INCREMENTAL ANALYSIS

We are producing 100,000 blenders
(at 80% capacity)

VC = 8$ / unit

FC = 400,000

Sells for 20$ / unit

→ New order for 30,000 blenders @ 17 each

(at 100% capacity)
100,000 / 0.8 = 125,000

* New order would bring us 5,000 over capacity

	REJECT	ACCEPT	CHANGE IN PROFIT
Sales	-	510,000	510,000
VC	-	240,000	(240,000)
FC	-	-	-
OP cost	-	60,000	(60,000)
			+ 210,000

OP cost = 12 x 5000

What should management do?

210,000 incremental gain = Accept the new order

MAKE OR BUY

Manufactured 500 gears and incurred following costs

DM	50,000
DL	19,000
VMOH	30,000
FMOH	20,000
	119,000

Supplier offers to SELL gears to them for 200$ each

FMOH consists mainly of depreciation so would not be avoidable

Would be able to produce another product with the new capacity that would have a CM of 3,000$

Should we Make or Buy?

	MAKE (Current)	BUY (New option)	CHANGE IN PROFT
DM	50,000	-	50,000
DL	19,000	-	19,000
VMOH	30,000	-	30,000
PURCHASE	-	100,000	(100,000)
OP COST	3,000		3,000
			+ 2,000 (BUY)

Purchase = 200 x 500 = 100,000

2000$ incremental gain = buy!

SELL OR PROCESS FURTHER

Company produces 3 products after incurring a joint cost of 6500$ (sunk cost)

After that point, each product could be either sold or processed further into 3 new products

A1 = 2,000	**process for 1500**	**A2 = 4,000**
B1 = 500	**process for 600**	**B2 = 1,000**
C1 = 3,700	**process for 3000**	**C2 = 7,000**

A2 = – 1500 + 4000 = 2500 → A2 optimal (2500)

B2 = – 600 + 1000 = 400 → B1 optimal (500)

C2 = - 3000 + 7000 = 4000 → C2 optimal (4000)

1) what is the net income if optimal sales mix is chosen

(2500 + 500 + 4000) – 6500 = 500 net income

2) If B1 had zero value, would it be worth it to process to B2

Yes, 400 CM is better than 0 CM

3) IF A1 could be made into C1 (at no additional cost), what would be A1 's opportunity cost of making the decision

The opportunity cost would be the CM of A2, 2500

4) Should A1 be produced into C1 ? why or why not

C2 has a higher CM, so yes

5) Assume C1 can be produced into A2, what does the cost of A2 have to be so that the company isn't any better or worse off?

C2 makes us a Sale of 7000 and a CM of 4000
A2 makes us a sale of 4000 and a CM of 2500

It would have to cost ZERO$ to process A1 into A2 so that the CM of A2 be 4000 like the CM of C2

KEEP OR REPLACE

Current machine is inefficient,

Considering getting a new machine

	Old Machine	New Machine
Original purchase cost	160,000	240,000
Accumulated Depr.	120,000	-
Estimated life	4 years	4 years

New machine will produce annual cost savings of 55,000 (4 years)

Old machine can be sold to scrap for 24,000

If kept till end of life, old machine would have salvage value of 2,000

New machine will have salvage value or 8,000

Replace or keep?

	KEEP	REPLACE	CHANGE IN PROFIT
revenues	-	-	-
purchase	-	240,000	(240,000)
Cost savings	-	55,000 x 4	220,000
Scrap. Op cost	24,000	-	24,000
Salvage value	2,000	8,000	6,000
			+ 10,000 (REP)

10,000$ incremental gain = replace

Additional question * what is the gain/loss on the sale of old equipment?

160k – 120k = 40k current value
Sell for 24K = loss of 16k (book value, salvage op cost irrelevant)

ELIMINATE UNPROFITABLE SEGMENT

XYZ company → Division A and Division B

Company considering getting rid of Div. B because of negative net income for several years

	DIV A	DIVB	TOTAL
Sales	400,000	300,000	700,000
COGS	150,000	200,000	350,000
Gross profit	250,000	100,000	350,000
S.A expenses	200,000	120,000	320,000
Net income	50,000	(20,000)	30,000

In Division B, 80% of COGS and 20% of S.A are VC

Management thinks they can save 30,000 of Fixed COGS and 30,0000 of Fixed S.A if it eliminates division B

- Hint * , some fixed costs are avoidable and some aren't, unavoidable fixed costs will just be reallocated to another division

RULE : if TCM > Avoidable FC → KEEP

A) determine if XYZ should discontinue division B

VC saved :	200k	x	80%	=	160k
	120k	x	20%	=	24k

TCM loss	300k – 160k – 24k	=	(116,000)
Avoidable FC		=	60,000
			(56,000)

(56,000) incremental loss = keep division B

B) if the company had discontinued division B for 2016, determine what their net income would have been

30,000 – 56,000 = (26,000) loss for the company

ELIMINATE UNPROFITABLE SEGMENT

XYZ manufactures steel beams

	Beam A	Beam B	Beam C	Total
Sales	60,000	72,000	78,000	210,000
VC	20,000	48,000	72,000	150,000
FC	18,000	12,000	8,000	38,000
Total costs	48,000	60,000	80,000	188,000
Op. Income	12,000	12,000	(2,000)	22,000

Currently producing 1200 of each beams

Capacity is 10,000 labor hours

Beam A takes 5 hours
Beam B takes 2 hours
Beam C takes 4 hours

FC are **allocated** on labor hours (allocated = unavoidable)

	A	B	C
CM	30k	4k	6k
CM/unit	/1200	/1200	/1200
CM/hr	/5	/2	/4
=	**5**	**10**	**1.25**

1) should they keep produce beam C

CM = 6000 > 0 avoidable FC = KEEP

2) if they could sell unlimited quantity of any beam, which would they produce?

Beam B → highest CM/unit/hour (10)

3) if they could sell unlimited of any, but a customer wants to buy 500 beams C, what should they charge them per unit to justify making the sale?

Need to get a CM/unit/hour of 10 from it. So,

X / 4 / 1200 = 10 → X = 40 (CM/unit)
-60 (VC/unit) 72k/1200
Answer = **100** (unit sale price)

4) The company has a contract that requires it to supply 400 units of each to a customer. Total market demand for a single product is limited to 2000, how many units of each should they manufacture to maximize its TCM?

10,000 hours
Contract = (400x5)+(400x2)+(400x4) = - 4400 hours req 4 contract
= **5600 hours left**

Go in order of CM (beam B) 1600 x 2 = - 3200 hours req 4 beam B
= **2400 hours left**

(beam A) ? x 5 = 2400
? = 480 units x 5. = - 2400 req for beam A
= 0 hours left

Produce 400 + 480 = 880 of A
Produce 400 +1600 = 2000 of B
Produce 400 + 0 = 400 of C

ALTERNATIVE COSTING METHODS

(important MEMORY AID)

	ABSORPTION	NORMAL	VARIABLE	TRHOUGHPUT
PRODUCT COSTS (COGS)	DM DL VMOH FMOH (per unit produced)	DM DL VMOH FMOH (per unit budgeted)	DM DL VMOH	DM
PERIOD COSTS	V.S.A F.SA	V.S.A F.S.A Volume variance = FMOH/unit x (units produced – units budgeted) Produced > budgeted = FMOH is overapplied → reduces COGS Produced < budgeted = FMOH is underapplied → increases COGS	FMOH V.S.A F.S.A	DL VMOH FMOH V.S.A F.S.A

Units produced > units sold = net income → = absorption > variable > throughput

Units produced < units sold = net income → = absorption < variable < throughput

ALTERNATIVE COSTING METHODS (!)

Units produced :	**800**	**V.S.A/unit :**	**400$**
Normal capacity :	**1000**	**F.S.A :**	**110,000$**
DM/ unit :	**500$**	**Units sold :**	**500**
DL per unit :	**200$**	**Unit sale price :**	**3,000$**
VMOH/unit :	**300$**		
FMOH :	**150,000$**		

Prepare income statements for each costing methods.

ABSORPTION COSTING

cogs = 500 + 200 + 300 + (150,000/800) = 1187.5

SALES	1,500,000	500 x 3000
COGS	593,750	500 x 1187.5
GROSS PROFIT	906,250	
OPERATING EXPENSE		
V.S.A	200,000	500 x 400
F.S.A	110,000	
OPERATING INCOME B4T	**596,250**	

NORMAL COSTING

cogs = 500 + 200 + 300 + (150,000/1000) = 1150

SALES		1,500,000	
COGS	575,000		500 x 1150
+ unfavorable volume variance	30,000		200 x 150 (underapplied)
GROSS PROFIT		895,000	
OPERATING EXPENSE			
V.S.A		200,000	
F.S.A		110,000	
OPERATING INCOME B4T		**585,000**	After overhead reconciliation

VARIABLE COSTING

cogs = 500 + 200 + 300 = 1000

SALES	1,500,000	
VARIABLE COSTS		
Variable COGS	500,000	500x1000
V.S.A	200,000	
CONTRIBUTION MARGIN *	800,000	Sales – VC = CM
FIXED COSTS		
FMOH	150,000	
F.S.A	110,000	
OPERATING INCOME B4T	**540,000**	CM - FC

THROUGHPUT COSTING

cogs = 500

SALES	1,500,000	
COGS	250,000	500x500
THROUGHPUT CONTRIBUTION MARGIN *	1,250,000	
OTHER OPERATING EXPENSES		
DL	160,000	200x800
VMOH	240,000	300x800
FMOH	150,000	
V.S.A	200,000	
F.S.A	110,000	
OPERATING INCOME B4T	**390,000**	TPCM – Op expense

RECONCILIATION *

(know when to add and substract)

Throughput → Variable

*** Produced > Sold by 300**

Throughput method Net income	=	390,000		
+ DL	=	60,000	200x300	
+ VMOH	=	90,000	300x300	
Variable method net income		**540,000**		

Absorption → Normal

Absorption method net income	=	596,250		
- FMOH	=	11,250	37.5x300	187.5-150 = 7.5
Normal method net income	=	**585,000**		

Units produced > units sold	=	net income →	=	absorption > variable > throughput
Units produced < units sold	=	net income →	=	absorption < variable < throughput

COST PLUS PRICING

Markup % = Markup / Cost

	FULL COST	ABSORPTION COST	VARIABLE COST
COSTS	DM DL VMOH FMOH V.S.A F.S.A	DM DL VMOH FMOH	DM DL VMOH V.S.A
MARK-UP	ROI	V.S.A F.S.A ROI	FMOH F.S.A ROI

XYZ is selling a product it has just designed, the following data relates to a budgeted volume of 40,000 units

They use cost-plus pricing and the markup on total unit cost is 15%

Per unit	**Total**
DM	15
DL	35
VMOH	12
FMOH	2,100,000 /40,000 = 52.5
V.S.A	8
F.S.A	1,300,000 /40,000 = 32.5

A) Target selling price?

(15+35+12+(52.5+32.5)+8) x 1.15 = 178.25

B) Markup % under variable costing?

(15+35+12+8) x ? = 178.25 = 154.6%

TIME AND MATERIAL PRICING

Labor rate = **(time charge / total hours) x desired profit**

Material loading % (markup) = **(material loading charges / cost of materials) + desired profit**

XYZ sells ventilation equipment and has the following budgeted cost data for 2016

	Time charges	**material charges**
Technicians wage and benefits	600,000	
Parts managers salary and benefits		72,000
Office managers salary and benefits	112,000	18,000
Other overhead	48,000	110,000
Total budgeted costs	760,000 $	200,000 $

They budgeted 10,000 hours of technician time it desires a 64$ profit margin per labor hour and 50% profit margin on parts. They estimate the invoice cost of parts and materials to be 500,000$

a) **Calculate the rate charged per labor hour** : 760,000/10,000 + 64 = 140$/hour

b) **Calculate the material loading charge** : 200,000/500,000 + 50% = 90%

c) **They receive a request for an estimate to repair a commercial air distributor. They estimate it would take them 20 hours of labor and 8000$ in parts. Calculate the Bill.**

: (20 x 140) + (8000 x 1.9) = 18,000 $

INTERNAL SALES

Transfer price : VC/unit + OC

OC = TCM given up / total units transferred

Very little cooperation between 2 departments at lighthouse Luminal who is a flashlight producer.
There is the lighting department and the bulb department. The lighting department buys bulbs from an outside vendor at 5.5$ per unit. The bulb department is manufacturing and selling 50,000 bulbs per year. These can be sold to an outside vendor for 5$ each (problem makes no sense but wtv). The bulbs have a VC of 3.45$, these VC include a 0.25$ V.S.A which is not incurred on internal transfers.

1) **Bulb department is at full capacity and receives a 500 bulb request from the lighting division. What is the minimum transfer price?**

   VC/internal unit = 3.45 – 0.25 = 3.20
   OC = [(5 - 3.45) x 500] / 500 = 1.55

   3.20 + 1.55 = 4.75 minimum transfer price

2) **If 310 bulbs are requested for transfer, the bulb dep will have to cancel 600 units with its present customers in order to accommodate the transfer. What will be the minimum transfer price in this case.**

   OC = [(5 – 3.45) x 600] / 310 = 3.00

   3.20 + 3.00 = 6.20 minimum transfer price

3) **An opportunity to purchase the bulbs from a new vendor for 5.25 arises. Calculate the minimum transfer price if 11,000 units are transferred and max capacity is 60,000 bulbs.**

   OC = [(5 – 3.45) x 1000] / 11,000 = 0.14
   (why would we buy from new vendor, he's more expensive.)

   3.20 + 0.14 = 3.34 minimum transfer price.

4) **Under which scenarios would a transfer be likely to take place? (lighting division perspective)**

   Scenario 1 : min tp < market = transfer
   Scenario 2 : min tp > market = don't transfer
   Scenario 3 : min tp < market = transfer

BUDGETS QUESTION *

We have the following information for 2018

Sales units :	JAN	FEB	MAR	APR	MAY
(50 $ per unit **)**	1000	1200	1400	600	1000

- Sales are 60% cash 40% on account. 60% of credit sales are collected in the month of sale, the rest in the following.
- It takes 2kg to make 1 FG. 1kg costs 7$ all DM purchases are made on account, 30% in the month rest in following.
- Ending DM is 30% of the following months production needs
- Each unit requires 1.5 hours of DL, workers are paid 20$ per hour.
- MOH is 7,000 per month (including 1,500 of depreciation)
- Ending FG is 20% of next month's sales.
- F.S.A per month is 5,000 , this includes 500$ for depreciation and amortization
- V.S.A is 10% of sales
- Selling and admin costs are paid in the month that they are incurred.
- A dividend of 2,500 will be declared and paid in JAN
- Equipment purchase in cash of 40,000 in FEB, equipment sold for 60,000 in MAR
- 2,500 new shares declared in JAN for 10$ each
- Borrowing is made in multiples of 500 and carry 12% annual interest.
- Borrowing occurs at the beginning of the month while repayment occurs at the end.

(In 2017)

- A/R totaled 12,000
- A/P totaled 10,000
- Cash balance was 5,000 (this also represents the minimum cash balance)
- FG were 0

Instructions

FOR THE FIRST QUARTER

Prepare :

Sales budget
Production budget
DM budget
DL budget
Collection schedule
Payment schedule
Cash budget

PREPARING THE OPERATING BUDGET FOR FIRST QUARTER

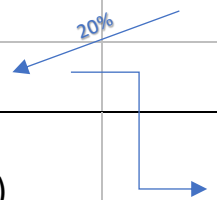
(must go in order)

SALES BUDGET

	JAN	FEB	MAR	APR	MAY
Expected unit sales	1,000	1,200	1,400	600	1,000
Unit selling price	50	50	50	50	50
Total sales	**50,000**	**60,000**	**70,000**	**30,000**	**50,000**

PRODUCTION BUDGET

	JAN	FEB	MAR	APR	MAY
Expected unit sales	1,000	1,200	1,400	600	1000
Add: Desired End FG	240	280	120	200	
Total Req. Units	1,240	1,480	1,520	800	
Less : Beg FG	0 (given)	240	280	120	
Total production	**1,240**	**1,240**	**1,240**	**680**	



DIRECT MATERIALS BUDGET *

	JAN	FEB	MAR	APR	MAY
Total production	1,240	1,240	1,240	680	
kg per unit	2	2	2	2	
Total DM needed	2,480	2,480	2,480	1,360	
Add : des. End DM	744	744	408		
Total DM required	3,224	3,224	2,888		
Less : beg. DM	744	744	744		
DM purchases	2,480	2,480	2,144		
Cost per DM	7	7	7		
Cost of DM purchases	**17,360**	**17,360**	**15,008**		

Assume

30%

DIRECT LABOUR BUDGET

	JAN	FEB	MAR	APR	MAY
Total production	1,240	1,240	1,240		
DL per unit	1.5	1.5	1.5		
Total required DL hours	1,860	1,860	1,860		
DL cost per hour	20	20	20		
Total DL cost	**37,200**	**37,200**	**37,200**		

COLLECTION SCHEDULE

	JAN	FEB	MAR
A/R	A/R as of Dec 2017 12,000		
JAN sales (50,000)	42,000 84%	8,000 16%	
FEB sales (60,000)		50,400	9,600
MAR sales (70,000)			58,800
Total	**54,000**	**58,400**	**68,400**

60% cash this month. +(40%x60% = 24% this month) = **84% this month** 40%x40% = **16% next month**

PAYMENT SCHEDULE

	JAN	FEB	MAR
A/P	A/P as of Dec 2017 10,000		
JAN purchase (17,360)	5,208 30%	12,152 70%	
FEB Purchase (17,360)		5,208	12,152
MAR Purchase (15,008)			4,502
Total	**15,208**	**17,360**	**16,654**

CASH BUDGET

*(go one column at a time) * *(Don't include depreciation in cash budget)*

	JAN	FEB	MAR	TOTAL
BEG CASH BALANCE as of Dec 2017	**5,000**	**14,902**	**5,432**	**5000**
Cash Receipts :				
+ collections	54,000	58,400	68,400	180,800
+ Sale of equipment			60,000	60,000
+ Issue of shares	25,000			
Total cash receipts	79,000	58,400	128,400	265,800
AVAILABLE CASH	**84,000**	**72,492**	**133,832**	**270,800**
Cash disbursements :				
- DM purchases	15,208	17,360	16,654	(49,222)
- DL uses	37,200	37,200	37,200	(111,600)
- MOH	5,500	55,000	5,500	(16,500)
- V.S.A	5,000 10% of sales	6,000	7,000	(18,000)
- F.S.A	4,500	4,500	4,500	(13,500)
- dividends paid	2,500			(2,500)
- Purchase of equipment		40,000		(40,000)
Total cash disbursements	69,908	110,560	70,854	(251,322)
EXCESS (DEFICIENCY)	**14,902**	**(-38,068)**	**62,978**	**19,478**
Financing :	No need to borrow Exceeds minimum 5000	Need to borrow 43,068 $ To have minimum 5000		
+ Borrowing		43,500 Can only borrow multiples of 500	We made enough to repay last months loan in full	43,500
- Repayment			43,500	(43,500)
- Interest			870	(870)
ENDING CASH BALANCE	**14,902**	**5432**	**18,608**	**38,942**

Borrowing happens at the beginning of the month and repayment happends at the end of the month. So really we owe 2 months of interest since we repaid the loan at the end of the following month.

Interest calculation is 12%/2 = 2%
2% x 43,500 = 870

BUDGET EXAMPLE 2

The last example was that of a **production** company, the following is a **Merchandising** company, in this case, Production, DM, DL , MOH budgets are replaced by one Purchasing budget.

Also, in the first example, we only did budgets, in this one, we will review basic Income statement and Balance sheet from COMM217

Company BEGAN operations in Jan 1 2018. The following is the balance sheet of January 1 to April 30

ASSETS		LIABILITIES & EQUIT	
CASH	25,500	**A/P**	53,760
A/R	90,000	**Capital Stock**	265,000
Inventory	28,000	**Retained earnings**	25,540
Building and Equipment (net)	200,000		

	JAN	FEB	MAR	APR
Sales :	120,000	360,000	200,000	180,000

- Sales are 25% cash and 75% on credit. All credit sales are collected in the month following the sale
- The Gross Margin % is 60% of sales. ← This means COGS = 40%
- The desired ending FG is 20% of next months sales.
- 1/5 of purchases are paid for in the month and the rest in the following month
- The monthly cash operating expenses are 80,000, including the monthly depreciation of 7000
- During Feb, the company will purchase office equipment for 17,000 cash
- Dividends of 13,500 were declared and paid in February
- The company must maintain a minimum cash balance of 25,000
- Borrowing will be made in increments of 1000
- Borrowing occurs at the beginning of the month and paid at the end of the month
- Annual interest rate is 12% (paid in full in the month of repayment)

Instructions : **1) prepare the Cash budget** **Month of Feb** **2) prepare the income statement** **month of Feb** **3) prepare the balance sheet** **at the end of Feb**

PURCHASING BUDGET

	JAN	FEB	MAR	APR
COGS	48,000	144,000	80,000	72,000
Add : Des. End inv	28,800	16,000	12,400	
Total Required inv	76,800	160,000	94,400	
Less : Beg inv	New company 0	28,800	16,00	
Total purchases	**76,800**	**131,200**	**78,400**	

COLLECTION SCHEDULE

	FEB	
A/R	90,000	Given
FEB Sales (360,000)	90,000	25%
Total	180,000	

PAYMENT SCHEDULE

	FEB	
A/P	53,760	
FEB Purchases (131,200)	26,240	1/5
Total	80,000	

CASH BUDGET

	FEB
BEG CASH BALANCE	**25,500**
Cash receipts :	
+ Collections	180,000
AVAILABLE CASH	**205,500**
Cash disbursements :	
- Purchases	80,000
- Operating expense	73,000
- purchase of equipment	17,000
- dividends paid	13,500
Total Disbursements	183,500
EXCESS (DEFICIENCY)	**22,000** Min cash balance is 25K, need to borrow 3k
Financing :	
- borrowing	3,000
- repayment	
- interest	
END CASH BALANCE	**25,000**

INCOME STATEMENT

	FEB	
Sales	360,000	
COGS	(144,000)	40% of sales
Gross Profit	216,000	
Operating expense	(80,000)	We include the depreciation in the income statement, unlike the cash budget
Net income	**136,000**	

BALANCE SHEET

ASSETS		LIABILITIES & EQUITY	
CASH	25,000	**A/P**	53,760
A/R	270,000	**Loan payable**	3,000
Inventory	16,000	**Capital shares**	265,000
Building and Equipment (net of depreciation)	210,000	**Retained earnings**	148,040
TOTAL ASSETS	**521,000**	**TOTAL LIABILITIES & EQUITY**	**521,000**

STANDARD COSTS AND VARIANCES

A company is manufacturing a single product. The **standard cost** per unit is as follows :

DM – **3kg** of plastic at **5$ per kg**	15$	
DL – **2 hours** at **12$ per hour**	24$	
VMOH	8$	/2h = **4$ per unit**
FMOH	6$	/2h = **3$ per unit**
Total standard cost per unit	53$	

The master MOH budget for the month is based on **standard capacity of 10,000 units** and budgeted VMOH of 80,000
And FMOH of 60,000. **Actual cost for producing 9,500 units in were as follows :**

DM (30,000kg)	147,000
DL (18,500 hours)	231,250
VMOH	77,500
FMOH	65,000
Total actual manufacturing costs	476,650

The purchasing department normally buys the quantities of raw materials that are expected to be used in production each month. Raw materials inventories, therefore, can be ignored.

a) **Compute the DM price, quantity and total variance**
b) **Compute the DL labor price, quantity and total variance**
c) **Compute the Variable MOH spending, efficiency and total variance**
d) **Compute the FMOH spending, volume and total variance**
e) **Compute the overhead controllable variance**
f) **Was overhead over or under applied and by how much**
g) **Compute the total manufacturing cost variance**

U = Unfavorable variance

F = Favorable variance

SQ = SQ/unit x actual production

DM VARIANCE

(ACTUAL COST)		(HYBRID)		(STANDARD COST)
AQ x AP		**AQ x SP**		**SQ x SP**
30,000 x 4.9		30,000 x 5		28,500 x 5
147,000	−	150,000	−	142,500
DM PRICE VARIANCE 3,000 (F)			−	**DM QUANTITY VARIANCE** 75,000 (U)
		TOTAL DM VARIANCE 4,500 (U)		

DL VARIANCE

AQ x AP		**AQ x SP**		**SQ x SP**
18,500 x 12.5		18,500 x 12		19,000 x 12
231,250	−	222,000	−	228,000
DL PRICE VARIANCE 9,250 (U)			−	**DL QUANTITY VARIANCE** 6,000 (F)
		TOTAL DL VARIANCE 3250 (U)		

VMOH VARIANCE

AQ x AP	AQ x SP	SQ x SP
18,500 x 4.2	18,500 x 4	19,000 x 4
77,500	74,000	76,000

SPENDING VARIANCE	EFFICIENCY VARIANCE
3,500 (U)	2,000 (F)

TOTAL VARIANCE
4,500 (U)

FMOH VARIANCE

BUDGET COST *

AQ x AP	BQ x SP	SQ x SP
18,500 x	20,000 x 3	19,000 x 3
65,000	60,000	57,000

SPENDING VARIANCE	VOLUME VARIANCE
5,000 (U)	3,000 (U)

TOTAL FOH VARIANCE
8,000 (U)

e) **OVERHEAD CONTROLLABLE VARIANCE**

Spending FOH + Total VOH = 5000(U) + 1500(U) = 6500(U)

f) **UNDERAPPLIED OR OVERAPPLIED?**

Total FOH + Total VOH = 8000(U) + 1500(U) = 9500 Underapplied

g) **TOTAL MANUFACTURING COST VARIANCE**

Add all 4 Totals = 8000(U) + 1500(U) + 4500(U) + 3250(U) = 17250(U)

THE BASICS (PRE MIDTERM)

CONTRIBUTION MARGIN	:	Sales – TVC Can also be : TFC + Operating income
CONTRIBUTION MARGIN RATIO	:	CM / sales
BREAK EVEN POINT IN UNITS	:	TFC / CM per unit
BREAK EVEN POINT IN $	:	TFC / CMR
TARGET OPERATING INCOME IN UNITS	:	(TFC + Target Income after tax) / CM per unit
TARGET OPERATING INCOME IN $	:	(TFC + Target Income after tax) / CMR
MARGIN OF SAFETY	:	Sales – Break even Sales
MARGIN OF SAFETY RATIO	:	MOS / sales
DEGREE OF OPERATING LEVERAGE	:	TCM / Operating income

*** %change in sales x DOL = %change in profits

PRACTICE PROBLEMS FROM ALL CHAPTERS AFTER THIS POINT

We manufactures cement mixers. We Receive 3 offers for our mixers next year, none of which offer our usual price of 140$ per mixers. Lets see if any of these offers are even feasible. We estimate to sell 22,000 mixers next year, with a capacity of 30,000.

ORDERS from	**HOLMES**	**VIVA**	**BRICKS**
# of mixers	3,000	10,000	5,000
Offered Price per unit	125$	95$	100$

- HOLMES wants the product shipped via a company we don't associate with, therefore shipping will cost 12,000. They also want their logo painted on each. Per unit, additional costs will be 15$ for DL, 5$ for DM and 4$ for admin costs.

- VIVA is nearby, so shipping will be reduced by 0.50$ per unit. VIVA is an ISO9001 certified company and requires an extra admin fee of 8$ unit.

- BRICKS is a foreign vendor and needs faster shipping, this will increase shipping by 2$ and we will also need to pay our workers 1.5x time. They also request that we split the 28,000 marketing fees with them.

The per unit-cost of a cement mixer based on max capacity is :

DM	15
DL	12
VOH	11
FOH	25
V.admin	6
V.shipping	2
F, admin	10

Instructions

Which order are we likely to accept

Revenue HOLMES		**375,000**
V.Costs :		
DM	(15+5) x 3000	60,000
DL	(12+15) x 3000	81,000
VOH	(11) x 3000	33,000
V.admin	(6+4) x 3000	30,000
- the shipping cost		12,000
TOTAL V.COSTS		**216,000**
TOTAL CM		**159,000 $**

Revenue VIVA	10,000 x 95	**950,000**
V.Costs :		
DM	(15) x 10,000	150,000
DL	(12) x 10,000	120,000
VOH	(11) x 10,000	110,000
V.admin	(6+8) x 10,000	140,000
V. shipping	(2 - 0.5) x 10,000	15,000
Opportunity cost	140-(15+12+11+6+2) =94CM/u Excess capacity = 2000 | 94x2000=	188,000
TOTAL V.COSTS		**723,000**
TOTAL CM		**227,000**

Revenue BRICKS	5,000 x 100	**500,000**
V.Costs :		
DM	(15) x 5,000	75,000
DL	(12 x 1.5) x 5,000	90,000
VOH	(11) x 5,000	55,000
V.admin	(6) x 5,000	30,000
V. shipping	(2 +2) x 5,000	20,000
Marketing cost	28,000/2	14,000
TOTAL V.COSTS		**284,000**
Profit		**216,000**

We have enough capacity to accommodate both HOLMES and BRICKS who both have a positive CM and who's added value outweigh the CM of the VIVA offer.

(REJECT OR ACCEPT PROBLEM)

Company has capacity of 60,000 units per year, 2018 budgeted operating results are as follows :

Revenues (50,000 @ 10$)		500,000
Variable Costs :		
Manufacturing. (50,000 @ 3.20$)	160,000	
Selling. (50,000 @ 0.80$)	40,000	200,000
Contribution Margin		300,000
Fixed Costs :		
manufacturing	100,000	
Selling and Admin	80,000	180,000
Operating Income		120,000

Receive an offer from a buy for 5000 @ 8$, do we accept?

5000 x 8 = 40,000$ revenue
5000 x 3.20 = 16,000 man cost
5000 x 2,80 = 14,000 sell cost
10,000 contribution margin = 25% CMR accept.

Would we accept an order from them for 20,000 units considering we only have 10,000 left of capacity?

	REJECT	ACCEPT	TOTAL
Revenues	-	160,000	160,000
V.man	-	64,000	(64,000)
V.sell	-	56,000	(56,000)
Opp cost (300k / 50,000) = 6. x20k	-	60,000	(60,000)
profit			**-(20,000)**

Accepting the order would cause an incremental loss of 20,000$, so we would reject the offer.

(COTSTING PROBLEM)

T shirt division accounting clerk needs help to create absorption and variable income statements.

	Variable Cost	Fixed Costs
COGS	1,000	5,000
Selling Expense	500	2,500
Marketing Expense	50	1,000

During the period, sales amounted to 10,000$. 500 units were produced and ending inventory consisted of 43 units.
There was no units in beginning inventory

What is the cost of ending inventory using absorption costing → (1000+5000)/500 = 12 → 12x43 = 516$
Using variable costing → 1,000/500 = 2 → 2x43 = 86
Calculate gross profit and contribution margin for both
Calculate net income if tax is 30%

Sales		10,000
COGS	**12x357**	5484
Gross profit		4,516
Selling exp		3,000
Marketing expense		1050
Income before tax		466
Tax (30%)		139.8
Net income after tax		**326.5**

ABSORBTION METHOD

Sales		10,000
V cogs	**2x357**	914
V selling		500
V mark		50
Contribution margin		8,536
F COGS		5,000
F.selling		2,500
F.mark		1,000
Operating income		36
Tax (30%)		10.8
Net income after tax		**25.2**

VARIABLE METHOD

PREMIDTERM COST OF GOODS MANUFACTURED PROBLEM

Raw materials, beginning inventory	$13,000
Purchases	13,000
Direct materials used	20,000
Direct labour	25,000
Factory overhead	8,000
Work in process, beginning inventory	8,000
Work in process, ending inventory	7,000
Finished goods, beginning inventory	6,000
Cost of goods sold	55,000
Gross profit	9,000
Operating income (loss)	(4,000)

Instructions: Prepare in good formats

a. A cost of goods manufactured schedule (Assume all raw materials used were direct materials.) for 2020 year. **(7 marks)**

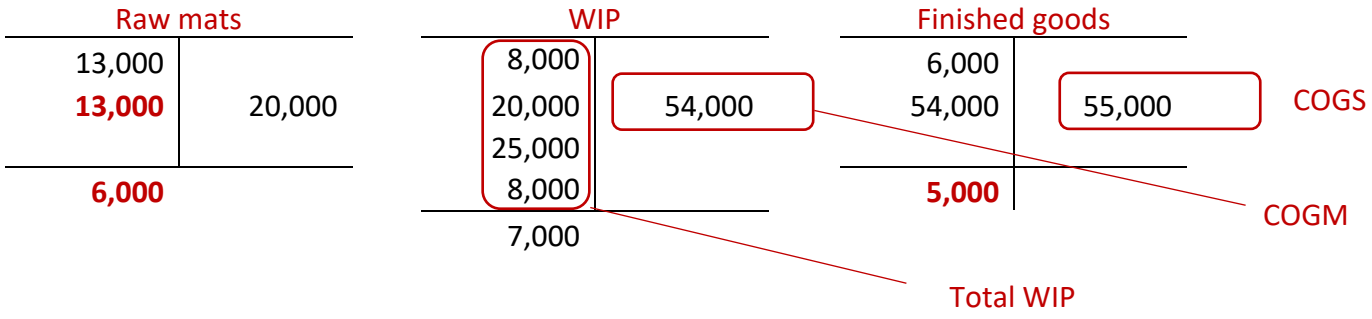
b. Prepare an income statement through operating income (loss) for 2020 year. **(5 marks)**

COMG schedule

WIP Beg		8000
Raw Mat beg	13,000	
Purchases	13,000	
total mats avail.	26,000	
Less raw mat end	6,000	
DM	20,000	
DL	25,000	
FOH	8,000	
Total Man. Cost		53,000
Total WIP		61,000
Less WIP end		7,000
COGM		**54,000**

Income statement

Sales		64,000
FG beg	6,000	
COGM	54,000	
Goods avail 4S	60,000	
Less FG end	5,000	
COGS		55,000
GP		9,000
Less Op exp		130,000
Operating loss		**-4,000**



PRE MIDTERM B/E – RATIO PROBLEM

John owns a barber shop. He employs 5 barbers. Each are paid 1,000 per month, one of them gets an extra 750 for admin. Each also receive a commission of 8$ per haircut. Each barber can do as many as 20 haircuts a day, but the average is 14. The shop is open 25 days per month and charges 20$ for a haircut. Here are the other costs

Advertising	750 per month
Rent	1,000 per month
Supplies	2.5 per haircut
Utilities	350 per month + 0.75 per haircut
Magazines	150 per month
Cleaning supplies	0.75 per haircut

A. Calculate the monthly break-even point for the following:

1. Number of haircuts
2. Total sales dollars
3. As a percentage of maximum capacity

B. If John would like a $6,000 monthly profit after tax, calculate the number of haircuts that must be given per month to achieve this profit. Campus Cutter Barber Shop tax rate is 40%.

Variable costs per haircut = 8 + 2.5 + 0.75 + 0.75 = 12

Total fixed costs = [(1000 + 750) + (4 x 1000) + 750 + 1000 + 350 + 150] = 8,000

A1) CM per haircut = 20 – 12 = 8 → BEu = 8,000 / 8 = 1,000

A2) Sales price per haircut = 20 → BE$ = 1,000 x 20 = 20,000

A3) Monthly capacity = 5 x 20 x 25 = 2,500 → Ratio of BE to capacity = 1,000 / 2,500 = 40%

1B) Target profit b4 tax = 6,000 / (1 – 0.4) = 10,000

→ # of haircut to achieve target OI = (8,000 + 10,000) / 8 = 2,250

COSTING / RECONCILIATION PROBLEM

Sales (9000 units)	540,000
Cost of goods sold	360,000
Gross profit	180,000
Selling and admin	100,000 (15% variable)
Net income	80,000

In 2017, units produced were equal to units sold and beg inv was 3,000 units. In 2018 sales remained unchanged and 10,000 units were produced. FMOH in 2018 was 135,000$ sales staff does not receive commission. VMOH costs are 25$ per unit.

1) prepare a variable costing income statement

	Variable
Sales	540,000
V.COGS	225,000
V.S.A	15,000
CM	300,000
F.S.A	85,000
FMOH	135,000
NI	80,000

2) prepare variable costing IS and absorption IS for 2018

	Variable
Sales	540,000
V.COGS	225,000
V.S.A	15,000
CM	300,000
F.S.A	85,000
FMOH	135,000
NI	80,000

	Absorption
Sales	540,000
COGS	346,000
GP	193,500
Sell.Admin	100,000
NI	93,500

346k cogs = VMOH/unit (25) + FMOH/unit (135000/10000 = 13.5) = 38.5 x 9000 **3)**
Variable is the same as 2017

3) reconcile de differences in net income

There was more units produced than sold. So absorption method yielded a higher NI.

VC net income	=	80,000
+ added to end inv	=	13,500 →
= Abs. Net income	=	93,500

10,000 – 9,000 = 1,000 units x 13.5 (FMOH/unit) = 13,500

4) how many units in FG inventory are at the end of 2018 and what is its value under variable costing ?

3000+9000-9000+10000-9000= 4,000 units left. Variable cost/unit = 25. 25x4000 = 100,000$

5) calculate break even sales in dollars → CMR = 300,000/540,000 = 0.55556 BE$ = (135,000 + 85,000) / 0.55556 = 396,000 $

COSTING RECONCILIATION PROBLEM

FOH	200,000	F.S.A	500,000	Beg inv	0
VOH	6$/unit	V.S.A	9$/unit	Units produced	42,000
DM	8$/unit			Units sold	40,000
DL	10$/unit			Sell price	75

1) Assume absorption method.

- What's the cost per toy car?
  → [6+8+10+(200k/42,000)] =28.76
- Prepare an income statement

Sales	3,000,000
Cogs	1,150,400
GP	1,849,600
V.S.A	360,000
F.S.A	500,000
NI	989,600

2) assume variable costing

- What's the cost per toy car?
  → [6+8+10] = 24
- Prepare an income statement
- show the reconciliation between both

Sales	3,000,000
Vcogs	960,000
V.S.A	360,000
CM	1,680,000
Fcogs	200,000
F.S.A	500,000
NI	980,000

More produced than sold, so absorption yields higher NI

Absorption NI	989,600	
- difference in cost	9520	(28.76-24)x(42000-40000)
= Variable NI	980,000	

3) Assume throughput costing

- What's the cost per toy car? → 8
- Show the reconciliation between throughput and absorption

Absorption NI	= 989,600	
Differences in cost	= 41520	(28.76-8)x(2000)
Throughput NI	= 948,080	

4) assume the company choses to allocate FOH using normal costing. At the beg of the year, they predicted they would manufacture 50,000 toy cars.
The company expenses production volume variance using the proration method.

- Calculate the cost per unit
- Show the reconciliation between normal costing and absorption costing

Cost per unit → 8 + 10 + 6 + (200k/50k) = 28

Normal costing NI = ? = **990,360**
Difference in cost = 7600 (28.76-28) x (50,000-40,000)
Absorption costing = 989,600

Budgets question (Serena sells scarfs at the flea market)

- Estimates sales to be 800 for JAN, 1200 for FEB, 2000 for MAR and 3000 for APR
- Gross profit ratio is 0.4
- 60% of next months sales should be kept in ending FG
- Serena pays herself 150$ per month, + her best friend 60$
- Estimates operating costs to be 130$ monthly
- She will pay 100$ per month in rent to the flea market
- Upgrading the space will cost 500$ of which 200$ will be paid in January and 300$ in February
- All other costs must be paid for as incurred
- She will begin January with 400$ in the bank
- All sales are made on credit and collected as follows : 18% of sales Is collected before the 15th of the month and receive a 2% discount 40% is collected between the 16th and the last day of the month. 12% will be collected the next month and 3% will be collected the 2nd month after. The rest (27%) will never be received.
- Payments for merchandise is made 30% in the month and 70% in the next
- Interest rate is 24% per year and interest payments are only due at the end of each quarter.
- Loans are borrowed at the beginning of the month and paid for at the end of the month.
- Serena must maintain a minimum cash balance of 1000$

Prepare a schedule of cash receipts for Q1

Prepare schedule of inventory purchase for Q1

Prepare schedule of cash disbursement for Q1

Prepare a cash budget for JAN and FEB

How much interest is owed on FEB 28? (Round to 2 decimals) **(next 2 pages)**

Collection schedule

	JAN	FEB	MAR
Jan sales (800)	(800x0.18x0.98)+(800x0.4) = 461.12	(800x0.12) = 96	(800x0.03) = 24
Feb sales (1200)		(1200x0.18x0.98)+(1200x0.4) =691.68	(1200x0.12) = 144
Mar sales (2000)			(2000x0.18x0.98) + (2000x0.4) = 1152.8
Total collection	461.12	787.68	1320.8

Purchasing budget

	JAN	FEB	MAR	APR
sales	800	1200	2000	3000
desired end inv	720	1200	1800	
total required inv	1520	2400	3800	
beg inv	0	720	1200	
total purchase required	1520	1680	2600	
x 0.6 (cogs)	912	1008	1560	

cash disbursement budget

	JAN	FEB	MAR
JAN inv purchase (912)	273.6	638.4	
FEB inv purchase (1008)		302.4	705.6
MAR inv purchase (1560)			468
total credit payments for merch	273.6	940.8	1173.6
salaries	210	210	210
operating costs	130	130	130
upgrading	200	300	
rent	100	100	100
total spent	913.6	1680.8	1613.6

Cash budget

	JAN	FEB
Beg balance	400	1000
Cash receipts :		
Collections	461.12	787.68
available cash	**861.12**	**1787.68**
cash disbursements		
inventory	273.6	940.8
salaries	210	210
operations	130	130
upgrade	200	300
rent	100	100
total disbursement	913.6	1680.8
excess/deficiency	**-52.48**	**106.88**
borrow	1052.48	893.12
ending balance	**1000**	**1000**

Interest on Feb 28th? → (1052.48 * 2/12 * 24%) + (893.12 * 1/12 * 24%) = 59.96 $

MAKE OR BUY SY tech manufactures a robot, the cost to manufacture 20,000 units is as follows

DM (35$ per robot)	700,000
DL (30$ per robot)	600,000
VOH (10$ per robot)	200,000
Allocated FOH (25$ per robot)	500,000
Total	2,000,000

SY Telc is approached by Chen Inc., which offers to make RecRobo for $80 per unit or $1.6 million.

Instructions

Using incremental analysis, determine whether SY Telc should accept this offer under each of the following independent assumptions:

1. Assume that $400,000 of the fixed overhead cost is avoidable. **(5 marks)**
2. Assume that none of the fixed overhead is avoidable. However, if the robots are purchased from Chen Inc., SY Telc can use the released productive resources to generate additional income of $200,000. **(5 marks)**

1)

	Make	Buy	profit change
DM	700,000		700,000
DL	600,000		600,000
VOH	200,000		200,000
FOH	500,000	100,000	400,000
Purchase		1,600,000	-1,600,000
			300,000

Net income incremental gain of 300,000$ from buying instead of making

2)

	Make	Buy	profit change
DM	700,000		700,000
DL	600,000		600,000
VOH	200,000		200,000
FOH			400,000
Opp. Cost	200,000		200,000
Purchase		1,600,000	-1,600,000
			100,000

Still an incremental gain of 100,000 despite the unavoidable fixed costs, because of the opportunity cost from not buying.

KEEP OR DISCONTINUE

Question : Erie division seems unprofitable, should we discontinue it?

	The Other Five Divisions	Erie Division	Total
Sales	$1,664,200	$ 96,200	$1,760,400
Cost of goods sold	978,520	76,470	1,054,990
Gross profit	685,680	19,730	705,410
Operating expenses	527,940	43,600	571,540
Net income	$ 157,740	$(23,870)	$ 133,870

In the Erie division, the cost of goods sold is $70,000 variable and $6,470 fixed, and operating expenses are $15,000 variable and $28,600 fixed. None of the Erie division's fixed costs will be eliminated if the division is discontinued. Should we discontinue?

	continue	Eliminate	Change in NI
sales	96,200	0	-96,200
Variable costs	85,000	0	85,000
Contribution margin	11,200	0	-11,200
fixed costs	35,070	35,070	0
			-11,200

Eliminating the division would cause a loss in overall company net Income. That is because Fixed costs just get reallocated elsewhere and are still incurred.

The rule to follow is

RULE : if TCM > Avoidable FC → KEEP

COSTING

Boat refit inc. produces and sells boat parts. They use a costing system based on actual costs. Selected accounting and production info for fiscal 2020 is as follows.

Net income (under absorption costing)	$ 400,000
Sales	$3,400,000
Fixed factory overhead	$ 600,000
Selling and administrative costs (all costs are fixed)	$ 280,000
Net income (under variable costing)	$ 310,000
Units produced	2,000

Boat Refit had no work in process inventory at either the beginning or the end of fiscal 2020. As well, the company did not have any finished goods inventory at the beginning of the fiscal year.

Instructions

a. Calculate the product costs per unit under absorption costing.
b. Calculate the product costs per unit under variable costing.
c. Calculate the costs of ending inventory under absorption costing.
d. Calculate the cost of ending inventory under variable costing.

NI absorb > NI variable = more units produced than sold

*** 400,000 – 310,000 = 90,000 of FMOH was deferred in the ending inventory at 300$ per unit (600,000 / 2000)**
Which means that sales must be 1,700 units (2,000 – 300)

A) Gross margin = Net income + Selling and Admin expense = 400,000 + 280,000 = 680,000
Absorption costs = Sales – gross margin = 3,400,000 – 680,000 = 2,720,000
Cost per Unit = 2,720,000 / 1,700 = 1,600$

B) Contribution margin = Net income + Selling and Admin + FOH = 310,000 + 280,000 + 600,000 = 1,190,000
Variable costs = Sales – Contribution margin = 3,400,000 = 1,190,000 = 2,210,000
Cost per unit = 2,210,000 / 1,700 = 1,300$

C) Cost of ending inventory under absorption = 1,600 x 300 = 480,000

D) Cost of ending inventory under variable = 1,300 x 300 = 390,000

INTERNAL SALES

Kirkland metal has 2 divisions, fabrication and assembly. Fabrication div standard variable production cost per unit is 300$. The division has no excess capacity, and it could sell all of its components to outside buyers at 380 per unit.

a. Determine an appropriate transfer price for the fabrication division.

b. How would the transfer price change if the fabrication division had excess capacity?

c. Assume that the transfer price for the component has been set at $374, which is the fabrication division's total cost plus a 10% markup. The fabrication division's total cost of a component is $340, which includes fixed overhead applied at the rate of $400,000 of budgeted fixed overhead costs on budgeted annual production of 10,000 units. The assembly division has a special offer for its product of $435. The assembly division incurs variable costs of $100 in addition to the transfer price for the fabrication division's components. Both divisions currently have excess capacity.

1. Is the assembly division's manager likely to accept or reject the special offer? Why?
2. Is this decision in the best interests of the company as a whole? Why or why not?
3. How could the situation be remedied using the transfer price?

A) When there is no excess capacity, the appropriate transfer price would be the market price, which is 380$

B) When there is excess capacity, the minimum transfer price would be any incremental variable costs, less cost savings created by transferring internally. If the excess capacity is not large enough to fill the total transfer order, then the minimum transfer price will be a weighted-average version of the variable cost and the market price.

or we can use this formula :

Transfer price : VC/unit + OC

OC = TCM given up / total units transferred

C1) total cost for assembly div would be : 374 +100 = 474. Selling at 435 wouldn't make sense as they would lose 39$ per unit sold.

C2) Final sell price = 435 -300VC – 100VC = 35$ Contribution margin per unit
the only relevant costs are the incremental variable costs. The manager should Accept the offer in the best interest of the company. as a whole.

C3) The best way to remedy the situation would be to allow the two division to Establish a negotiated transfer price that would divide the profits equally between the 2 divisions.

PRODUCTION BUDGET

Tyson chandler company's sales budget projects unit sales of part Y of 11,000 units in January, 13,000 units in February, and 16,000 units in March. Each unit require 2.5kg of materials, which cost 2$ per kg. They want their ending RM to equal 25% of the next months production requirements, and its ending FG to be 30% of the next months expected unit sales. These goals were met at December 31 3019.

A) **Prepare a production Budget for JAN and FEB 2020**
B) **Prepare a DM budget for Jan 2020**

PRODUCTION BUDGET

	JAN	FEB	MAR
Unit sales	11,000	13,000	16,000
plus Req end FG	3900	4800	
required units	14,900	17,800	
less beg FG	3300	3900	
required production	11,600	13,900	

DM BUDGET

	JAN	FEB
required production	11,600	13,900
RM per unit	2.5	2.5
RM required	29,000	34,750
plus red end RM	8687.5	
required RM	37,688	
less beg RM	7250	
RM purchases units	30,438	
cost per RM	2	
Total cost for RM	60875	

COLLECTION / REPAYMENT

NIU company's budgeted sales and DM purchases are as follows

	Budgeted Sales	Budgeted Direct Materials Purchases
January	$350,000	$40,000
February	280,000	25,000
March	380,000	50,000

NIU's sales are 60% cash and 40% credit. Historically 5% of credit sales remain uncollectible. It collects 15% of credit sales in the month of sale, 40% in the month following sale, and the remaining in the second month following sale. NIU's purchases are 30% cash and 70% on account. It pays purchases on account 40% in the month of purchase, and 60% in the month following purchase.

A) prepare a schedule of expected collections for March
B) prepare a schedule of expected DM payments for March

March collections schedule

		MAR
JAN sales (350,000)	x 0.657	59850
FEB sales (280,000)	x 0.152	42560
MAR sales (380,000)	x 0.171	249660
Total collections		352070

Sales collections →
month of = 0.6 + (0.4 x 0.95 x 0.15) = 0.657
2nd month = (0.4 x 0.95 x 04) = 0.152
3rd month = (0.4 x 0.95 x 0.45) = 0.171

March DM payment schedule

		MAR
FEB purch (25,000)	x 0.42	10500
MAR purch (50,000)	x 0.58	29000
Total collections		39500

DM purchases →
month of = 0.3 + (0.7x04) = 0.58
2nd month = (0.7x0.6) = 0.42

VARIANCES

The following info was taken from Fernetti's annual manufacturing overhead cost budget.

Variable manufacturing overhead costs	$34,650
Fixed manufacturing overhead costs	$19,800
Normal production level in labour hours	16,500
Normal production level in units	4,125
Standard labour hours per unit	4

During the year, 4,000 units were produced, 16,100 hours were worked, and the actual manufacturing overhead was $55,000. Actual fixed manufacturing overhead costs equalled the budgeted fixed manufacturing overhead costs. Overhead is applied based on direct labour hours.

1. **Compute all possible variances given the information provided above.**
2. **Compute the total budget variance for manufacturing overhead during the last period.**
3. **Compute the total under-applied (over-applied) manufacturing overhead.**

VMOH VARIANCES

AQ x AP	AQ x SP	SQA x SP
(55,000-19,800)	16,100 x 2.1	16,000 x 2.1
35200	**33810**	**33600**

SPENDING VARIANCE	EFFICIENCY VARIANCE
1,390 U	**210 U**

TOTAL VOH VARIANCE
1,600 U

FMOH VARIANCES

AQ x AP	AQ x SP	SQA x SP
	16,500 x 1.2	16000 1.2
19,800	**19,800**	**19,200**

SPENDING VARIANCE	VOLUME VARIANCE
0 U	**600 U**

TOTAL FOH VARIANCE
600 U

SP 2.1 = 34,630 / 16,500

SQA 16,000 = 4,000 x 4

Total under applied = 1,600 Underapplied VOH + 600 underapplied FOH = 2,200 under-applied total OH

COSTING

Consider changing production from manual to automatic. The result of the change would be that variable manufacturing costs would be reduced from 40% of sales to 15% of sales. But fixed manufacturing costs would double to 1.8M. the following income statement is based on the company's current manual production process.

Management is also considering outsourcing production. A supplier offers to produce the good at 45% of sales. If we outsource, the company would no longer incur variable manufacturing costs and would reduce fixed manufacturing costs to 1/3 of its current (manual). All other fixed costs as well as variable cost percentages would remain the same. Assume that the company produces its goods just-in-time. Hence all manufacturing costs become cost of goods sold.

Income Statement
Year Ending March 31, 2017

Sales		$3,000,000
Cost of goods sold (variable and fixed manufacturing costs)		2,100,000
Gross profit		900,000
Selling and administrative expenses		
Variable costs (10% of sales)	$300,000	
Fixed costs	75,000	375,0000
Income before taxes		525,000
Income tax expense (20%)		105,000
Income after taxes		$ 420,000

a) Based on the provided information calculate the break-even point in sales dollars for the company for the year ending March 31, 2017.

b) Calculate the break-even point in sales dollars for the year ending March 31, 2017, if the company changes to an automatic production.

c) Calculate the sales dollars required for the outsourcing option to have the same operating income as projected in the pro forma income statement (the current manual production process) for the year ending March 31, 2016.

d) Starting from which level of sales dollars is the manual production option better than the outsourcing option? Show your calculations and justify your answer.

A) CVP statement for manual

sales	3,000,000
VCOGS	1,200,000
V.S.A	300,000
total vc	1,500,000
CM	1,500,000
FCOGS	900,000
F.S.A	75,000
total fc	975,000
operating income b4t	525,000

Cm ratio = 1.5M/3M = 50%

Break even point in sales
= 975,000/50% = 1,950,000$

B) CVP statement for automatic

sales	3,000,000
VCOGS	450,000
V.S.A	300,000
total vc	750,000
CM	2,250,000
FCOGS	1,800,000
F.S.A	75,000
total fc	1,875,000
operating income b4t	375,000

CM ratio = 2.25M/3M = 75%

break even point in sales
= 1,875,000/75% = 2,500,000

C) CVP statement for Outsourcing

sales	3,000,000
purchasing cost	1,350,000
V.S.A	300,000
total vc	1,650,000
CM	1,350,000
FCOGS	300,000
F.S. A	75,000
total fc	375,000
operating income b4t	975,000

CM ratio = 1.35M/3M = 45%

required sales = (375,000 + 525,000) / 45%
= 2,000,000

D) manual option : 0.5s + 975K Automatic option = 0.55s + 375K combine → 0.5s +975K = 0.55s + 375K → S = 12,000,000

OPERATING LEVERAGE

Shown below are the estimated revenues and costs for the current manual system and the proposed automated system under the assumption of last year's sales of $1,500,000:

	Manual System	Automated System
Sales	$1,500,000	$1,500,000
Variable costs	$1,200,000	400,000
Contribution margin	300,000	1,100,000
Fixed costs	100,000	900,000
Operating income	$ 200,000	$ 200,000

(a) Using the operating leverage, which option is preferable if sales are expected to increase by 20% next year? Show your calculations.

(b) Using the operating leverage, which option is preferable if sales are expected to decrease by 20% next year? Show your calculations.

(c) Given that historical sales volume has always been below $1.5m, which option would you propose to Vancouver Company? Justify your answer.

OP leverage manual = 300K/200K = 1.5
Op leverage automatic = 1.1M/200K = 5.5

A → 1.5 x 20% = 30% increase in profit
→ 5.5 x 20% = 110% increase in profit ← preferable

B → 1.5 x -20% = 30% decrease in profit ← preferble
→ 5.5 x -20% = 110% decrease in profit

C → above 1.5M in sales (% increase) Automatic is more profitable
→ below 1.5M in sales (% decrease) Manual is more profitable

So yea… in this case manual is obviously prerferable. duh

PRODUCTION CAPACITY

Montreal Ltd produces 3 different bicycles which are the simple A, the classic B, and the superb C.

Product	Price per unit	Variable cost per unit	Budgeted units to be sold	Machine hours required per unit
Simple A	$600	$480	350	Two Hours
Classic B	$650	$290	500	Three Hours
Superb C	$720	$400	300	Eight Hours

The fixed costs incurred for the production of the three bike models amount to $120,000. The total machine hours available amount to 3,800 hours.

1. Calculate the maximum profit achievable from full capacity production at Montreal Ltd.
2. Montreal Ltd has the option to rent additional machinery to make sure that all budgeted units can be produced and sold. This would increase fixed costs by an additional $35,000. Would you recommend doing this? Explain your answer and show calculations.

	A	B	C
Price	600	650	720
Vcost	480	290	400
CM	120	360	320
hours per	2	3	8
CM/unit	60	120	40

Order of CM priority	units to produce		hours per unit	hours needed	hours available		profit
B 1st	500		3	1,500	3,800	500 x 360	180,000
A 2nd	350		2	700	2,300	350 x 120	42,000
C 3rd	300	200	8	2400	1,600	200 x 320	64,000
					0		286,000
						less Fixed costs	120,000
						Max net profit	**166,000**

The only thing we are missing to fill the budgeted units is 100 units of Superb C. 100 x 320CM would give us 32,000$. Doing so would increase our fixed cost by 35,000$, which is 3000$ more than we would be making so no, we would definetly not recommend doing this.

INTERNAL SALES

Next Level (NL) is a division of Global Electronics, Inc. NL produces video game systems. These systems are sold to retailers. NL recently approached the manager of the personal computer (PC) division regarding a request to buy a special circuit board for a new advanced video game system. NL has requested that the PC division produces 200,000 units of this special circuit board. The following facts are available regarding the PC division:

Selling price of standard circuit board	$54
Variable cost of standard circuit board	30
Additional variable costs of special circuit board	20

For each of the following independent situations, calculate the minimum transfer price and liscuss whether PC should accept the offered price.

(a) Next Level has offered to pay the PC division $62 per circuit board. The PC division has no available capacity. The PC division would have to forgo sales of 200,000 circuit boards to existing customers in order to meet the request of Next Level.

(b) Next level has offered to pay the PC division $90 per circuit board. The PC division has no available capacity. The PC division would have to forgo sales of 250,000 circuit boards to existing customers in order to meet the request of Next Level.

(c) Next Level has offered to pay the PC division $62 per circuit board. The PC division has available capacity.

A

profit from lost opportunity = 200,000 x (54-30) = 4.8M
Profit from internal deal = 200,000 x (62-50) = 2.4M
= 2.4M Loss = reject

or we could have just calculated minimum transfer price =
OC = (54-30) / units transferred = 24
VC + OC = 50 + 24 = 74 62 < 74 = reject

B

lets use minimum TP technique, Min TP would be : OC = (54-30) / 250,000 = 30 → 50 + 30 = 80 → 90 > 80 = accept

or ,
250K x (54-30) = 6M
200k x (90-50) = 8M
6M gain = accept

C

Since PC division has available capacity to fill the order, we would just charge at cost for internal sales.

Basically the minimum transfer price is still → VC + OC . except opportunity cost is Zero,
VC = 50 so minimum TP = 50

62 > 50 = accept request

BUDGETS

Montreal Corporation has recently acquired a small manufacturing operation in British Columbia that produces one of its more popular items. This plant will provide these units for resale in retail hardware stores in British Columbia and Alberta. Because the budget prepared by the plant was incomplete, Jordan Leigh, Montreal' CFO, was sent to B.C. to oversee the plant's budgeting process for the second quarter of 2017.

Jordan asked various managers to collect the following information for preparing the second-quarter budget.

Sales in Units

Unit sales for March 2017	102,000
Expected unit sales for April 2017	110,000
Expected unit sales for May 2017	115,000
Expected unit sales for June 2017	120,000
Expected unit sales for July 2017	135,000
Expected unit sales for August 2017	160,000
Average unit selling price	**$15**

- **Req end FG = 10% of next month unit sales**
- **All sales are on account**
- **50% of A/R is received in the same month**
  50% in the next month.

- **DM required per unit = 1.1kg**
- **DM are 1.5$ per kg**
- **DM Beg inv March 31 = 12,155kg**
- **Reg end DM = 10% of next month DM needed for production**
- **DM paid on account**
- **50% of A/P paid in the same month**
  50% in the next month
- **Beg A/P March 31 = 120,600$**

- **DL per unit = 15 minutes or (0.25 hours)**
- **DL per hour = 18$**

Next few pages.

For the **second quarter of 2017 prepare the monthly and total of the following budgets:**

a. Sales budget.
b. Schedule for expected cash collections from customers.
c. Production budget.
d. Direct materials budget.
e. Schedule for expected payments for materials purchases.
f. Direct labour budget.

SALES BUDGET

	APR	MAY	JUNE	Total
unit sales	110,000	115,000	120,000	345,000
Unit sell price	15	15	15	15
$ sales	1,650,000	1,725,000	1,800,000	5,175,000

COLLECTION SCHEDULE

		APR	MAY	JUNE	Total
MAR sales	1,530,000	765,000.0			765,000.0
APR sales	1,650,000	825,000.0	825,000.0		1,650,000.0
MAY sales	1,725,000		862,500.0	862,500.0	1,725,000.0
JUN sales	1,800,000			900,000.0	900,000.0
total collections		1,590,000	1,687,500	1,762,500	5,040,000.0

PRODUCTION BUDGET

	APR	MAY	JUNE	total
unit sales	110,000	115,000	120,000	345,000
add req end FG	11,500	12,000	13,500	13,500
total req	121,500	127,000	133,500	382,000
less beg FG	11,000	11,500	12,000	11,000
total production	110,500	115,500	121,500	347,500

DM BUDGET

	APR	MAY	JUNE	total
Units to be produced	110,500	115,500	121,500	347,500
DM per unit	1.1	1.1	1.1	1.1
DM req	121,550	127,050	133,650	382,250
add end DM	12,705	13,365	15,125	15,125
DM req	134,255	140,415	148,775	423,445
less beg DM	12,155	12,705	13,365	12,155
total DM req	122,100	127,710	135,410	385,220
cost per DM	1.5	1.5	1.5	1.5
DM purchase cost	183,150	191,565	203,115	577,830

PAYMENT SCHEDULE

		APR	MAY	JUNE	total
MAR end A/P		120,600			
APR purch	183,150	91,575	91,575		
MAY purch	191,565		95,783	95,783	
JUN purch	203,115			101,558	
total disbursement		212,175	187,358	197,340	596,873

DL BUDGET

	APR	MAY	JUNE	total
Units produced	110,500	115,500	121,500	347,500
DL per unit	0.25	0.25	0.25	0.25
total DL hours	27,625	28,875	30,375	86,875
rate per DL	18	18	18	18
DL cost	497,250	519,750	546,750	1,563,750

*** note, it's a good idea to do the month of july when possible, as some required inventory numbers require data from it.**

COSTING / RECONCILE

Quebec corp. is a manufacturer of specialty skates. The operating results for 2016 are as follows :

Units produced	20,000	pairs
Units sold	18,000	pairs
Selling price	$200	per pair
Production information:		
Direct materials	$1,000,000	
Direct labour	750,000	
Variable manufacturing overhead	450,000	
Fixed manufacturing overhead	800,000	
Variable marketing costs	180,000	
Fixed marketing costs	200,000	

There was no beginning finished goods inventory.

Instructions (Hint: Prepare the production cost per unit under each method first.)

a) Assuming the company uses Throughput costing method:
   1. Prepare the Throughput costing income statement for 2016. (8 Marks)
   2. Reconcile the difference in net income between the Variable costing and Throughput-costing methods. (2 Marks)
   3. Reconcile the difference in net income between the Absorption costing and Variable-costing methods (2 Marks)

b) Assuming the company uses the budgeted volume of 25,000 pairs to allocate the fixed overhead rate rather than the actual production volume of 20,000 pairs. The company expenses production volume variance to cost of goods sold in the accounting period in which it occurs. Do the following:

   1. Prepare the income statement for 2016 under Normal Absorption costing. (6 Marks)

   2. Reconcile the difference in net income between the Normal Absorption costing and Absorption-costing methods. (2 Marks)

A1

Sold < produced

Throughput IS	
Sales	3,600,000
dm	900,000
tpcm	2,700,000
dl	750,000
vmoh	450,000
fmoh	800,000
v.s.a	180,000
f.s.a	200,000
NI	320,000

A2

Throughput NI = 320,000
+ Cost difference = [(750,0037.0+450,000) / 20,000] = 60 → 60 x (20,000-18,000) = 120,000 month000
Variable NI = **440,000**

A3

Throughput NI = 320,000
+ cost difference = [(750,000+450,000+ 800,000) / 20,000] = 100 → x 2000 = 200,000
Absorption costing = **520,000**

B1

sales	3,600,000	
COGS	2,556,000	(18,000 x 142)
plus Unfavorable variance	160,000	(5000 x 32)
adjusted COGS	2,716,000	
gross profit	884,000	
V.S.A	180,000	
F.S.A	200,000	
NI b4T	504,000	

B2

Absorption NI	= 520,000
- deferred FMOH	= **16,000**
Normal NI	= 504,000

VARIANCES

The following is a production report for the most recent period of operations:

Standard Cost Card

Direct materials (2 kg at $3 per kilogram)	$6.00
Direct labour (0.8 hours at $10)	8.00
Variable overhead (0.8 hours at $5 per hour)	4.00
Fixed overhead (0.8 hours at $10 per hour)	8.00
	$26.00

Costs	Total Standard Cost	Variances			
		Price/Rate	Spending/Budget	Quantity/Efficiency	Volume
Direct materials	$405,000	$33,000 U		$9,000 F	
Direct labour	540,000	13,675 F		7,000 U	
Variable overhead	270,000		$1,500 U	?	
Fixed overhead	540,000		$1000 U		$7,000 F

a. How many units were produced during the period?

b. How many kilograms of raw material were purchased and used during the period?

c. What was the actual cost per kilogram of raw materials?

d. How much were actual direct labour hours worked during the period?

e. What was the actual rate paid per direct labour hour?

f. What was the actual variable overhead cost incurred during the period?

g. What was the total fixed cost in the company's master budget?

h. What were the hours for the master budget fixed overhead?

i. What was the total overhead budget variance?

j. What was the total under-applied (over-applied) manufacturing overhead?

A) 405,000 /6 = **67,500 units**

B) (405,000 – 9,000) / 3$ = **132,000 kg**

C) [(132,000 x 3) + 33,000] = 429,000 / 132,000 = **3.25$ per kg**

D) (540,000 + 7,000) / 10$ = **54,700 hours**

E) [(54,700 x 10) – 13,675] = 533,325 / 54,700 = **9.75$ per hour**

F) Find AQxSP (54,700 x 5) then add the spending variance + 1,500 = **275,000**

G) Standard Fixed Cost + Volume Variance = 540,000 + 7,000 = **533,000$**

H) 533,000 / 10 = **53,300 hours**

I) VOH spending V + VOH efficiency V + FOH Spending V = 1,500 + 3,500 + 1,000 = **6,000 U**

J) **Applied** = 270k + 540k =810K **Actual** = 275k + 534k = 809K = **1,000 F overapplied**

DM VARIANCES

AQ x AP	AQ x SP	SQA x SP
132,000 x 3.25 429,000	132,000 x 3 396,000	67,500x2 x 3 405,000
PRICE VARIANCE 33,000 U	QUANTITY VARIANCE 9,000 F	
TOTAL DM VARIANCE 24,000 U		

DL VARIANCES

AQ x AP	AQ x SP	SQA x SP
54,700 x 9.75 533,325	54,700 x 10 547,000	67,500x0.8 x 10 540,000
PRICE VARIANCE 13,675 F	QUANTITY VARIANCE 7,000 U	
TOTAL DL VARIANCE 6,675 F		

VOH VARIANCES

AQ x AP	AQ x SP	SQA x SP
275,000	54,700 x 5 273,500	67,500x0.8 x 5 270,000
SPENDING VARIANCE 1,500 U	EFFICIENCY VARIANCE 3,500 U	
TOTAL VOH VARIANCE 5,000 U		

FOH VARIANCES

AQ x AP	AQ x SP	SQA x SP
534,000	53,300 x 10 533,000	67,500x0.8 x 10 540,000
SPENDING VARIANCE 1000 U	VOLUME VARIANCE 7000 F	
TOTAL FOH VARIANCE 6,000 F		