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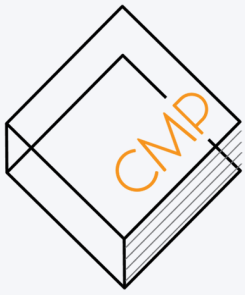

COMM 294 SOLUTIONS

FINAL REVIEW SESSION

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CHARTERED PROFESSIONAL ACCOUNTANTS BRITISH COLUMBIA

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Budgeting

Production Budget

	Budgeted sales
+	Desired ending inventory
=	Total need
-	Beginning inventory
=	Required production

Direct Materials Budget

	Production
x	Materials per unit
=	DM required for production needs
+	Desired ending DM inventory
=	Total need
-	Beginning DM inventory
=	Required DM purchases

Direct Labour Budget

	Units of production (production budget)
x	DL per unit
=	Required #DLH

Manufacturing Overhead Budget

	Budgeted DLH
x	Variable MOH rate
=	Variable MOH costs
+	Fixed MOH costs
=	Total MOH costs
-	Non-cash costs (depreciation)
=	Cash disbursement for MOH

Selling & Administrative Expense Budget

	Budgeted sales (units)
x	Variable SG&A rate
=	Variable SG&A expenses
+	Fixed SG&A expenses
=	Total SG&A expenses
-	Non-cash costs
=	Cash SG&A expenses

Cash Budget

	Beginning cash balance
+	Cash collections
=	Total cash available
-	Cash disbursements (DM, DL, MOH, SG&A, PPE, Dividend)
=	Excess (Deficiency)
+/-	Financing (borrowing, repayments, interest)
=	Ending cash balance

Static vs. Flexible Budgets

Static Budgets

- Prepared for a single, planned level of activity

Flexible Budgets

- Prepared for any level of activity within the relevant range

Difference between 2 budgets @ different number of hours: Due to lower activity

Difference between Budget vs. Actual @ same number of hours: Due to poor cost control

Question 1: Budgeting

Central Perk Café has provided you with the following sales budget:

January	41,000 bags of coffee beans
February	31,000 bags of coffee beans
March	25,000 bags of coffee beans
April	31,000 bags of coffee beans
May	25,000 bags of coffee beans

The inventory of finished goods at the end of each month should equal 20% of the next month's sales. However, on December 31, the finished goods inventory totaled only 6,000 units (bags).

Each bag of coffee bean requires 3 layers of packaging. Since the production of this packaging by Central Perk's supplier is sometimes irregular, the company has a policy of maintaining an ending inventory at the end of each month equal to 30% of the next month's production needs. This requirement was met on January 1 of the current year.

Required:
Prepare a budget showing the quantity of packaging to be purchased each month for January, February and March, as well as in total for the quarter.

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Solution:

Production Budget

	January	February	March	April
Budgeted Sales (#units)	41,000	31,000	25,000	31,000
Add: Desired ending inventory	6,200	5,000	6,200	5,000
Total needs	47,200	36,000	31,200	36,000
Less: Beginning inventory	(6,000)	(6,200)	(5,000)	(6,200)
Units to produce	41,200	29,800	26,200	29,800

Materials Purchase Budget

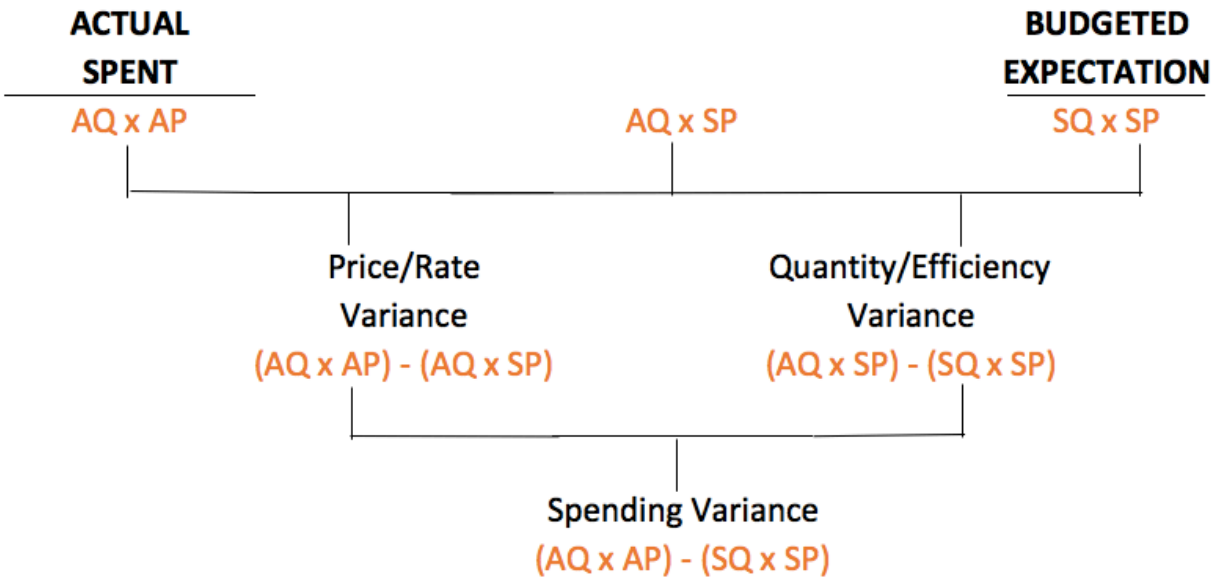
	January	February	March	Quarter
Units to produce	41,200	29,800	26,200	97,200
Packaging needed (3 x #units)	123,600	89,400	78,600	291,600
Add: Desired ending inventory	26,820	23,580	26,820	26,820
Total needs	150,420	112,980	105,420	368,820
Less: Beginning inventory	(37,080)	(26,820)	(23,580)	(37,080)
Required purchases	113,340	86,160	81,840	281,340

Note:

Beginning and ending inventory for the quarter is **NOT** a sum of January, February and March inventories

Standard Costing & Variance Analysis

Variance Analysis Model



AQ = Actual Quantity
SQ = Standard Quantity

AP = Actual Price
SP = Standard Price

If Actual Costs > Standard Costs → Unfavourable → (+) value
If Actual Costs < Standard Costs → Favourable → (-) value

Direct Materials

DM Price Variance (MPV) = (AQp x AP) – (AQp x SP)
= AQp x (AP – SP)
(based on amount purchased)

DM Quantity Variance (MQV) = (AQu x SP) – (SQu – SP)
= SP x (AQu – SQu)
(based on amount used)

Direct Labour

DL Rate Variance (LRV) = (AH x AR) – (AH x SR)

= AH x (AR – SR)

DL Efficiency Variance (LEV) = (AH x SR) – (SH x SR)

= SR x (AH – SH)

Note:

Rate = Price

Efficiency = Quantity

R = Rate

H = Hours

Variable Manufacturing Overhead

VMOH Spending Variance (VOSV) = (AH x AR) – (AH x SR)

= AH x (AR – SR)

VMOH Efficiency Variance (VOEV) = (AH x SR) – (SH x SR)

= SR x (AH - SH)

Question 2: Standard Costing Variance Analysis

Mr. Boba is the owner of Chatime, a bubble tea store. He uses standards established by the National Boba Association based on performances by other bubble tea store chains from various parts of the country, such as Coco and Share Tea:

Direct Labour: 0.2 hrs @ $12.50/hr	$2.50
Direct Materials: 35 L of tea @ $0.20/L	$7.00
Total cost for 40 bubble teas	$9.50

Actual operating results for Chatime are provided below:

Number of bubble teas produced	120,000
Actual direct labour hours worked	860
Total actual direct labour cost	$10,320
Materials (tea) purchased	160,000 L
Materials used in production	152,000 L
Price paid for materials	$0.19/L

Mr. Boba is anxious to find out how his store is performing based on national standards. Please help him by computing all labour and material variances.

The next page is left blank for you to show your work.

Materials

MPV = AQp x (AP – SP)

= 160,000 x (0.19 – 0.20)

= $1,600 F

MQV = SP x (AQu – SQu)

= 0.20 x (152,000 – 105,000)

= $9,400 U

[SQu = 120,000 bubble teas x (35L/40 bubble teas) = 105,000]

Labour

LRV = AH x (AR – SR)

= 860 x (12 – 12.50)

= $430 F

[AR = $10,320/#860 = $12/hr]

LEV = SR x (AH – SH)

= 12.50 x (860 – 600)

= $3,250 U

[SH = 120,000 bubble teas x (0.2hrs/40 bubble teas) = 600]

Variable vs. Absorption Costing

Relationship between Production & Sales	**Effect on Inventory**	**Relationship between Absorption and Variable Net Operating Income**
Production > Sales	Inventory increases	Absorption > Variable
Production < Sales	Inventory decreases	Absorption < Variable
Production = Sales	No change	Absorption = Variable

Variable Costing Income

- Only affected by changes in unit sales
- Not affected by changes in unit produced
- When sales increase, net operating income increases

Absorption Costing Income

- Influenced by changes in unit sales AND units of production
- Producing more units (even if they are not sold) can increase net operating income → due to lower FMOH allocated per unit

Reporting for Control

Segment Reporting

	Sales
-	Variable costs
=	Segment CM
-	Traceable/Controllable FC (to each specific segment)
=	Segment margin
-	Common FC (to the entire company)
=	Net operating income

Traceable FC: eliminated if the segment did not exist

Common FC: would remain if the segment did not exist

Question 3: Segment Reporting

Mr. Boba, the owner of Chatime, has recently expanded the Broadway location to include a restaurant that sells Boba Pizza. The bubble tea store takes up 1000 sq ft, and the restaurant takes up 4000 sq ft. He is concerned because it seems that the restaurant is not doing so well. He wants to know whether or not he should close the restaurant (but keep the bubble tea store).

The following income statement has been provided. In addition, he tells you that common fixed costs are allocated based on square footage.

	Chatime	Bubble tea store	Restaurant
Sales	$ 800,000	$ 450,000	$ 350,000
Variable costs	(300,000)	(120,000)	(180,000)
CM	500,000	330,000	170,000
Traceable FC	(130,000)	(40,000)	(90,000)
Segment margin	370,000	290,000	80,000
Common costs	(200,000)	(40,000)	(160,000)
Profit	$ 170,000	$ 250,000	$ (80,000)

Please advise Mr. Boba whether or not he should eliminate the restaurant, and explain why/why not.

No, because the restaurant has a positive segment margin. Common costs are not traceable to each individual segment, so even if the restaurant were eliminated, Mr. Boba would still incur $200,000 of common FC. Eliminating the restaurant would result in a lower total profit for Chatime by $80,000.

Return on Investment (ROI)

$$Return\ on\ Investment\ (ROI) = \frac{Operating\ Income}{Invested\ Capital}$$

where: $Invested\ Capital = Average\ Operating\ Assets = \frac{Beginning\ Assets + Ending\ Assets}{2}$

Decision: If ROI > Target (hurdle rate) → good!

How to increase ROI?

- Reduce operating expenses
- Increase sales
- Reduce invested capital (operating assets)

Problems with ROI

- Managers may under-invest in new equipment
- Managers may avoid good investments that would dilute their ROI
- Managers may avoid expenses in the short-run that would hurt the business in the long-run
- Managers may not know how to increase ROI
- Managers often inherit committed costs that they can't control

Residual Income (RI)

Residual Income (RI) = Income – Capital Charge
where: *Capital Charge = Invested Capital x Cost of Capital*

Decision: If RI > $0 → good!

Advantages of RI

- Encourages managers to invest in profitable projects that would be rejected had they used ROI
    - Eliminates tendency to under-invest in new assets
    - No problem with ROI dilution

Disadvantages of RI

- Dollar figure → not useful when comparing large vs. small projects/segments
- Requires estimate of divisional cost of capital

Transfer Pricing

- When one segment of a company provides goods/services to another segment of the same company
- Shifts profits between divisions but does not affect profit of the entire company
- Must take opportunity costs into account
- Transfer pricing methods:
  - Market-based
  - Cost-based
  - Negotiated – depends on capacity available

Negotiated Transfer Prices

- Highest acceptable price to buying division = cost of buying from outside supplies
- Lowest acceptable price to selling division

$$Minimum\ transfer\ price = UVC + \frac{Total\ CM\ lost\ from\ outside\ sales}{\#\ units\ transferred}$$

3 scenarios:

1) Supplying division has excess capacity
   - No outside sales lost
   - *Transfer price >= UVC*

2) Supplying division has **no** excess capacity
   - All internal sales come at expense of outside sales
   - If 1 internal sale is traded for 1 external sale, then:

     Transfer price >= UVC + UCM from outside sale

3) Supplying division has **partial** excess capacity
   - Some internal sales come at expense of outside sales
   - $Minimum\ transfer\ price = UVC + \frac{UCM * \#\ units\ of\ sales\ lost}{\#\ units\ transferred}$

Question 4: Transfer Pricing

Pearson Spector Design makes suits for rich lawyers in New York. The company has two divisions: Buttons and Suits.

The Suits Division wishes to purchase 50,000 buttons per year. It currently buys these buttons from an outside supplier for $30 per button. The Button Division has a production capacity of 300,000 buttons. Currently, they sell their buttons on the market for $35 per button. It costs them $18 to manufacture each button.

a) Suppose the Button Division is already operating at capacity selling to the outside market. What is the minimum transfer price they would accept from the Suits Division? Will this transaction go through?

Min price = UVC + UCM from outside sale
= 18 + (35 – 18)
= $35 → USP for outside market
The transaction will NOT go through because the minimum price accepted by the Button Division exceeds the maximum price the Suits Division is willing to pay, which is $30 (outside supplier).

b) Now suppose the Button Division is still operating at capacity, but it can avoid $5 in sales commissions for internal sales. What is the minimum transfer price they would accept from the Suits Division?

Min price = UVC + Lost UCM
= (18 – 5) + (35 – 18)
= 13 + 17
= $30
Note: this is equal to the amount Suits Division can purchase buttons for from an outside supplier, so they would be indifferent

c) If the Button Division had ample capacity, what would be the minimum transfer price they would accept from the Suits Division?

No lost sales, so lost UCM = 0
Min price = UVC = $18

d) Suppose the Suits Division requires a special type of button instead of the regular buttons that the Button Division produces. The variable cost for each special button would be $25. The Button Division currently has no ample capacity, and the production of 50,000 special buttons will displace 55,000 regular buttons from production. In this case, what is the minimum transfer price that the Button Division would accept?

$$Min\ price = UVC + \frac{TCM\ lost\ from\ outside\ sales}{\#\ units\ transferred}$$

$$= 25 + \frac{55{,}000 * (35 - 18)}{50{,}000}$$

$$= \$43.70$$

Relevant Costs for Decision Making

Identifying Relevant Costs

Relevant costs:

- Avoidable/differential costs
- Opportunity costs

Irrelevant costs:

- Costs that do not differ between alternatives
- Sunk costs
- Unavoidable costs
- Joint costs (irrelevant after split-off point)

Total vs. Differential Cost Approaches

Total Approach:

- Compare 2 contribution format incomes statements for the 2 alternatives

Differential Approach:

- Only analyze costs that differ between the alternatives

Both approaches should provide the same answer/conclusion

Add/Drop Decision

Keep segment if CM lost > (FC avoided + CM gained)

*Tip: Sometimes keeping/dropping a segment both result in a loss → look at which decision MINIMIZES the loss

Make/Buy Decision

If avoidable cost to buy > avoidable cost to make → MAKE

Special Orders

- One-time order that is not part of the company's ongoing business
- Opportunity costs are common as the special order often comes at the expense of some normal orders

If incremental revenue > incremental costs (i.e. Positive ICM) → ACCEPT

Question 5: Special Orders

Minions Kevin, Bob and Stuart have started their own company that produces banana holders. They have provided you with the following information:

Last year's ending inventory	3,400 units
Demand for this year	132,000 units
Annual production capacity	160,000 units
Unit selling price	$25
Unit variable costs	$12

A special order for 40,000 banana holders was received for a contract price of $575,000. Should Kevin, Bob and Stuart accept this order? Why or why not?

1) UCM on special order:

USP = $575,000/40,000 = 14.375

UVC = 12

UCM = 2.375 → positive UCM, good

2) Check for capacity constraint:

	Opening inventory	3,400
+	Production	160,000
-	Demand	(132,000)
-	Special order	(40,000)
=	Short of capacity	(8,600)

We do not have enough capacity to fulfill all regular demand plus the special order, so there will be an opportunity cost if we choose to accept the special order.

Opportunity cost: if we accept the special order, we will need to give up on 8,600 units of regular orders.

UCM on regular orders = $25 - $12 = $13

Net Benefit (Loss)
= 40,000 x $2.375
- 8,600 x $13
= ($16,800)

Since accepting the special order results in a net loss, Kevin, Bob and Stuart should REJECT the order.

Utilization of a Constrained Resource

- If one limited resource restricts the company's ability to satisfy all demand, there is a constraint

To optimize net benefit, rank products produced based on ***Contribution Margin per Unit of Scarce Resource***

→ this will maximize total CM for the sales mix

Question 6: Utilization of a Constrained Resource

Spongebob's Bakery produces 3 products: banana bread, chocolate chip cookies and blueberry muffins. Information regarding the selling prices, unit costs, as well as the weekly demand for each product are given below:

	Banana Bread	Chocolate Chip Cookies	Blueberry Muffins
Selling price	$ 80	$ 60	$ 90
VC	$ 50	$ 40	$ 55
FC (allocated)	$ 25	$ 8	$ 22
Spongebob's time	10 min	5 min	7 min
Demand	125	100	150

Each week, Spongebob can only work up to 40 hours (2,400 minutes). How much of each product should be produced in order to maximize Spongebob's operating income?

Solution:

	Banana Bread	Chocolate Chip Cookies	Blueberry Muffins
Selling price	$ 80	$ 60	$ 90
VC	$ 50	$ 40	$ 55
FC (allocated)	$ 25	$ 8	$ 22
Spongebob's time	10 min	5 min	7 min
Demand	125	100	150
CM	$ 30	$ 20	$ 35
CM per min	$ 3	$ 4	$ 5
Rank	3	2	1
Minutes needed to fulfill production		2800	
		>	
Minutes available		2400	

Production Order	# produced	mins used	total mins used
1) Muffins	150	1050	1050
2) Cookies	100	500	1550
3) Bread	85	850	2400

Joint Costs (Sell or Process Further)

- ***Joint products:*** two or more products produced from a common input
- ***Split-off point:*** the point in the manufacturing process where each joint product is recognized as separate products
- ***Joint costs are irrelevant in decisions regarding what to do with a product from the split-off point forward***
- ***Byproducts:*** low-value or zero-value products produced in the process (unavoidable)

Continue processing after split-off point if incremental revenue > incremental costs (i.e. ICM > 0)

Joint Cost Questions: 2 decisions

1) Assuming we produce anything at all, what should we produce/sell to maximize contribution margin?
    - Put joint costs aside
    - Determine what maximizes ICM after split-off point

2) Should we produce anything at all?
    - Compare joint costs to ICM (think of joint costs as "mini fixed costs")
    - If ICM > joint costs → PRODUCE

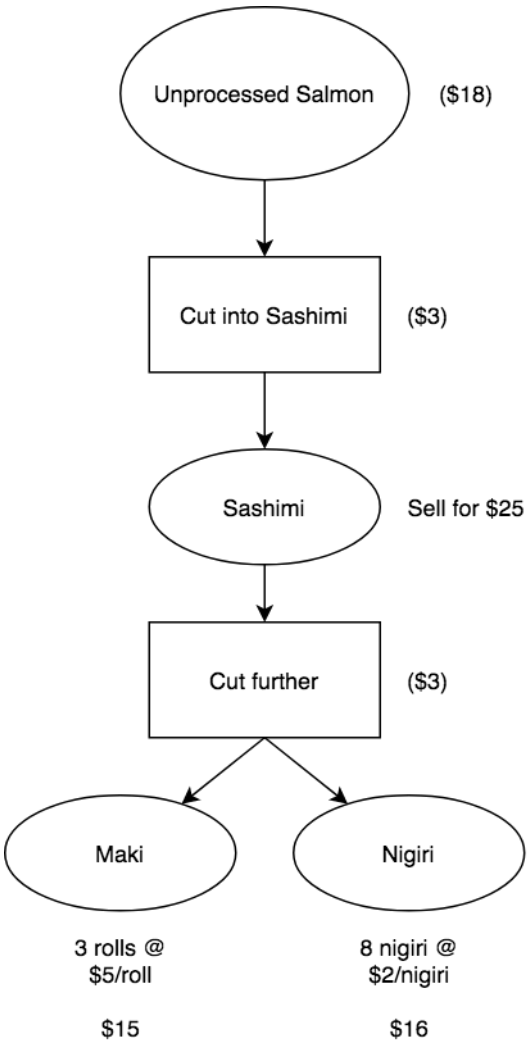
Question 7: Joint Costs (Sell or Process Further)

Sushi Company specializes in the processing and cooking of salmon. They have a large amount of salmon on hand, and are trying to decide whether to sell it as Sashimi or to cut it up to make Salmon Maki and Salmon Nigiri. Here are the costs and selling price information for Sashimi:

Unprocessed salmon (cannot be sold directly)	$18 per KG
Processing costs to make Sashimi	$3 per KG
Selling price for Sashimi	$25 per KG

If not sold as Sashimi, the salmon could be further cut up at a cost of $3 and made into Salmon Maki and Salmon Nigiri. 1 KG of Sashimi will yield 3 rolls of Salmon Maki and 8 Salmon Nigiri. The Salmon Maki can be sold for $5 per roll and each Salmon Nigiri can be sold for $2.

Sushi Company has 100 KG of unprocessed salmon. What should they produce for sale?



- Sell as Sashimi = $25 per KG
- Cut further and make Maki and Nigiri = (3x5) + (8x2) - 3 = $28 per KG

To maximize profit, should process all 100 KG salmon into Maki and Nigiri (and not produce any Sashimi).

Joint costs = 18 +3 = $21. ICM > joint costs → produce!

Production Plan:

- Salmon: 0 KG
- Maki: 3 x 100 = 300 rolls
- Nigiri: 8 x 100 = 800 pieces