{k hours}; AR = 221\text{k}/19\text{k hours} = \$11.63; SR = \$10$$

$$LPV = 19\text{k} * (11.63 - 10) = \$30,970 \text{ Unfavourable (U)}$$

Actual labour price was more than expected. Yikes!





# Balanced Scorecard

Incorporation of financial and nonfinancial measures in an integrated system that links **performance measurement with company strategic goals**. Measures **differ by industry**.

## Key Perspectives & Examples of Measures

**Financial:** measures directly related to your income statement

E.g. profit margin, cost per unit manufactured, % increase in sales, cost of spoilage, cost of securing new customers

**Customer:** customer satisfaction, perception of company and products

E.g. cost per customer, customer satisfaction ratings, % of market share, # of customer complaints, # of return customers

**Internal Process:** internal operations and efficiencies within company

E.g. % of spoilage, input cost per unit, % of capacity used, # of process improvements implemented, cost of quality inspection

**Learning & Growth:** intangible resources within company such as innovation and employee knowledge

E.g. # of employees trained on manufacturing process/customer service, # of employee initiatives implemented, employee turnover

# Topic 2:

## Absorption & Variable Costing



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# Review: Product & Period Costs

## Manufacturing (AKA Product) Costs

- **Direct Materials (DM), Direct Labour (DL), Manufacturing Overhead (MOH)**
- **DM/DL** directly associated with finished product; e.g. workers paid by production level
- **MOH** = indirectly associated costs; e.g. depreciation, insurance, maintenance on factory, factory manager salary
- **Recorded as inventory** and expensed as sold (to COGS)

## Non-Manufacturing (AKA Period) Costs

- Marketing/selling/admin expenses (e.g. advertising, shipping, sales travel, commissions, sales salaries, warehouse for manufactured goods)
- Includes selling costs and admin costs
- **Selling Costs:** help secure customer orders and get product into customer hands
- **Admin Costs:** general management costs
- **NOT** included in inventory; expensed when incurred

# Absorption vs. Variable Costing



## Absorption Costing

- Used for **financial accounting** (proper IFRS & ASPE requirements)
- Fixed MOH classified as **product cost**

## Variable Costing

- Used for **managerial accounting** (variable costs matter more in decision making)
- Fixed MOH classified as **period cost**

# Absorption vs. Variable Costing (cont.)



## Absorption Costing

- Accumulate **ALL manufacturing costs** as product costs **in inventory** until sold
- $DM + DL + VMOH + FMOH$

## Variable Costing

- Accumulates **variable manufacturing costs ONLY** in inventory until sold
- $DM + DL + VMOH$

# Absorption vs. Variable Costing Statements

## Absorption Costing Income Statement

Sales ( $1,600 \times \$500$ )		\$800,000
Cost of goods sold		
Direct materials ( $1,600 \times \$185$ )	\$296,000	
Direct labor ( $1,600 \times \$100$ )	160,000	
Manufacturing overhead	<u>40,000</u>	<u>496,000</u>
<b>Gross profit</b>		<b>304,000</b>
Operating expenses		
Sales commissions ( $1,600 \times \$15$ )	24,000	
Sales personnel salaries	10,000	
CEO salary	<u>150,000</u>	<u>184,000</u>
<b>Net income</b>		<b><u>\$120,000</u></b>

## Variable Costing Income Statement

Sales ( $1,600 \times \$500$ )		\$800,000
Variable costs		
Direct materials ( $1,600 \times \$185$ )	\$296,000	
Direct labor ( $1,600 \times \$100$ )	160,000	
Sales commissions ( $1,600 \times \$15$ )	<u>24,000</u>	<u>480,000</u>
<b>Contribution margin</b>		<b>320,000</b>
Fixed costs		
Manufacturing overhead	40,000	
Sales personnel salaries	10,000	
CEO salary	<u>150,000</u>	<u>200,000</u>
<b>Net income</b>		<b><u>\$120,000</u></b>



# Determining Target Selling Prices

## Absorption Costing

1. **Compute manufacturing cost per unit**
  - DM per unit + DL per unit + Variable MOH per unit + Fixed MOH per unit
2. **Compute markup percentage**
  - (Desired Return per unit + S&A expenses per unit) / manufacturing cost per unit
3. **Set target selling price**
  - Manufacturing cost per unit + (markup percentage \* manufacturing cost per unit)

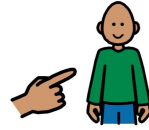
Our target selling price will cover desired return and all S&A costs

## Variable Costing

1. **Compute variable cost per unit**
  - DM per unit + DL per unit + Variable MOH per unit + Other VC per unit (e.g. S&A)
2. **Compute markup percentage**
  - (Desired Return per unit + Fixed costs per unit) / variable cost per unit
3. **Set target selling price**
  - Variable cost per unit + (markup percentage \* variable cost per unit)

Our target selling price will cover desired return and all fixed costs

# Practice Problem #2



your turn

UBC has built a new flower store on campus, Pushing Petals, offering affordable prices to romantic students. The following information reflects their 2024 sales and costs:

**Number of Units Produced Annually:** 22,000

**Desired Return per unit:** \$10

**Variable costs per unit:**

- DM, DL and VMOH \$6
- Selling & Admin Expenses \$4

**Fixed costs per year:**

- Manufacturing Overhead \$88,000
- Selling & Admin Expenses \$55,000

Determine Pushing Petal's **markup percentage under variable costing**.



## Practice Problem #2



**Variable Costing = DM + DL + VMOH + other VC**

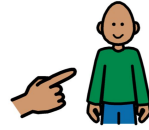
**DM + DL + VMOH + other VC = \$6 + \$4 = \$10**

**Fixed costs per unit = (88k + 55k) / 22k = \$6.50**

**Markup % = (10 + 6.5) / 10 = 1.65**

**Under variable costing, we will apply a 165% markup to our variable costs to earn \$10 back on every bouquet.**

# Practice Problem #3



your turn

UBC has built a new flower store on campus, Pushing Petals, offering affordable prices to romantic students. The following information reflects their 2024 sales and costs:

**Number of Units Produced Annually:** 22,000

**Desired Return per unit:** \$10

**Variable costs per unit:**

- DM, DL and VMOH \$6
- Selling & Admin Expenses \$4

**Fixed costs per year:**

- Manufacturing Overhead \$88,000
- Selling & Admin Expenses \$55,000

Determine Pushing Petal's **target selling price under absorption costing**.





## Practice Problem #3



**Absorption Costing = DM + DL + VMOH + FMOH**

DM + DL + VMOH = \$6; FMOH/unit =  $88k/22k = \$4$ ; Per unit cost =  $6 + 4 = \$10$

S&A expense per unit = Fixed =  $55k/22k = \$2.5$  + \$4 (Variable) = \$6.5

Markup % =  $(10 + 6.5) / 10 = 165\%$

Target Selling price =  $10 + (165\% * 10) = \$26.50$

**Under absorption costing, we will sell each bouquet for \$26.50 to earn \$10 in net income.**

# Topic 3:

## Responsibility Accounting

# Segment Reporting

## Responsibility Accounting

- Identifying and reporting costs and revenues on the basis of the manager who makes day-to-day decisions about the items
- A manager's performance is evaluated **ONLY** on matters directly under their control



## Traceable (Direct) Fixed Costs

- Fixed costs that only apply to a specific segment
- If we removed that segment, the cost would not exist anymore either
- E.g. production manager for Tesla battery cells  
-> direct labour costs for the cell division

## Common (Indirect) Fixed Costs

- Fixed costs that can be identified with multiple segments
- If we removed a specific segment, the cost would still exist
- E.g. cost of software update for an entire organization

# Responsibility Centres

## Cost Centre

Managers responsible to operate within a budget

**Not evaluated on how much income they can generate**

E.g. production lines and customer service centres

## Profit Centre

Managers responsible for improving the 'bottom line' profits

**Evaluated on ability to achieve profit targets**

E.g. retail stores, bank branches and McDonalds franchises

## Investment Centre

Managers responsible for making investment decisions

**Evaluated on return on investment (ROI)**

E.g. investments in new product lines, mergers & acquisitions

### Types of Responsibility Centers



Expenses

Cost Center



Expenses and Revenues

Profit Center



Expenses and Revenues and Return on Investment

Investment Center

# Responsibility Report for Profit Centres

## Controllable Fixed Costs

Most direct fixed costs (traceable costs) are **controllable** by a profit centre

E.g. profit centre supervisor salary, payroll for profit centre employees

## Non-Controllable Fixed Costs

Indirect fixed costs (common costs) are **non-controllable** by a profit centre

E.g. property tax on head office, HR department costs

	Budget	Actual	Favourable (F) Unfavourable (U)
Sales	XXX	XXX	XXX
- Variable Costs	(XXX)	(XXX)	(XXX)
= Contribution Margin	XXX	XXX	XXX
- Controllable FC	(XXX)	(XXX)	(XXX)
= Controllable Margin	XXX	XXX	XXX

**Controllable Margin = Contribution Margin - Controllable FC**

# Cost Centres vs. Profit Centres

## Cost Centre Example

Fox Company Finishing Department Responsibility Report For the Month Ended January 31, 2022				
Controllable Costs	Budget	Actual	Difference Favorable - F Unfavorable - U	
Indirect materials	\$13,500	\$14,000	\$ 500	U
Indirect labor	18,000	17,000	1,000	F
Utilities	4,500	4,600	100	U
Supervision	4,000	4,000	0	
Total	\$40,000	\$39,600	\$ 400	F

Manager able to control all MOH costs except depreciation, property taxes and their own salary

## Profit Centre Example

Mantle Company Marine Division Responsibility Report For the Year Ended December 31, 2022				
	Budget	Actual	Difference Favorable - F Unfavorable - U	
Sales	\$1,200,000	\$1,150,000	\$50,000	U
Variable costs				
Cost of goods sold	500,000	490,000	10,000	F
Selling and administrative	160,000	156,000	4,000	F
Total	660,000	646,000	14,000	F
Contribution margin	540,000	504,000	36,000	U
Controllable fixed costs				
Cost of goods sold	100,000	100,000	0	
Selling and administrative	80,000	80,000	0	
Total	180,000	180,000	0	
Controllable margin	\$ 360,000	\$ 324,000	\$36,000	U

All indirect costs are omitted from the report

# Practice Problem #4



Bob has decided to shut down Bob's Burgers and open up a McDonald's franchise instead. Now, Mac Donald, CEO of McDonald's is determining the performance of Bob's franchise for the previous year, using the following information. Assume McDonald's only sells one item - the Big Mac.

Big Mac selling price per unit: \$7

Big Mac variable cost per unit: \$3

Total units sold: 50,000

## Fixed costs:

Payroll at Bob's franchise: \$120,000

McDonalds head office rent: \$400,000

Manager's salary (not Bob): \$40,000

National advertising costs: \$68,000



**Determine the controllable margin per unit for Bob's franchise.**

# Practice Problem #4



Contribution margin =  $7 - 3 = \$4$  per unit

Controllable fixed costs = payroll & Bob's salary

Non-controllable costs = head office rent & advertising

Controllable fixed costs per unit =  $(120k + 40k) / 50k = \$3.20$

**Controllable margin =  $\$4 - \$3.2 = \$0.80$  per Big Mac**



# Topic 4:

## ROI vs. Residual Income

# Responsibility Report for Investment Centres

## Controllable Fixed Costs

**ALL FIXED COSTS** are controllable by the manager of an investment centre

## Return on Investment

In addition to the profit centre report inclusions, this report also shows **budgeted and actual ROI**

ROI for an investment centre =

**Controllable Margin**

**Average Operating Assets**

	Budget	Actual	Favourable (F) Unfavourable (U)
Sales	XXX	XXX	XXX
- Variable Costs	(XXX)	(XXX)	(XXX)
= Contribution Margin	XXX	XXX	XXX
- Controllable FC	(XXX)	(XXX)	(XXX)
= Controllable Margin	XXX	XXX	XXX
<b>Return on Investment</b>	<b>XXX %</b>	<b>XXX %</b>	<b>XXX %</b>



# Return on Investment (ROI)

$$\frac{\text{Controllable Margin}}{\text{Average Operating Assets}}$$

OR

$$\frac{\text{Net Income}}{\text{Total Assets}}$$

<b>Average Operating Assets</b>	$\frac{(\text{This year's operating assets} + \text{Last year's operating assets})}{2}$
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**Operating assets** = current assets and factory assets used in operations and controlled by the manager

**Non-Operating assets** = idle factory assets, land held for future cost; excluded from equation

## Application of ROI

Can increase ROI by:

- Increasing sales
- Reducing operating expenses
- Reducing operating assets

Compare calculated figure against company's prev ROI or ROI of similar company

Manager evaluated ONLY on ROI may reject profitable investment opportunities



# Residual Income (RI)

**Residual Income = Controllable Margin - (Minimum Rate of Return x Average Operating Assets)**

## Benefits

- Encourages managers to make profitable investments that would be **rejected by managers under ROI**
- i.e. If an investment would decrease ROI, the manager evaluated on ROI would reject it. However, if evaluated on RI, the manager would accept it if RI is positive.

## Drawbacks

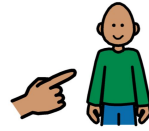
- Cannot be used to compare performance of different- sized divisions (\$1 million operating income vs. \$100,000 operating income)
- Does not indicate what earnings should be (need an external benchmark)
- Does not incorporate non-financial indicators

If Residual Income > 0, **accept project**

If Residual Income < 0, **reject project**



## Practice Problem #5



your turn

The Dunder Mifflin Scranton branch has a controllable margin of \$72,000. This year's operating assets are \$500,000 and last year's were \$385,000. The minimum required rate of return for Dunder Mifflin is 15%.

Determine:

1. The ROI of the branch
2. The RI of the branch
3. If the manager of the branch is evaluated on ROI, will an investment of \$21,000 that generates additional controllable margin of \$3,250 be accepted or rejected?
4. Following the last question, if they are instead evaluated on RI, will the investment be accepted or rejected?



# Practice Problem #5



1. Average Operating Assets =  $(500k + 385k) / 2 = 442.5k$ ; **ROI =  $72k / 442.5k = 16.3\%$**
2. **RI =  $72k - 0.15 * 442.5k = \$5,625$**
3. ROI of investment =  $3250 / 21k = 15.5\%$ ; **reject investment because  $15.5\% < 16.3\%$  (new ROI < original ROI)**
4. RI of investment =  $3250 - 0.15 * 21k = \$100$ ; **accept investment because RI > 0**

# Topic 5:

## Transfer Pricing



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# What are Transfer Prices?

Price that one division in an organization charges another division for products or services

Company's net income stays the same no matter what the transfer price is

Normally will occur between a parent and its subsidiary

**Example:** If Division A charges Division B \$18 for Product X, this will produce the same company-wide net income as if they charged \$15 for Product X to Division B.

## \$18 charged

	Division A	Division B
Sales	<b>\$18</b>	\$30
COGS	\$5	<b>\$18</b>
= Net Income	<u>\$13</u>	<u>\$12</u>

## \$15 charged

	Division A	Division B
Sales	<b>\$15</b>	\$30
COGS	\$5	<b>\$15</b>
= Net Income	<u>\$10</u>	<u>\$15</u>



# Transfer Pricing Methods

<b>Negotiated</b>	Selling division and buying division negotiate a price to transfer at that leaves both parties better off.
<b>Market-Based</b>	Company uses market price of similar goods traded on external market to determine internal transfer prices.
<b>Cost-Based</b>	Divisions sell items to other division at the cost of production (COGS). <b>Results in improper transfer pricing, causing losses in profitability and ignoring opportunity cost.</b>

*E.g. Doc Martens states that the Sole Division must use a transfer price based on the variable cost of the sole.*

## Before

Boot Division		Sole Division	
Selling price of boots	\$90	Selling price of sole	\$18
Variable cost of boot (not including sole)	35	Variable cost per sole	11
Cost of sole purchased from outside supplier	17		
<b>Contribution margin per unit</b>	<b>\$38</b>	<b>Contribution margin per unit</b>	<b>\$ 7</b>
<b>Total contribution margin per unit \$45 (\$38 + \$7)</b>			

## After

Boot Division		Sole Division	
Selling price of boots	\$90	Selling price of sole	\$11
Variable cost of boot (not including sole)	35	Variable cost per sole	11
Cost of sole purchased from sole division	11		
<b>Contribution margin per unit</b>	<b>\$44</b>	<b>Contribution margin per unit</b>	<b>\$ 0</b>
<b>Total contribution margin per unit \$44 (\$44 + \$0)</b>			

# Negotiated Method: Minimum Transfer Price

## Negotiated

Selling division and buying division negotiate a price to transfer at that leaves both parties better off.

The Selling Division must not be worse off - they will determine the lower limit, i.e. the minimum transfer price.

## Incremental Costs

Technically, this includes both **variable costs** and **relevant fixed costs**

### Relevant fixed costs are rare

- Additional costs required for internal transfer to occur (new equipment/supervisor)
- Does not include fixed costs that occur regardless of internal transfer

**Minimum  
Transfer Price**

=

Incremental costs per unit  
incurred up to point of  
transfer

+

Opportunity costs per  
unit to the supplying  
divisions

=

Variable Cost

+

Per-unit Lost  
Contribution Margin  
on outside sales

=

Variable Cost

+

**Total CM lost**  

---

**# units transferred**

# Negotiated Method: Minimum Transfer Price

## Negotiated

Selling division and buying division negotiate a price to transfer at that leaves both parties better off.

The Selling Division must not be worse off - they will determine the lower limit, i.e. the minimum transfer price.

$$\begin{aligned}
 \text{Minimum Transfer Price} &= \text{Incremental costs per unit incurred up to point of transfer} + \text{Opportunity costs per unit to the supplying divisions} \\
 &= \text{Variable Cost} + \text{Per-unit Lost Contribution Margin on outside sales} \\
 &= \text{Variable Cost} + \frac{\text{Total CM lost}}{\text{\# units transferred}}
 \end{aligned}$$

## Opportunity Costs

Applies when selling division **does not have excess capacity**

i.e. If the selling division would be able to sell the goods to external buyers instead of transferring internally, **there is an opportunity cost**. If they wouldn't be bought regardless, then there is **no opportunity cost**.



# Negotiated Method: Minimum Transfer Price

There are three scenarios that can occur to determine our minimum transfer price.

Selling division **has excess capacity.**

$$\text{Minimum Transfer Price} = \text{Variable Cost}$$

Selling division **does not have excess capacity.**

$$\text{Minimum Transfer Price} = \text{Variable Cost} + \frac{\text{Lost CM from lost sales for all units transferred}}{\text{\# of units transferred}}$$

Selling division **has partial excess capacity.**

$$\text{Minimum Transfer Price} = \text{Variable Cost} + \frac{\text{Lost CM from lost sales (only for \# units of lost sales)}}{\text{\# of units transferred}}$$

# Negotiated Method: Maximum Transfer Price

## Negotiated

Selling division and buying division negotiate a price to transfer at that leaves both parties better off.

The Buying Division must not be worse off - they will determine the upper limit, i.e. the max transfer price.

## Market Price

The max transfer price will be dictated by the **selling price of an external supplier**.

i.e. If the external supplier sells the product at \$17/unit while the transfer price is \$20/unit, why would the buying division transfer internally?

**Maximum TP > Minimum TP, Transfer!**

**Maximum TP < Minimum TP, Don't Transfer!**

### Range of negotiated transfer prices



Upper limit is determined by the buying division.

Lower limit is determined by the selling division.

# Practice Problem #6a



New Balance has a Leather Division and a Sneaker Division. The Leather Division has a production capacity of 100,000 leather squares per year. Currently, they sell each square for \$15 and it costs \$8 to produce.

The Sneaker division is currently purchasing 40,000 leather squares per year from an outside supplier at \$20 each. They now are considering buying internally from the Leather Division.

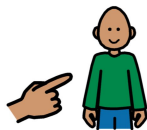
## Part 1:

1. If the Leather Division is already operating at capacity selling externally, what is the minimum transfer price they would accept from the Sneaker division? Will this transaction be accepted?
2. The Leather Division is still operating at capacity, but they can avoid \$2 in sales commission expenses per square sold if they divert to selling internally. What is the minimum transfer price they would accept from the Sneaker division?





# Practice Problem #6a



your turn

1. **Operating @ capacity, then:**

$$\text{Minimum Transfer Price} = \text{Variable Cost} + \frac{\text{Lost CM from lost sales for all units transferred}}{\text{\# of units transferred}}$$

Therefore, Min Transfer Price = \$8 (VC) + (\$15 - \$8) (Lost CM from external sales lost) = \$15

Max Transfer Price = market price = \$20; 15 < 20, so the Sneaker Division **will accept**.

2. Reduced VC = \$8 - \$2 commission = \$6 VC

Lost CM = \$15 - \$8 = \$7 (note that we don't use the reduced VC calculated above because we would not reduce our VC with external sales)

**Min Transfer Price = \$6 + \$7 = \$13**

## Practice Problem #6b



New Balance has a Leather Division and a Sneaker Division. The Leather Division has a production capacity of 100,000 leather squares per year. Currently, they sell each square for \$15 and it costs \$8 to produce.

The Sneaker division is currently purchasing 40,000 leather squares per year from an outside supplier at \$20 each. They now are considering buying internally from the Leather Division.

### Part 2:

1. Suppose the Leather Division instead has excess capacity of 12,000 leather squares. If the Sneaker Division offers them \$12.50 per square, will they accept this transaction?
2. Suppose the Sneaker Division requires special textured leather that is different to the squares currently produced by the Leather Division. The additional variable cost of texturing is \$3 per square. The Leather Division is currently operating at full capacity and taking on the special order would displace production of 25,000 regular squares. What is the minimum transfer price the Leather Division would accept?







# Practice Problem #6b



your turn

## 1. Partial excess capacity

CM per unit:  $\$15 - \$8 = \$7$

Lost sales:  $40,000$  (total Sneaker sales) -  $12,000 = 28,000$  units

Min. Transfer Price =  $\$8$  (VC) +  $[(\$7 * 28,000) / 40,000] = \mathbf{\$12.90}$

$\$12.90 > \$12.50$ , therefore Leather Division **will not accept**

## 2. Textured leather VC = $\$8 + \$3 = \$11$

Opportunity Cost (Lost CM):  $[(\$7 * 25,000) / 40,000] = \$4.38$

Min. Transfer Price =  $\$11 + \$4.38 = \mathbf{\$15.38}$

$$\text{Minimum Transfer Price} = \text{Variable Cost} + \frac{\text{Lost CM from lost sales (only for \# units of lost sales)}}{\text{\# of units transferred}}$$

# Topic 6:

## Incremental Analysis



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# Types of Decisions

Types	Strategy
Scrap OR Keep	Pick <b>one side or the other</b> and find <b>relevant costs</b> for that side
Make OR Buy	Pick <b>one side or the other</b> and find <b>relevant costs</b> for that side
Sell OR Process Further	Compare <b>extra revenues</b> to <b>extra costs</b> and calculate net impact
Keep OR Drop	Compare <b>Segment CM lost</b> to <b>Controllable Fixed Costs saved</b>
Accept OR Reject Special Order	<b>VC + Relevant FC + Opportunity Costs</b> vs. <b>Revenue</b>



# Scrap OR Keep / Make OR Buy

## Strategy

1. Pick one side or the other (not both)
2. Find **relevant costs** for that side
3. Determine whether each relevant cause causes an **inflow (+) or outflow (-)**
4. Add up **all relevant costs** and determine positive or negative impact
5. Choose decision w/ **positive impact**

## Relevant Costs VS Irrelevant Costs

**Relevant:** avoidable (differential) costs, opportunity costs

**Irrelevant:** unavoidable costs, sunk costs, joint costs

### E.g. Scrap or Keep

An employee at Enterprise Rent-A-Car accidentally drives one of the rental cars into a pole, damaging it. Enterprise purchased the car 3 years ago for \$50,000. Since then, they have added a GPS system for \$100. The rental car has depreciated by \$10,000 and has a useful life of 7 years.

The rental manager contacts the scrap yard, who offers the company \$10,000 for the damaged car. If Enterprise goes with this option, they will need to purchase a replacement car for \$12,000.

Alternatively, Enterprise can keep and fix the vehicle. This will require parts costing \$800 and safety inspection costing \$400.



# Scrap OR Keep / Make OR Buy

## E.g. Scrap or Keep

An employee at Enterprise Rent-A-Car accidentally drives one of the rental cars into a pole, damaging it. ~~Enterprise purchased the car 3 years ago for \$50,000. Since then, they have added a GPS system for \$100. The rental car has depreciated by \$10,000 and has a useful life of 7 years.~~

The rental manager contacts the scrap yard, who offers the company \$10,000 for the damaged car. If Enterprise goes with this option, they will need to purchase a replacement car for \$12,000.

Alternatively, Enterprise can keep and fix the vehicle. This will require parts costing \$800 and safety inspection costing \$400.

Scraping it results in an **outflow**, so keeping it results in an **inflow**.

**Decision: Keep the Car**

## Process

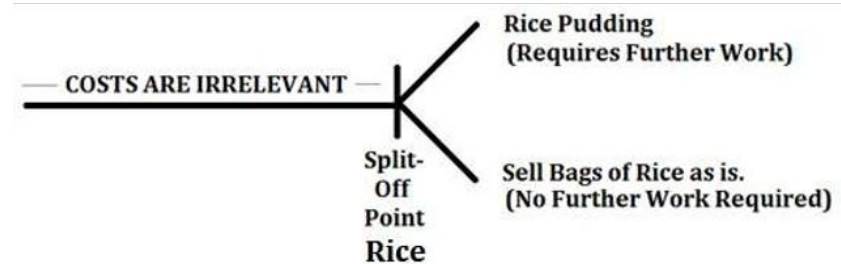
1. Cross out any irrelevant costs (historical price, GPS, depreciation)
2. Choose a side - let's choose "Scrap"!
3. Calculate as follows:

Sale of Vehicle	10,000	I
Purchase of Vehicle	(12,000)	O
New Parts	800	I
Safety Inspection	400	I
Total	(800)	O

# Sell OR Process Further

## Strategy

1. Cross out all costs that will be **incurred regardless of decision**. This includes any costs prior to the “**split off point**”.
2. Compare extra revenue to extra costs.



**Extra Revenue > Extra Costs, then process further**

**Extra Revenue < Extra Costs, then sell as is**

## Extra Considerations

Should production occur at all or would we be better off without it?

What should we produce and sell to maximize contribution margin?

# Keep OR Drop a Segment

## E.g. Keep or Drop

Lebron James Jersey Co. has two departments: one that sells authentic jerseys and one that sells replica jerseys. The company info is presented below:

	Authentic	Replica	Total
Sales	9,000	4,500	13,500
- VC	(7,050)	(3,020)	(10,070)
= CM	1,950	1,480	3,430
- Direct FC	(500)	1,500	(2,000)
= Controllable Margin	1,450	(20)	1,430

Direct fixed expenses include depreciation on equipment of \$40 for the Authentic Department and \$30 for the Outdoor Department.

## Strategy

1. Compare **segment CM lost** to **direct FC saved** if we were to **drop the segment**.
2. **Add inflows and outflows to get net effect.** Ensure that these do not include non-controllable fixed costs or sunk costs.
3. **Keep segment if:**

$$CM \text{ lost} > (FC \text{ avoided} + CM \text{ gained})$$



# Keep OR Drop a Segment

## E.g. Keep or Drop

Lebron James Jersey Co. has two departments: one that sells authentic jerseys and one that sells replica jerseys. The company info is presented below:

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= CM	1,950	1,480	3,430
- Direct FC	(500)	1,500	(2,000)
= Controllable Margin	1,450	(20)	1,430

Direct fixed expenses include depreciation on equipment of \$40 for the Authentic Department and \$30 for the Outdoor Department.

## Should we shut down the Replica department?

Segment CM Lost = **1,480 O**

Direct Fixed Costs saved =  $1,500 - 30 =$   
**1,470 I**

**$1,470 I - 1,480 O = (10) O$**

**Answer:** We should keep the Replica department because we lose \$10 more in Contribution Margin by shutting it down.

### Other reasons to keep the Replica dept:

1. Replica dept may drive sales to other segments
2. We don't want to lose loyal customers
3. Company morale and overall reputation





# Accept OR Reject Special Orders

## Strategy

1. Find costs (outflows) pertaining to the special order.
2. Compare to revenues (inflows).

**Relevant Costs > Relevant Revenues, then reject!**

**Relevant Costs < Relevant Revenues, then accept!**

## Outflows

Variable Costs such as DM, DL, VMOH, Relevant Fixed Costs

Typically, there will be an opportunity cost (current capacity)

E.g. Suppose the Sneaker Division requires special textured leather that is different to the squares currently produced by the Leather Division. The additional variable cost of texturing is \$3 per square. The Leather Division is currently operating at full capacity and taking on the special order would displace production of 25,000 regular squares...

# Practice Problem #7



Tesla incurs the follow annual costs in producing 500,000 battery cells for their new Roadster model launch.

Direct materials	1,000,000
Direct labour	1,500,000
Variable MOH	800,000
Fixed MOH	<u>900,000</u>
Total Manufacturing Costs	4,200,000



Instead of producing in-house, Tesla may purchase battery cells externally for \$10 per unit. \$500,000 of the fixed MOH will still be incurred if the cells are purchased. What should Tesla and Elon Musk do?

# Practice Problem #7



Direct materials	1,000,000	Outflow
Direct labour	1,500,000	Outflow
Variable MOH	800,000	Outflow
Fixed MOH	<u>900,000</u>	Partial Outflow
Total Manufacturing Costs	4,200,000	

## Choose a side: continuing to make the cells

Direct materials incurred	(1m)	O
Direct labour incurred	(1.5m)	O
Variable MOH	(800k)	O
Fixed MOH	900k - 500k = (400k)	O
Purchase Price	500k * \$10 = 5m	I
Total Annual cost	1.3m	I

Continue to make the cells. There is a 1.3m inflow by doing so instead of purchasing externally.



# Questions?

