Managerial Accounting 2
Master Budget

اعداد

د. حسين كريم الشمري

Financial Planning and Analysis (FP&A) Systems

A **financial planning and analysis (FP&A) system** helps managers assess the company's future and know if they are reaching their performance goals. A complete FP&A system includes subsystems for (1) planning, (2) measuring and recording results, and (3) evaluating performance.

يساعد نظام التخطيط والتحليل المالي المديرين على تقييم مستقبل الشركة ومعرفة ما إذا كانوا قد وصلوا إلى أهداف الأداء الخاصة بهم. يشتمل نظام الكامل على أنظمة فرعية لـ (1) التخطيط ، (2) قياس النتائج وتسجيلها ، و (3) تقييم الأداء.

Purposes of Budgeting Systems

Budget

A detailed plan, expressed in quantitative terms, that specifies how resources will be acquired and used during a specified period of time.

الموازنة

خطة مفصلة ، معبراً عنها كميا او ماليا من خلالها ، يتم تحديد كيفية الحصول على الموارد واستعمالها خلال فترة زمنية محددة في المستقبل

Purposes of Budgeting Systems

1. **Planning**
2. **Facilitating Communication and Coordination**
3. **Allocating Resources**
4. **Controlling**
5. **Evaluating Performance and Providing Incentives**

1- التخطيط

2- تسهيل الاتصال والتنسيق

3- تخصيص الموارد

4- الرقابة

5- تقويم الاداء و تقديم الحوافز

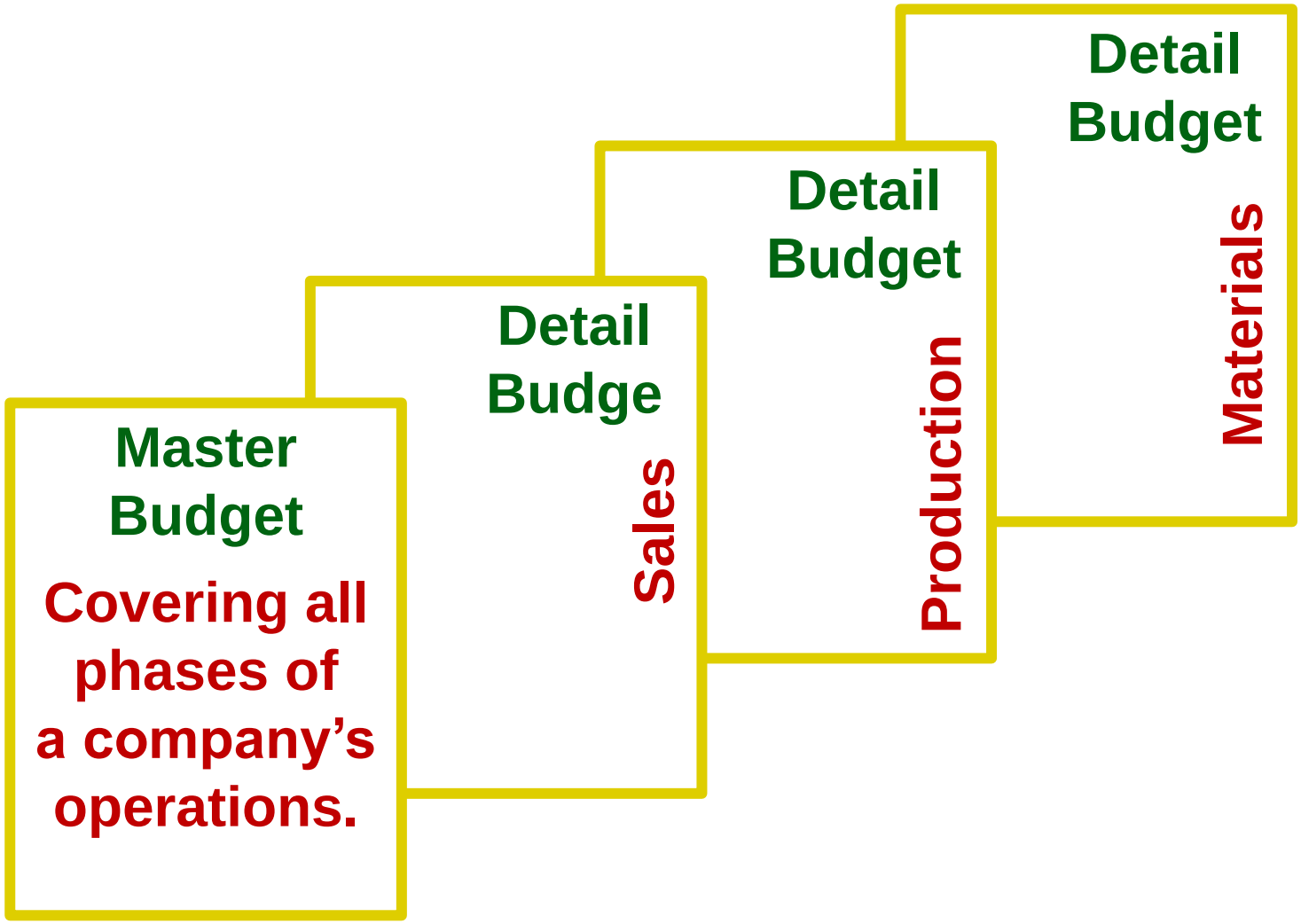
Types of Budgets(انواع الموازنات)

Different types of budgets serve different purposes. A master budget, or profit plan, is a comprehensive set of detailed budgets covering all phases of an organization’s operations for a specified period of time

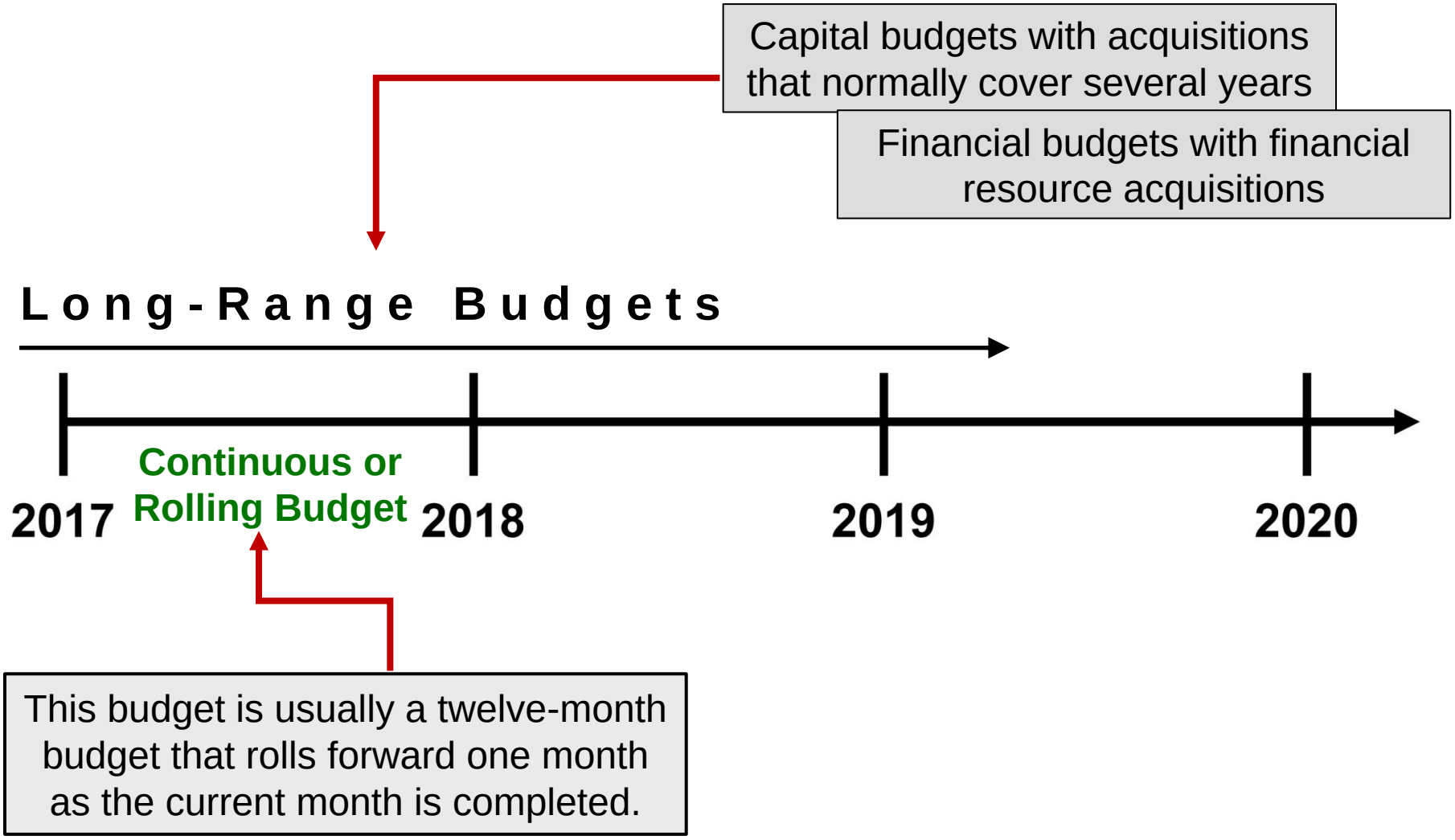
تخدم الأنواع المختلفة من الموازنات الشاملة أغراضًا مختلفة.

الموازنة الشاملة ، أو خطة الربح ، هي مجموعة شاملة من الموازنات التفصيلية التي تغطي جميع مراحل عمليات الوحدة الاقتصادية لفترة زمنية محددة

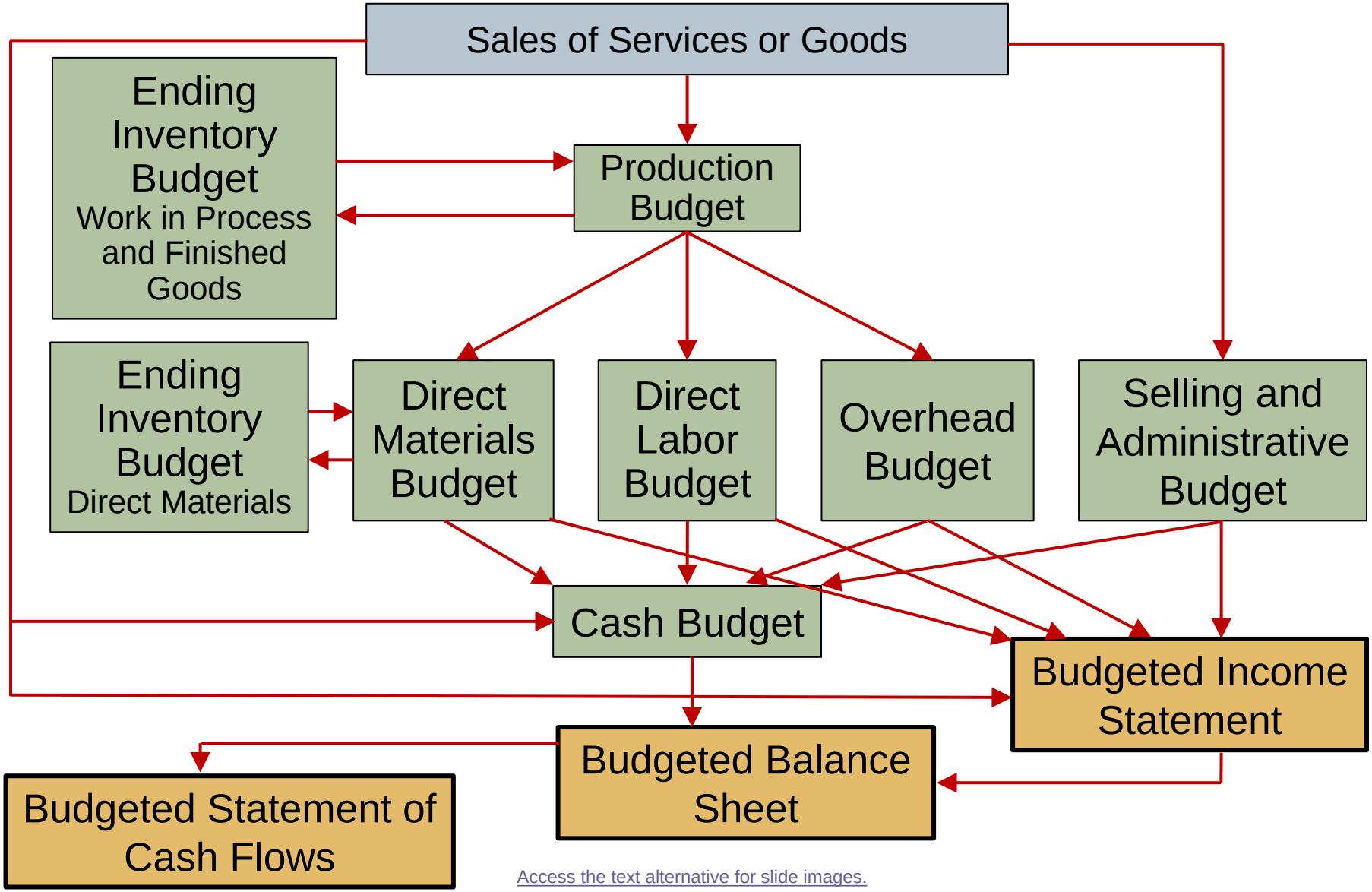
Types of Budgets(انواع الموازنات)



Long-Range Budgets



Components of a Master Budget



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Sales Budget موازنة المبيعات

Breakers, Inc. is preparing budgets for the quarter ending June 30.

Budgeted sales for the next five months are:

April	20,000 units
May	50,000 units
June	30,000 units
July	25,000 units
August	15,000 units.

The selling price is $10 per unit.

Sales Budget موازنة المبيعات

	April	May	June	Quarter
Budgeted sales (units)	20,000	50,000	30,000	100,000
Selling price per unit	$ 10	$ 10	$ 10	$ 10
Total Revenue	$200,000	$ 500,000	$ 300,000	$1 ,000,000

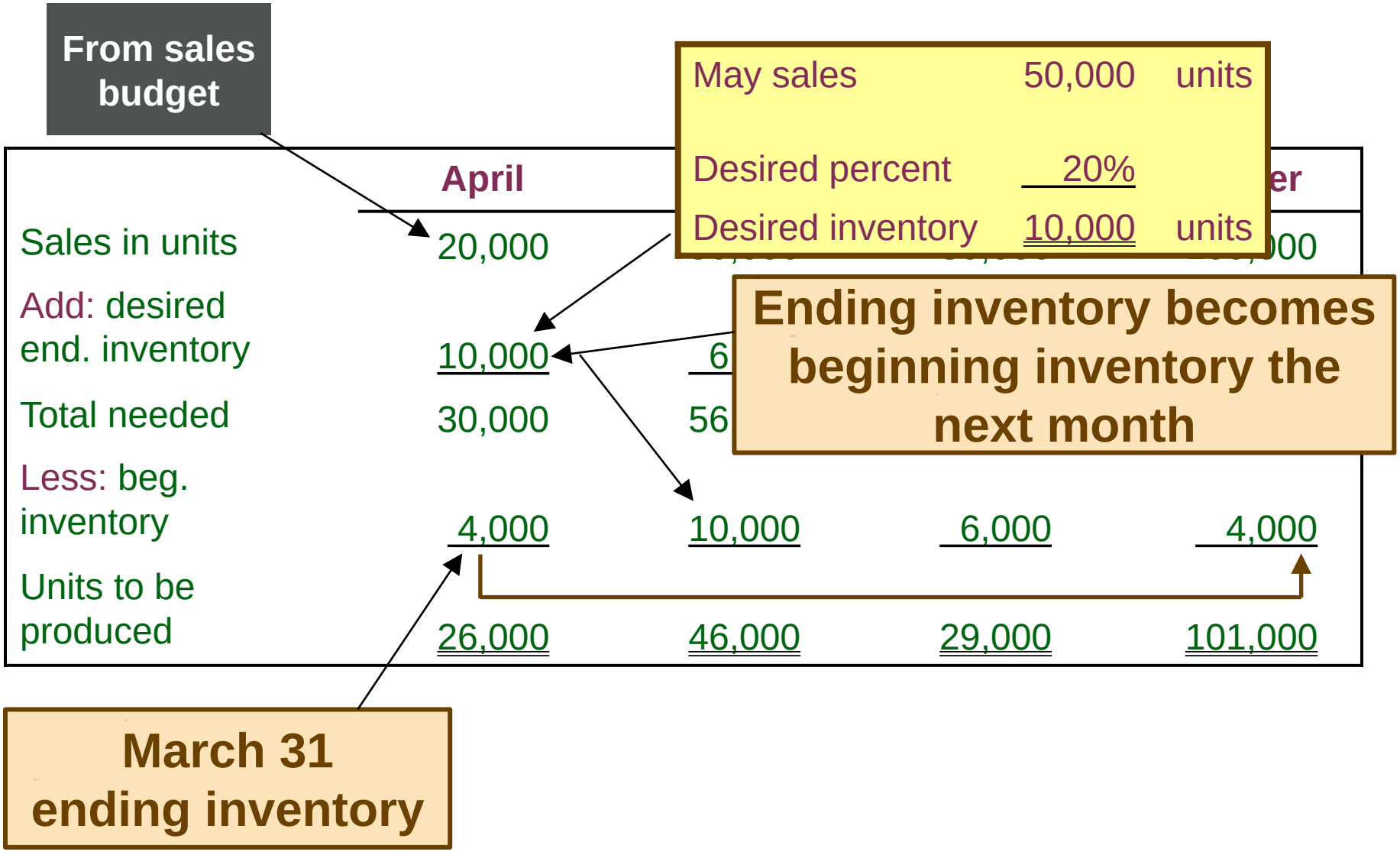
Production Budget موازنة الانتاج

Now that the sales budget is complete, the production budget can be prepared. The purpose of the production budget is to ensure that production meets budgeted sales and provides sufficient ending inventory. Production must be adequate to meet budgeted sales and provide for sufficient ending inventory.

The management of Breakers, Inc. wants ending inventory to be equal to 20% of the following month's budgeted sales in units. On March 31, 4,000 units were on hand .Let's prepare the production budget.

Production Budget = Sales in units + desired end. Inventory - beg. inventory

Production Budget



Sales Budget

Illustration: Hayes Company

- Expected sales volume: 3,000 units in the first quarter with 500-unit increases in each succeeding quarter.
- Sales price: $60 per unit.

Sales Budget
For the Year Ending December 31, 2020

	Quarter				
	1	2	3	4	Year
Expected sales in units	3,000	3,500	4,000	4,500	15,000
Unit selling price	× $60	× $60	× $60	× $60	× $60
Total sales	$180,000	$210,000	$240,000	$270,000	$900,000

Production Budget
Illustration

Hayes believes it can meet future sales needs with an ending inventory of 20% of next quarter's budgeted sales volume.

Production Budget **by Quarter**
For the Year Ending December 31, 2020

	1	2	3	4	Year
Expected sales in units	3,000	3,500	4,000	4,500	
Add: Desired finished Goods units	700	800	900	1,000	
Total required units	3,700	4,300	4,900	5,500	
Less: Beginning Finished goods units	600	700	800	900	
Required production units	**3,100**	**3,600**	**4,100**	**4,600**	**15,400**

EXERCISE 1

Paige Company estimates that unit sales will be 10,000 in quarter 1, 14,000 in quarter 2, 15,000 in quarter 3, and 18,000 in quarter 4. Using a sales price of $70 per unit, prepare the sales budget by quarters for the year ending December 31, 2020

	1	2	3	4	year
Budgeted Sales(unit)	**10000**	**14000**	**15000**	**18000**	**57000**
S.P ($)	**70**	**70**	**70**	**70**	**70**
Total sales	**700000**	**980000**	**1050000**	**1260000**	**3990000**

EXERCISE 2

Sales budget data for Paige Company are given in **EXERCISE 1**. Management desires to have an ending finished goods inventory equal to 25% of the next quarter's expected unit sales. Prepare a production budget by quarters for the first 6 months of 2020.

	Quarter 1	Quarter 2	
Sales in units	10000	14000	24000
Add: desired end. inventory	3500	3750	3750
Total needed	13500	17750	27750
Less: beg. inventory	2500	3500	2500
17	11000	14250	25250

Managerial Accounting 2
Master Budget

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Direct Materials Budget

Shows quantity and cost of direct materials to be purchased.

Units to Be Produced	×	Direct Materials Units per Unit of Unit Produced	=	**Direct Materials Units Required for Production**

Direct Materials Units Required for Production	+	Desired Ending Direct Materials Units	−	Beginning Direct Materials Units	=	**Direct Materials Required to Be Purchased**

Direct Materials Budget
Continued

Direct Materials Units Required for Production	+	Desired Ending Direct Materials Units	−	Beginning Direct Materials Units	=	**Direct Materials Required to Be Purchased**

Direct Materials Units to Be Purchased	×	Cost per Direct Materials Units	=	**Cost of Direct Materials Purchased**

موازنة المشتريات المواد

كمية المواد المباشرة المطلوبة في الانتاج = عدد الوحدات المنتجة * المواد المباشرة للوحدة الواحدة

المواد المباشرة المطلوبة للشراء = كمية المواد المباشرة المطلوبة في الانتاج + مخزون مواد اخر المادة – مخزون مواد اول المدة

كلفة مشتريات المواد = المواد المباشرة المطلوبة للشراء * كلفة الشراء المواد

Direct-Material Budget 2

From our production budget

	April	May	June	Quarter
Production in unit	26,000	46,000	29,000	101,000
Materials per unit	5	5	5	5
Production needs	130,000	**230,000**	145,000	505,000
Add: desired **ending** inventory	**23,000**	14,500	11,500	11,500
Total needed	153,000	244,500	156,500	516,500
Less: beginning inventory	13,000	23,000	14,500	13,000
Materials to be purchased	140,000	221,500	142,000	503,500

10% of the following month's production

March 31 inventory

Direct-Material Budget 3

July Production	
Sales in units	25,000
Add: desired ending inventory	3,000
Total units needed	28,000
Less: beginning inventory	5,000
Production in units	23,000

		May	June	Quarter
		46,000	29,000	101,000
		5	5	5
		230,000	145,000	505,000
Add: desired **ending** inventory	23,000	14,500	11,500	11,500
Total needed	153,000	244,500	156,500	516,500
Less: beginning inventory			14,500	13,000
Materials purchased			142,000	503,500

June Ending Inventory	
July production in units	**23,000**
Materials per unit	**5**
Total units needed	**115,000**
Inventory percentage	**10%**
June desired ending inventory	**11,500**

Sales Budget

Illustration: Hayes Company

- Expected sales volume: 3,000 units in the first quarter with 500-unit increases in each succeeding quarter.
- Sales price: $60 per unit.

Sales Budget
For the Year Ending December 31, 2020

	Quarter				
	1	2	3	4	Year
Expected sales in units	3,000	3,500	4,000	4,500	15,000
Unit selling price	× $60	× $60	× $60	× $60	× $60
Total sales	$180,000	$210,000	$240,000	$270,000	$900,000

Production Budget
Illustration

Hayes believes it can meet future sales needs with an ending inventory of 20% of next quarter's budgeted sales volume.

Production Budget **by Quarter**
For the Year Ending December 31, 2020

	1	2	3	4	Year
Expected sales in units	3,000	3,500	4,000	4,500	
Add: Desired finished Goods units	700	800	900	1,000	
Total required units	3,700	4,300	4,900	5,500	
Less: Beginning Finished goods units	600	700	800	900	
Required production units	**3,100**	**3,600**	**4,100**	**4,600**	**15,400**

Direct Materials Budget
Problem data

- Each unit produced requires two pounds of raw materials at a cost of $4 per pound
- Hayes maintains an ending inventory of raw materials equal to 10% of the next quarter's production requirements
- The desired ending direct materials amount is 1,020 pounds for the fourth quarter of 2020
- Prepare a Direct Materials Budget

Direct Materials Budget
Illustration

Direct Materials Budget by Quarter
For the Year Ending December 31, 2020

	1	2	3	4	Year
Units to be produced	3,100	3,600	4,100	4,600	
Direct materials per unit	× 2	× 2	× 2	× 2	
Total pounds needed	6,200	7,200	8,200	9,200	
Add: Ending Direct Materials[a]	720	820	920	1,020[c]	
Total materials required	6,920	8,020	9,120	10,220	
Less: Beginning Direct Materials	620[b]	720	820	920	
Direct Materials purchases	6,300	7,300	8,300	9,300	
Cost per pound	× $4	× $4	× $4	× $4	
Total cost of direct materials purchases	**$25,200**	**$29,200**	**$33,200**	**$37,200**	**$124,800**

[a]10% of next quarter's production requirements

[b]10% of estimated first-quarter pounds needed for production

[c]Total pounds needed for production is assumed to be 10,200 for the first quarter for 2021

DO IT! 2: Sales, Production, and DM Budgets

Sales data

Soriano Company is preparing its master budget for 2020. Relevant data pertaining to its sales, production, and direct materials budgets are as follows.

Sales. Sales for the year are expected to total 1,200,000 units. Quarterly sales, as a percentage of total sales, are 20%, 25%, 30%, and 25%, respectively. The sales price is expected to be $50 per unit for the first three quarters and $55 per unit beginning in the fourth quarter. Sales in the first quarter of 2021 are expected to be 10% higher than the budgeted sales for the first quarter of 2020.

DO IT! 2: Sales, Production, and DM Budgets

Production and Direct materials data

Production. Management desires to maintain the ending finished goods inventories at 25% of the next quarter's budgeted sales volume.

Direct materials. Each unit requires 3 pounds of raw materials at a cost of $5 per pound. Management desires to maintain raw materials inventories at 5% of the next quarter's production requirements. Assume the production requirements for the first quarter of 2021 are 810,000 pounds.

DO IT! 2: Sales, Production, and DM Budgets

Sales Budget

Prepare a **sales**, production, and direct materials budgets by quarters for 2020.

Sales Budget
For the Year Ending December 31, 2020

	Quarter				
	1	2	3	4	Year
Expected units sales[a]	240,000	300,000	360,000	300,000	1,200,000
Unit selling price	× $ 50	× $ 50	× $ 50	× $ 55	
Total sales	**$ 12,000,000**	**$ 15,000,000**	**$ 18,000,000**	**$ 16,500,000**	**$ 61,500,000**

[a]Specified quarterly percentage times annual units, e.g., first quarter of .20 × 1,200,000

DO IT! 2: Sales, Production and DM Budgets

Production Budget

Prepare **production** budgets by quarters for 2020.

Production Budget
For the Year Ending December 31, 2020

	Quarter				
	1	2	3	4	Year
Expected unit sales	240,000	300,000	360,000	300,000	
Add: Desired ending finished goods units[a]	75,000	90,000	75,000	66,000[b]	
Total required units	315,000	390,000	435,000	366,000	
Less: Beginning finished goods units	60,000[c]	75,000	90,000	75,000	
Required production units	**255,000**	**315,000**	**345,000**	**291,000**	**1,206,000**

[a]25% of next quarter's unit sales

[b]Estimated first-quarter 2021 sales units: 240,000 + (240,000 × .10) = 264,000: 264,000 × .25

[c]25% of estimated first-quarter 2020 sales units (240,000 × .25)

DO IT! 2: Sales, Production and DM Budgets

Direct Materials Budget

Direct Materials Budget

For the Year Ending December 31, 2020

	Quarter				
	1	2	3	4	Year
Units to be produced	255,000	315,000	345,000	291,000	
Direct materials per unit	3	3	3	3	
Total pounds needed for production	765,000	945,000	1,035,000	873,000	
Add: Desired ending direct materials (pounds)	47,250	51,750	43,650	40,500	
Total materials required	812,250	996,750	1,078,650	913,500	
Less: Beginning direct materials (pounds)	38,250	47,250	51,750	43,650	
Direct materials purchases	774,000	949,500	1,026,900	869,850	
Cost per pound	$ 5	$ 5	$ 5	$ 5	
Total cost of direct materials purchases	**$ 3,870,000**	**$ 4,747,500**	**$ 5,134,500**	**$ 4,349,250**	**$ 18,101,250**

[a]Estimated first-quarter 2021 production requirements: 810,000 × .05 = 40,500

[b]5% of estimated first-quarter pounds needed for production

Direct Labor Budgets

موازنة العمل المباشر

Prepare budgets for direct labor, manufacturing overhead, and selling and administrative expenses, and a budgeted income statement.

Direct Labor Budget

- Shows both quantity of hours and cost of direct labor necessary to meet production requirements
- Critical in maintaining a labor force that can meet expected production
- Total direct labor cost formula:

Units to Be Produced	×	Direct Labor Hours per Unit	×	Direct Labor Cost per Hour	=	**Total Direct Labor Cost**

موازنة العمل المباشر

موازنة كلفة العمل المباشر = عدد الوحدات المنتجة * الوقت لازم لإنتاج الوحدة * كلفة الاجر المباشر لساعة

Direct Labor Budget

Illustration: Direct labor hours are determined from the production budget. At Hayes Company, two hours of direct labor are required to produce each unit of finished goods. The anticipated hourly wage rate is $10.

Direct Labor Budget

For the Year Ending December 31, 2020

	Quarter				
	1	2	3	4	Year
Units to be produced (Illustration 9.5)	3,100	3,600	4,100	4,600	
Direct labor hours per unit	× 2	× 2	× 2	× 2	
Total required direct labor hours	6,200	7,200	8,200	9,200	
Direct labor cost per hour	× $10	× $10	× $10	× $10	
Total direct labor cost	**$ 62,000**	**$ 72,000**	**$ 82,000**	**$ 92,000**	**$ 308,000**

Managerial Accounting 2
Master Budget

اعداد

د. حسين كريم الشمري

Pargo Company is preparing its master budget for 2020. Relevant data pertaining

to its sales, production, and direct materials budgets are as follows

Sales. Sales for the year are expected to total 1,000,000 units. Quarterly sales are 20%, 25%, 25%,

and 30%, respectively. The sales price is expected to be $40 per unit for the first three quarters and $45 per unit beginning in the fourth quarter. Sales in the first quarter of 2021 are expected to be 20% higher than the budgeted sales for the first quarter of 2020.

Production. Management desires to maintain the ending finished goods inventories at 25% of the next quarter's budgeted sales volume.

Direct materials. Each unit requires 2 pounds of raw materials at a cost of $12 per pound. Management desires to maintain raw materials inventories at 10% of the next quarter's production requirements.

Assume the production requirements for first quarter of 2021 are 450,000 pounds.

Prepare the sales, production, and direct materials budgets by quarters for 2020.

- Q1 = 1000000 * 20% =200000
- Q2= 1000000* 25% = 250000
- Q3= 1000000* 25% = 250000
- Q4= 1000000* 30% = 300000

- 2021
- Q1= 200000 * 1.2 = 240000

Sales Budget
For the Year Ending December 31, 2020

	1	2	3	4	year
Sales expected	200000	250000	250000	300000	
s.p	40	40	40	45	
Total sales	8000000	1000000	1000000	1350000	4150000

Production Budget
For the Year Ending December 31, 2020

	1	2	3	4	year
Sales expected	200000	250000	250000	300000	
Ending .f .g	62500	62500	75000	60000	
b. f. g	50000	62500	62500	75000	
Production budget	212500	250000	262500	285000	

- ending q 4(2020) = sales q1 (2021) * 25%
- = 240000 * 25% =60000

- B f.g q1 (2020) = 50000
- ending q 4(2019) =sales q1 (2020) * 25%
- = 200000 * 25%
- = 50000

Direct Materials Budget
For the Year Ending December 31, 2020

	1	2	3	4	year
Production budget	212500	250000	262500	285000	
D.M Per unit	2	2	2	2	
Total pounds needs for production	425000	500000	525000	570000	
Ending . d .m	50000	52500	57000	45000	
(Beginning .d.m)	42500	50000	52500	57000	
D.M . Purchases	432500	502500	529500	558000	
Cost per pounds	12	12	12	12	
Total c. d. m Purchases	5190000	6030000	6354000	6696000	

ending q4 (2019) = 425000 * 10%

= 42500

Manufacturing Overhead Budget

- Shows expected manufacturing overhead costs for budget period
- Distinguishes between fixed and variable overhead costs

Direct Labor Budget

Illustration: Direct labor hours are determined from the production budget. At Hayes Company, two hours of direct labor are required to produce each unit of finished goods. The anticipated hourly wage rate is $10.

Direct Labor Budget

For the Year Ending December 31, 2020

	Quarter				
	1	2	3	4	Year
Units to be produced (Illustration 9.5)	3,100	3,600	4,100	4,600	
Direct labor hours per unit	× 2	× 2	× 2	× 2	
Total required direct labor hours	6,200	7,200	8,200	9,200	
Direct labor cost per hour	× $10	× $10	× $10	× $10	
Total direct labor cost	**$ 62,000**	**$ 72,000**	**$ 82,000**	**$ 92,000**	**$ 308,000**

Manufacturing Overhead Budget
Problem data

Hayes Company expects variable costs to fluctuate with production volume on the basis of the following rates per direct labor hour: indirect materials $1.00, indirect labor $1.40, utilities $0.40, and maintenance $0.20. Thus, for the 6,200 direct labor hours to produce 3,100 units, budgeted indirect materials are $6,200 (6,200 × $1), and budgeted indirect labor is $8,680 (6,200 × $1.40). Hayes also recognizes that some maintenance is fixed. The amounts reported for fixed costs are assumed.

Prepare a Manufacturing Overhead Budget.

Manufacturing Overhead Budget
Illustration

Manufacturing Overhead Budget
For the Year Ending December 31, 2020

	Quarter				
	1	2	3	4	Year
Direct labor hours (Illus. 9.11)	6,200	7,200	8,200	9,200	30,800
Variable costs					
Indirect materials ($1.00/hour)	$ 6,200	$ 7,200	$ 8,200	$ 9,200	$ 30,800
Indirect labor ($1.40/hour)	8,680	10,080	11,480	12,880	43,120
Utilities ($0.40/hour)	2,480	2,880	3,280	3,680	12,320
Maintenance ($0.20/hour)	1,240	1,440	1,640	1,840	6,160
Total variable costs	18,600	21,600	24,600	27,600	92,400
Fixed costs					-
Supervisory salaries	20,000	20,000	20,000	20,000	80,000
Depreciation	3,800	3,800	3,800	3,800	15,200
Property taxes and insurance	9,000	9,000	9,000	9,000	36,000
Maintenance	5,700	5,700	5,700	5,700	22,800
Total fixed costs	38,500	38,500	38,500	38,500	154,000
Total manufacturing overhead	**$ 57,100**	**$ 60,100**	**$ 63,100**	**$ 66,100**	**$ 246,400**

Selling and Adm. Expense Budget

- Projection of anticipated operating expenses
- Distinguishes between fixed and variable costs

Illustration: Variable expense rates per unit of sales are sales commissions $3 and freight-out $1. Variable expenses per quarter are based on the unit sales from the sales budget (Illustration 9-3). Hayes expects sales in the first quarter to be 3,000 units. Fixed expenses are based on assumed data.

Prepare a selling and administrative expense budget.

Selling and Adm. Expense Budget
Illustration

Selling and Administrative Expense Budget
For the Year Ending December 31, 2020

	Quarter				
	1	2	3	4	Year
Budgeted sales units (Illus. 9.3)	3,000	3,500	4,000	4,500	15,000
Variable costs					
Sales commissions ($3/unit)	$ 9,000	$ 10,500	$ 12,000	$ 13,500	$ 45,000
Freight-out ($1/unit)	3,000	3,500	4,000	4,500	15,000
Total variable costs	12,000	14,000	16,000	18,000	60,000
Fixed costs					
Advertising	5,000	5,000	5,000	5,000	20,000
Sales salaries	15,000	15,000	15,000	15,000	60,000
Office salaries	7,500	7,500	7,500	7,500	30,000
Depreciation	1,000	1,000	1,000	1,000	4,000
Property taxes and insurance	1,500	1,500	1,500	1,500	6,000
Total fixed costs	30,000	30,000	30,000	30,000	120,000
Total selling and Administrative expenses	**$ 42,000**	**$ 44,000**	**$ 46,000**	**$ 48,000**	**$ 180,000**

Managerial Accounting 2
Master Budget

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Exercises

Atlanta Company is preparing its manufacturing overhead budget for 2020. Relevant data consist of the following.

Units to be produced (by quarters): 10,000, 12,000, 14,000, 16,000.

Direct labor: time is 1.5 hours per unit.

Variable overhead costs per direct labor hour:

indirect materials $0.80 ; indirect labor $1.20; and

maintenance $0.50.

Fixed overhead costs per quarter: supervisory salaries $35,000; depreciation $15,000; and maintenance $12,000.

Instructions

Prepare the manufacturing overhead budget for the year, showing quarterly data.

ATLANTA COMPANY
Manufacturing Overhead Budget
For the Year Ending December 31, 2020

	Q1	Q2	Q3	Q4	year
Units to be produced	10000	12000	14000	16000	52000
Direct labor hours per unit	1.5	1.5	1.5	1.5	1.5
Total Direct labor (1)	15000	18000	21000	24000	78000
Variable costs					
indirect materials ($0.80* (1))	12000 $	14400	16800	19200	62400
indirect labor ($1.20 * (1))	18000	21600	25200	28800	93600
maintenance ($0.50. * (1))	7500	9000	10500	12000	39000
Total Variable costs	37500	45000	52500	60000	195000

ATLANTA COMPANY
Manufacturing Overhead Budget
For the Year Ending December 31, 2020

	Q1	Q2	Q3	Q4	year
Total Variable costs	37500	45000	52500	60000	195000
Fixed costs					
supervisory salaries	35000	35000	35000	35000	140000
depreciation	15000	15000	15000	15000	60000
maintenance	12000	12000	12000	12000	48000
Total Fixed costs	62000	62000	62000	62000	248000
Total Manufacturing Overhead Budget	99500	107000	114500	122000	443000

Exercises

Kirkland Company combines its operating expenses for budget purposes in a selling and administrative expense budget. For the first 6 months of 2020, the following data are available.

1. Sales: 20,000 unit quarter 1; 22,000 unit quarter 2.

2. Variable costs per dollar of sales: sales commissions 5%, delivery expense 2%, and advertising 3%.

3. Fixed costs per quarter: sales salaries $12,000, office salaries $8,000, depreciation $4,200, insurance $1,500, utilities $800, and repairs expense $500.

4. Unit selling price: $20.

Instructions

Prepare a selling and administrative expense budget by quarters for the first 6 months of 2020.

KIRKLAND COMPANY
Selling and Administrative Expense Budget
For the Six Months Ending June 30, 2020

	Q1	Q2	Six months
Sales	20000	22000	42000
selling price	20	20	20
Total Sales(1)	400000	440000	840000
Variable costs			
sales commissions 5%, * (1)	20000	22000	42000
delivery expense 2%, * (1)	8000	8800	16800
advertising 3%. *(1)	12000	13200	25200
Total Variable costs	40000	44000	84000

KIRKLAND COMPANY
Selling and Administrative Expense Budget
For the Six Months Ending June 30, 2020

	Q1	Q2	Six months
Total Variable costs	**40000**	**44000**	**84000**
Fixed costs			
sales salaries	**12000**	**12000**	**24000**
office salaries	**8000**	**8000**	**16000**
depreciation	**4200**	**4200**	**8400**
insurance	**1500**	**1500**	**3000**
utilities	**800**	**800**	**1600**
repairs expense	**500**	**500**	**1000**
Total Fixed costs	**27000**	**27000**	**54000**
Selling and Administrative Expense Budget	**67000**	**71000**	**138000**

Exercises

Fultz Company has accumulated the following budget data for the year 2020.

1. Sales: 30,000 units, unit selling price $85.

2. Cost of one unit of finished goods: direct materials 1 pound at $5 per pound, direct labor 3 hours at $15 per hour, and manufacturing overhead $5 per direct labor hour.

3. Inventories (raw materials only): beginning, 10,000 pounds; ending, 15,000 pounds.

4. Selling and administrative expenses: $170,000; interest expense: $30,000.

5. Income taxes: 30% of income before income taxes.

Instructions

a. Prepare a schedule showing the computation of cost of goods sold for 2020.

b. Prepare a budgeted multiple-step income statement for 2020

FULTZ COMPANY
Computation of Cost of Goods Sold
For the Year Ending December 31, 2020

Cost of Goods Sold unit of finished goods	
direct materials =1 pound * $5 per pound	**5**
direct labor 3 hours * $15 per hour	**45**
manufacturing overhead $5 * 3	**15**
Total Cost of Goods Sold (65 * 30000) =1950000	**65**

FULTZ COMPANY
Budgeted Income Statement
For the Year Ending December 31, 2020

Sales (30000 * 85)	2550000
Cost of Goods Sold	(1950000)
Gross profit	600000
Selling and administrative expenses	(170000)
Income form operation	430000
interest expense	(30000)
Income before taxes	400000
Income taxes (400000* 30%)	120000
Net income	280000

Managerial Accounting 2
Master Budget

اعداد

د. حسين كريم الشمري

P22.1A (LO 2, 3) Cook Farm Supply Company manufactures and sells a pesticide called Snare. The following data are available for preparing budgets for Snare for the first 2 quarters of 2020.

1. Sales: quarter 1, 40,000 bags; quarter 2, 56,000 bags. Selling price is $60 per bag.
2. Direct materials: each bag of Snare requires 4 pounds of Gumm at a cost of $3.80 per pound and 6 pounds of Tarr at $1.50 per pound.
3. Desired inventory levels:

Type of Inventory	January 1	April 1	July 1
Snare (bags)	8,000	15,000	18,000
Gumm (pounds)	9,000	10,000	13,000
Tarr (pounds)	14,000	20,000	25,000

4. Direct labor: direct labor time is 15 minutes per bag at an hourly rate of $16 per hour.
5. Selling and administrative expenses are expected to be 15% of sales plus $175,000 per quarter.
6. Interest expense is $100,000 for the two quarters.
7. Income taxes are expected to be 30% of income before income taxes.

Your assistant has prepared two budgets: (1) the manufacturing overhead budget shows expected costs to be 125% of direct labor cost, and (2) the direct materials budget for Tarr shows the cost of Tarr purchases to be $297,000 in quarter 1 and $439,500 in quarter 2.

Instructions

Prepare the budgeted multiple-step income statement for the first 6 months and all required operating budgets by quarters. (*Note:* Use variable and fixed in the selling and administrative expense budget.) Do not prepare the manufacturing overhead budget or the direct materials budget for Tarr.

COOK FARM SUPPLY COMPANY
Sales Budget
For the Six Months Ending June 30, 2020

	Quarter		Six Months
	1	2	
Expected unit sales	40000	56000	96000
Unit selling price	$60	$60	$60
Total sales	2400000	3360000	5760000

COOK FARM SUPPLY COMPANY
Production Budget
For the Six Months Ending June 30, 2020

	Quarter		Six Months
	1	2	
Expected unit sales	40000	56000	
Add : ending finished goods units .	15000	18000	
Total required units	55000	74000	
Less: Beginning finished goods units	8000	15000	
Required production units	47000	59000	106000

COOK FARM SUPPLY COMPANY
Direct Materials Budget—Gumm
For the Six Months Ending June 30, 2020

	Quarter		Six Months
	1	2	
Units to be produced	47000	59000	
Direct materials per unit	4	4	
Total pounds needed for production	188000	236000	
Add: Desired ending direct materials	10000	13000	
Total materials required	198000	249000	
Less: Beginning direct materials	9000	10000	
Direct materials purchases	189000	239000	
Cost per pound	$3.80	$3.80	
Total cost of direct materials purchases	718200	908200	1626400

COOK FARM SUPPLY COMPANY
Direct Labor Budget
For the Six Months Ending June 30, 2020

	Quarter		Six Months
	1	2	
Units to be produced	47000	59000	
Direct labor time (hours) per unit	¼	¼	
Total required direct labor hours	11750	14750	
Direct labor cost per hour	16	16	
Total direct labor cost	188000	236000	424000

COOK FARM SUPPLY COMPANY
Selling and Administrative Expense Budget
For the Six Months Ending June 30, 2020

	Quarter		Six Months
	1	2	
Budgeted sales	2400000	3360000	
Variable (15% sales)	360000	504000	
Fixed	175000	175000	
Total	535000	679000	1214000

COOK FARM SUPPLY COMPANY

Computation of Cost of Goods Sold
For the Year Ending December 31, 2020

Cost of Goods Sold unit of finished good	
direct materials **Gumm (4 * 3.80)** **Tarr (6*1.50)**	 **15.20** **9**
direct labor hours (1/4 * 16)	**4**
manufacturing overhead (%125 * D .L .COST) (%125 * 4)	**5**
Total Cost of Goods Sold (96000 *33.20)= 3187200	**33.20**

COOK FARM SUPPLY COMPANY
Budgeted Income Statement
For the Year Ending December 31, 2020

Sales	5760000
Cost of Goods Sold	(3187200)
Gross profit	2572800
Selling and administrative expenses	(1214000)
Income form operation	1358800
interest expense	(100000)
Income before taxes	1258800
Income taxes (%30 * 1258800)	(377640)
Net income	881160

Managerial Accounting 2
Master Budget

اعداد

د. حسين كريم الشمري

Prepare a cash budget.

Cash Budget

- Shows anticipated cash flows
- Important output in preparing financial budgets
- Contains three sections:
  - Cash Receipts (المقبوضات النقدية)
  - Cash Disbursements (المدفوعات النقدية)
  - Financing(التمويل)
- Shows beginning and ending cash balances

Cash Budget

ANY COMPANY
Cash Budget

Beginning cash balance	$ X,XXX
Add: Cash receipts (itemized)	X,XXX
Total available cash	X,XXX
Less: Cash disbursements (itemized)	X,XXX
Excess (deficiency) of available cash over cash disbursements	X,XXX
Financing	X,XXX
Net income	$ X,XXX

Prepare a cash budget.

Danner Company expects to have a cash balance of $45,000 on January 1, 2020. Relevant monthly budget data for the first 2 months of 2020 are as follows. Collections from customers: January $85,000, February $150,000. Payments for direct materials: January $50,000, February $75,000. Direct labor: January $30,000, February $45,000. Wages are paid in the month they are incurred. Manufacturing overhead: January $21,000, February $25,000. These costs include depreciation of $1,500 per month. All other overhead costs are paid as incurred. Selling and administrative expenses: January $15,000, February $20,000. These costs are exclusive of depreciation. They are paid as incurred. Sales of marketable securities in January are expected to realize $12,000 in cash. Danner Company has a line of credit at a local bank that enables it to borrow up to $25,000. The company wants to maintain a minimum monthly cash balance of $20,000.

Instructions : Prepare a cash budget for January and February

DANNER COMPANY
Cash Budget
For the Two Months Ending February 28, 2020

	January	February
Beginning cash balance	45000	27500
Add: Receipts		
Collections from customers	85000	150000
Sale of marketable securities	12000	0
Total receipts	97000	150000
Total available cash	142000	177500

DANNER COMPANY
Cash Budget
For the Two Months Ending February 28, 2020

	January	February
Less: Disbursements		
Direct materials	50000	75000
Direct labor	30000	45000
Manufacturing overhead	19500	23500
Selling and administrative expenses	15000	20000
Total disbursements	114500	163500
Excess (deficiency) of available cash over cash disbursements	27500	14000
Financing		
Add: Borrowings	0	6000
Less: Repayments	0	0
Ending cash balance	27500	20000

E22.17 (LO 4) Nieto Company's budgeted sales and direct materials purchases are as follows.

	Budgeted Sales	Budgeted D.M. Purchases
January	$200,000	$30,000
February	220,000	36,000
March	250,000	38,000

Nieto's sales are 30% cash and 70% credit. Credit sales are collected 10% in the month of sale, 50% in the month following sale, and 36% in the second month following sale; 4% are uncollectible. Nieto's purchases are 50% cash and 50% on account. Purchases on account are paid 40% in the month of purchase, and 60% in the month following purchase.

Instructions

a. Prepare a schedule of expected collections from customers for March.

b. Prepare a schedule of expected payments for direct materials for March.

NIETO COMPANY
Schedule of Expected Collections from Customers - March

	March
March cash sales	75000
Collection of March credit sales	17500
Collection of February credit sales	77000
Collection of January credit sales	50400
Total collections	219900

NIETO COMPANY
Schedule of Expected Payments for Direct Materials - March

	March
March cash purchases	19000
Payment of March credit purchases	7600
Payment of February credit purchases	10800
Total payments	37400

E22.18 (LO 4) **Service** Green Landscaping Inc. is preparing its budget for the first quarter of 2020. The next step in the budgeting process is to prepare a cash receipts schedule and a cash payments schedule. To that end the following information has been collected.

Clients usually pay 60% of their fee in the month that service is performed, 30% the month after, and 10% the second month after receiving service.

Actual service revenue for 2019 and expected service revenues for 2020 are November 2019, $80,000; December 2019, $90,000; January 2020, $100,000; February 2020, $120,000; and March 2020, $140,000.

Purchases of landscaping supplies (direct materials) are paid 60% in the month of purchase and 40% the following month. Actual purchases for 2019 and expected purchases for 2020 are December 2019, $14,000; January 2020, $12,000; February 2020, $15,000; and March 2020, $18,000.

Instructions

a. Prepare the following schedules for each month in the first quarter of 2020 and for the quarter in total:

1. Expected collections from clients.

2. Expected payments for landscaping supplies.

b. Determine the following balances at March 31, 2020:

1. Accounts receivable.

2. Accounts payable.

توضيح المقبوضات

الشهر	140000	**3**		
3	نفس الشهر	%60	84000	
4	الشهر التالي	%30		
5	الشهر الثاني / لشهر البيع او تقديم الخدمات	%10	-	

GREEN LANDSCAPING INC.
Schedule of Expected Collections From Clients
For the Quarter Ending March 31, 2020

	January	February	March	Quarter
November	8000			8000
December	27000	9000		36000
January	60000	30000	10000	100000
February		72000	36000	108000
March			84000	
Total collections	95000	111000	130000	336000

توضيح المدفوعات

الشهر	18000	3		
3	نفس الشهر	%60	10800	
4	الشهر التالي	%40		

GREEN LANDSCAPING INC.
Schedule of Expected Payments for Landscaping Supplies
For the Quarter Ending March 31, 2020

	January	February	March	Quarter
December	5600			
January	7200	4800		
February		9000	6000	
March			10800	
Total payments				

(120000* 10%) + (140000* 40%) = 68000

Accounting receivable

(18000* 40%) = 7200

Accounting payable

Managerial Accounting 2
Master Budget

اعداد

د. حسين كريم الشمري

P22.4A (LO 4) Colter Company prepares monthly cash budgets. Relevant data from operating budgets for 2020 are as follows.

	January	February
Sales	$360,000	$400,000
Direct materials purchases	120,000	125,000
Direct labor	90,000	100,000
Manufacturing overhead	70,000	75,000
Selling and administrative expenses	79,000	85,000

All sales are on account. Collections are expected to be 50% in the month of sale, 30% in the first month following the sale, and 20% in the second month following the sale. Sixty percent (60%) of direct materials purchases are paid in cash in the month of purchase, and the balance due is paid in the month following the purchase. All other items above are paid in the month incurred except for selling and administrative expenses that include $1,000 of depreciation per month.

Other data:

1. Credit sales: November 2019, $250,000; December 2019, $320,000.
2. Purchases of direct materials: December 2019, $100,000.
3. Other receipts: January—collection of December 31, 2019, notes receivable $15,000; February—proceeds from sale of securities $6,000.
4. Other disbursements: February—payment of $6,000 cash dividend.

The company's cash balance on January 1, 2020, is expected to be $60,000. The company wants to maintain a minimum cash balance of $50,000.

Instructions

a. Prepare schedules for (1) expected collections from customers and (2) expected payments for direct materials purchases for January and February.

b. Prepare a cash budget for January and February in columnar form.

توضيح المقبوضات

الاشهر				
	نفس شهر البيع	%50		
	الشهر الاول بعد شهر البيع	%30		
	الشهر الثاني بعد شهر البيع	%20		

Expected Collections from Customers

	January	February
November	50000	-
December	96000	64000
January	180000	108000
February	-	200000
Total collections	326000	372000

توضيح المدفوعات

125000		شهر 2		
2	نفس الشهر (نقد)	%60	75000	
3	الشهر الاول بعد شهر الشراء	%40	-	

Expected Payments for Direct Materials

	January	February
December	40000	-
January	72000	48000
February	-	75000
Total payments	112000	123000

Cash Budget
For the Two Months Ending February 28, 2020

	January	February
Beginning cash balance	60000	51000
Add: Receipts		
Collections from customers	326000	372000
Notes receivable	15000	
Sale of securities		6000
Total receipts	341000	378000
Total available cash	401000	429000

Cash Budget
For the Two Months Ending February 28, 2020

	January	February
Less: Disbursements		
Direct materials	**112000**	**123000**
Direct labor	**90000**	**100000**
Manufacturing overhead	**70000**	**75000**
Selling and administrative expenses	**78000**	**84000**
Cash dividend		**6000**
Total disbursements	**350000**	**388000**
Excess (deficiency) of available cash over cash disbursements	**51000**	**41000**
Financing		
Add: Borrowings	**0**	**9000**
Less: Repayments	**0**	
Ending cash balance	**51000**	**50000**

Managerial Accounting 2
Capital Budgeting

اعداد

د. حسين كريم الشمري

Describe capital budgeting inputs and apply the cash payback technique.

For purposes of capital budgeting, **estimated cash inflows and outflows are the preferred inputs**.

Why?

Ultimately, the value of all financial investments is determined by the value of cash flows received and paid.

Cost Flow Information

Typical cash flows relating to capital budgeting

Cash Outflows

- Initial investment
- Repairs and maintenance
- Increased operating costs
- Overhaul of equipment

Cash Inflows

- Proceeds from sale of old equipment
- Increased cash received from customers
- Reduced cash outflows related to operating costs
- Salvage value of equipment

Illustrative Data

Stewart Shipping Company is considering an investment of $130,000 in new equipment.

Initial investment	$130,000
Estimated useful life	10 years
Estimated salvage value	- 0 -
Estimated annual cash flows	
Cash inflows from customers	$200,000
Cash outflows for operating costs	176,000
Net annual cash flow	$ 24,000

Cash Payback

Cash payback formula

Cash payback technique identifies time period required to recover cost of capital investment from net annual cash inflow produced by investment.

Cash payback period for Stewart is …

Cost of Capital Investment	÷	Net Annual Cash Flow	=	Cash Payback Period
$130,000	÷	$24,000	=	5.42 years

Cash Payback
Evaluation of project

Shorter payback period = More attractive investment

In case of uneven net annual cash flows, company determines cash payback period when:

$$\text{Cumulative net cash flows from investment} = \text{Cost of investment}$$

Cash Payback

Cash payback period-unequal cash flows

Illustration: Chen Company proposes an investment in a new website that is estimated to cost $300,000.

Year	Investment	Net Annual Cash Flows	Cumulative Net Cash Flow
0	$300,000		
1		$60,000	$60,000
2		90,000	150,000
3		90,000	240,000
4		120,000	360,000
5		100,000	460,000

Cash payback period = 3.5 years

DO IT! 1 Cash Payback Period

Watertown Paper Corporation is considering adding another machine for the manufacture of corrugated cardboard. The machine would cost $900,000. It would have an estimated life of 6 years and no salvage value. The company estimates that annual cash inflows would increase by $400,000 and that annual cash outflows would increase by $190,000. **Compute the cash payback period.**

Estimated annual cash inflows	$400,000
Estimated annual cash outflows	190,000
Net annual cash flow	$210,000

$$\text{Cash payback period} = \frac{\$900,000}{\$210,000} = \textbf{4.3 years}$$

Managerial Accounting 2
Capital Budgeting

اعداد

د. حسين كريم الشمري

Net Present Value Method

Use the net present value method.

Discounted cash flow technique:

- Generally recognized as best approach
- Considers both estimated total cash inflows and time value of money
- Two methods:
  - **Net present value (NPV)**
  - **Internal rate of return (IRR)**

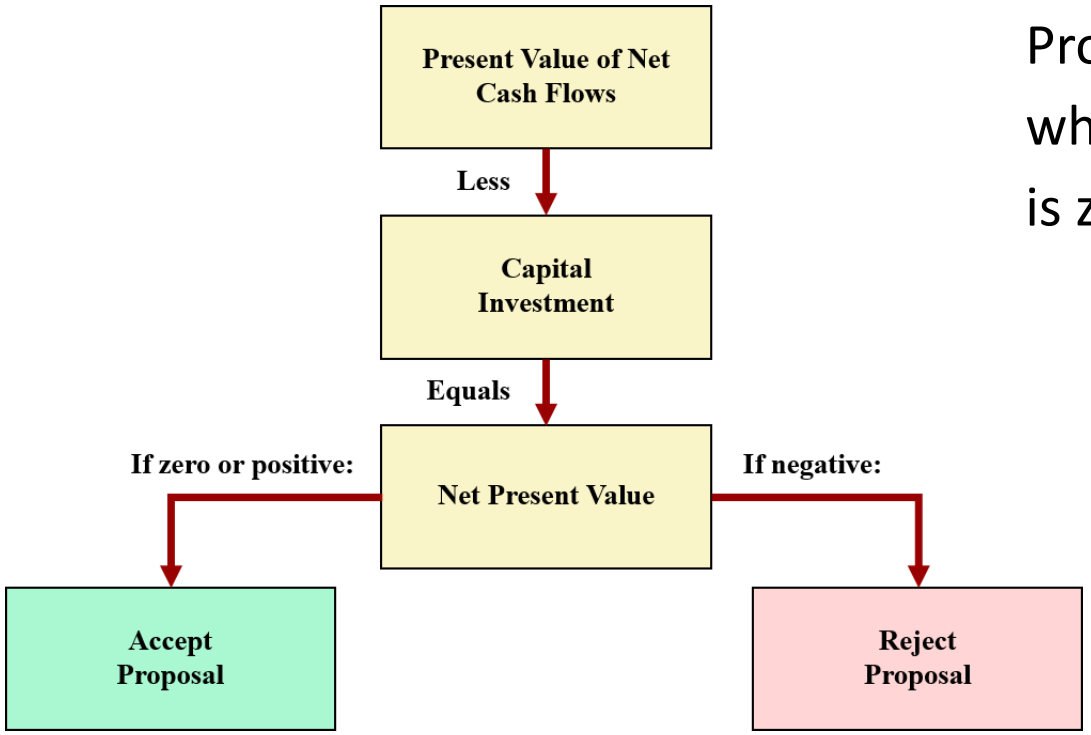
Net Present Value Method

- Cash inflows are discounted to their present value and then compared with capital outlay required by investment
- Interest rate used in discounting is required minimum rate of return
- Proposal is acceptable when NPV is zero or positive
- Higher positive NPV, more attractive investment

Net Present Value Method

Net present value decision criteria

معايير قرار صافي القيمة الحالية



Proposal is acceptable when net present value is zero or positive.

Equal Annual Cash Flows

Present value of equal net annual cash flows

Illustration: In the Stewart Shipping Company example the company's net annual cash flows are $24,000. If we assume this amount **is uniform over the asset's useful life**, we can compute the present value of the net annual cash flows.

Capital investment $130,000

	Present Value at 12%
Discounted factor for 10 periods	5.65022
Present value of net cash flows:	
$24,000 × 5.65022	**$135,605**

Equal Annual Cash Flows

Net present value-equal net annual cash flows

Illustration: Calculate the net present value.

	12%
Present value of net cash flows	$135,605
Less: Capital investment	130,000
Net present value	**$ 5,605**

Proposed capital expenditure is **acceptable** at a required rate of return of 12% because the **net present value is positive**.

Unequal Annual Cash Flows
Illustration

Stewart Shipping Company expects the same total net cash flows of $240,000 over the life of the investment. Because of a declining market demand for the new product the net annual cash flows are higher in the early years and lower in the later years.

The present value of the net annual cash flows is calculated as follows.

Unequal Annual Cash Flows

Present value of unequal annual cash flows

Year	Assumed Net Annual Cash Flows	Discount Factor 12%	Present Value 12%
	(1)	(2)	(1) × (2)
1	$34,000	0.89286	$30,357
2	30,000	0.79719	23,916
3	27,000	0.71178	19,218
4	25,000	0.63552	15,888
5	24,000	0.56743	13,618
6	22,000	0.50663	11,146
7	21,000	0.45235	9,499
8	20,000	0.40388	8,078
9	19,000	0.36061	6,852
10	18,000	0.32197	5,795
	$240,000		**$144,367**

Unequal Annual Cash Flows

Net present value-unequal annual cash flows

Illustration: Calculate the net present value.

	12%
Present value of net cash flows	$144,367
Less: Capital investment	130,000
Net present value	**$ 14,367**

Proposed capital expenditure is **acceptable** at a required rate of return of 12% because the **net present value is positive**.

Comprehensive Example

Investment information for Best Taste Foods

Best Taste Foods is considering investing in new equipment to produce fat-free snack foods.

Initial investment	$1,000,000
Cost of equipment overhaul in 5 years	$200,000
Salvage value of equipment in 10 years	$20,000
Cost of capital (discount rate)	15%
Estimated annual cash flows	
Cash inflows received from sales	$500,000
Cash outflows for cost of goods sold	$200,000
Maintenance costs	$30,000
Other direct operating costs	$40,000

Comprehensive Example
Computation of net annual cash flow

Compute the net annual cash flows for this project.

Cash inflows received from sales	$ 500,000
Cash outflows for cost of goods sold	(200,000)
Maintenance costs	(30,000)
Other direct operating costs	(40,000)
Net annual cash flow	**$ 230,000**

Comprehensive Example
NPV of Best Taste Foods investment

Compute the net present value for this proposed investment.

Event	Time Period	Cash Flow	×	15% Discount Factor	=	Present Value
Net annual cash flow	1-10	$ 230,000		5.01877		$1,154,317
Salvage value	10	20,000		.24719		4,944
Less: Equipment purchase	0	1,000,000		1.00000		1,000,000
Less: Equipment overhaul	5	200,000		.49718		99,436
Net present value						**$ 59,825**

DO IT! 2: Net Present Value
Problem data

Watertown Paper Corporation is considering adding another machine for the manufacture of corrugated cardboard. The machine would cost $900,000. It would have an estimated life of 6 years and no salvage value. The company estimates that annual cash inflows would increase by $400,000 and that annual cash outflows would increase by $190,000. Management has a required rate of return of 9%.

Calculate the net present value on this project and discuss whether it should be accepted.

DO IT! 2: Net Present Value
Solution

Calculate the net present value on this project and discuss whether it should be accepted.

Estimated annual cash inflows	$400,000
Estimated annual cash outflows	190,000
Net annual cash flow	$210,000

	Cash Flow	9% Discount Factor	Present Value
Present value of net annual cash flows	$210,000	4.48592	$942,043
Less: Capital investment			900,000
Net present value			$42,043

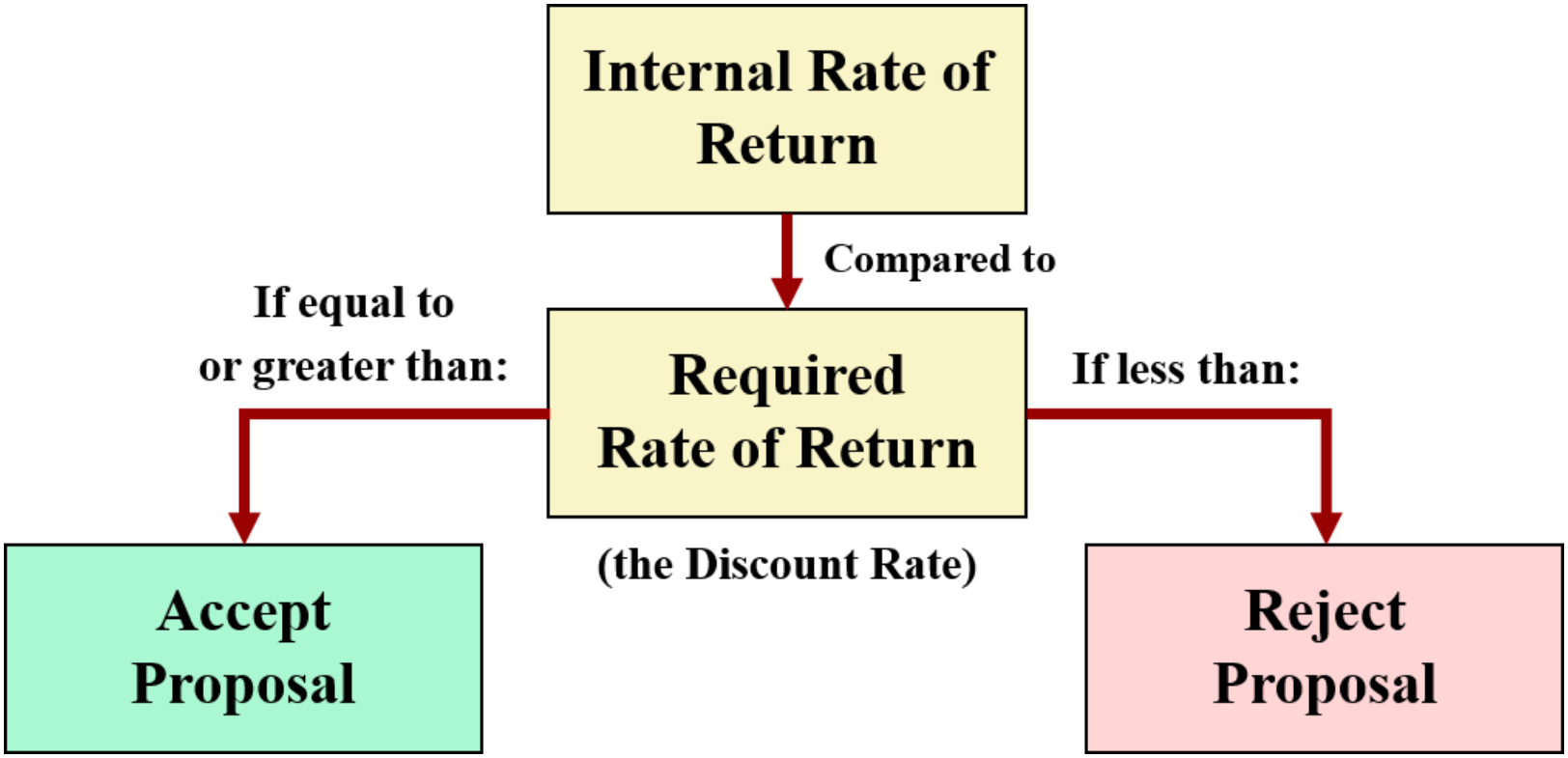
NPV is greater than zero, Waterton should accept the project.

Use the internal rate of return method.

- Differs from net present value method in that it finds interest yield of potential investment
- **Internal rate of return (IRR)** - interest rate that will cause present value of proposed capital expenditure to equal present value of expected net annual cash flows (NPV equal to zero)
- How does one determine internal rate of return?

Internal Rate of Return

Internal rate of return decision criteria



Comparing Discounted Cash Flow Methods

		Net Present Value	Internal Rate of Return
1.	Objective	Compute net present value (a dollar amount).	Compute internal rate of return (a percentage)
2.	Decision Rule	If net present value is zero or positive, accept the proposal.	If internal rate of return is equal to or greater than the required rate of return, accept the proposal.
		If net present value is negative, reject the proposal.	If internal rate of return is less than the required rate of return, reject the proposal.

DO IT! 4: Internal Rate of Return
Problem data

Watertown Paper Corporation is considering adding another machine for the manufacture of corrugated cardboard. The machine would cost $900,000. It would have an estimated life of 6 years and no salvage value. The company estimates that annual cash inflows would increase by $400,000 and that annual cash outflows would increase by $190,000. Management has a required rate of return of 9%.

Calculate the internal rate of return on this project and discuss whether it should be accepted.

DO IT! 4: Internal Rate of Return
Calculation of the internal rate of return

Estimated annual cash inflows	$400,000
Estimated annual cash outflows	190,000
Net annual cash flow	$210,000
Machine cost	$900,000
Net annual cash flow	÷ $210,000
Present value factor	4.28571

Now, find the rate that corresponds to the present value factor.

DO IT! 4: Internal Rate of Return

Rate for pv factor of 4.28571 for 6 periods

Table 4
Present Value of an Annuity of 1

Period	4%	5%	6%	7%	8%	9%	10%	11%
1	0.96154	0.95238	0.94340	0.93458	0.92593	0.91743	0.90909	0.90090
2	1.88609	1.85941	1.83339	1.80802	1.78326	1.75911	1.73554	1.71252
3	2.77509	2.72325	2.67301	2.62432	2.57710	2.53129	2.48685	2.44371
4	3.62990	3.54595	3.46511	3.38721	3.31213	3.23972	3.16987	3.10245
5	4.45182	4.32948	4.21236	4.10020	3.99271	3.88965	3.79079	3.69590
6	5.24214	5.07569	4.91732	4.76654	4.62288	4.48592	4.35526	4.23054
7	6.00205	5.78637	5.58238	5.38929	5.20637	5.03295	4.86842	4.71220

Required rate of return is only 9%, project should be accepted.

Managerial Accounting 2
Capital Budgeting

اعداد

د. حسين كريم الشمري

q1

Doug's Custom Construction Company is considering three new projects, each requiring an equipment investment of $\$22{,}000$. Each project will last for 3 years and produce the following net annual cash flows.

Year	AA	BB	CC
1	7000 $	10000 $	13000$
2	9000	10000	12000
3	12000	10000	11000
TOTAL	28000	30000	36000

The equipment's salvage value is zero, and Doug uses straight-line depreciation. Doug will not accept any project with a cash payback period over 2 years. Doug's required rate of return is 12%.

Instructions

a. Compute each project's payback period, indicating the most desirable project and the least desirable project using this method.

b. Compute the net present value of each project. Does your evaluation change?

A

AA

Year	Net Annual Cash Flow	Cumulative Net Cash Flow
1	7000	7000
2	9000	16000
3	12000	28000

Cash payback period =2 + 6000 /12000

=2.5

A

BB-

Cost of Capital Investment	÷	Net Annual Cash Flow	=	Cash Payback Period

22000 / 10000 = 2.2

A

A – CC

Year	Net Annual Cash Flow	Cumulative Net Cash Flow
1	13000	13000
2	12000	25000
3	11000	36000

Cash payback period = 1+ 9000 / 12000

= 1.75

B

AA-

Year	Cash Flow	Discount Factor	Present Value
1	7000	.89286	6250
2	9000	.79719	7175
3	12000	.71178	8541
Total present value			21966
Less: Investment			(22000)
Net present value			(34)

B

BB-

	Present Value at 12%
Discounted factor for 3 periods	2.40183
Present value of net cash flows:	
10000 * 2.40183	24018
Less: Investment	(22000)
N p v	2018

B

CC-

Year	Cash Flow	Discount Factor	Present Value
1	13000	.89286	11607
2	12000	.79719	9566
3	11000	.71178	7830
Total present value			29003
Less: Investment			(22000)
Net present value			7003

Bruno Corporation is involved in the business of injection molding of plastics. It is considering the purchase of a new computer–aided design and manufacturing machine for $430,000. The company believes that with this new machine it will improve productivity and increase quality, resulting in an increase in net annual cash flows of $101,000 for the next 6 years. Management requires a 10% rate of return on all new investments

Instructions

Calculate the internal rate of return on this new machine. Should the investment be accepted?

When net annual cash flows are expected to be equal, the internal rate of return can be approximated by dividing the capital investment by the net annual cash flows to determine the discount factor, and then locating this discount factor on the present value of an annuity table.

capital investment / net annual cash flows

$430,000/$101,000 = 4.25743

By tracing across on the 6-year row, we see that the discount factor for 11% is 4.23054. Thus, the internal rate of return on this project is approximately 11%

Since this is above the company's required rate of return, the project should be accepted

Use the annual rate of return method

Indicates profitability of a capital expenditure by dividing expected annual net income by average investment.

Expected Annual Net Income	÷	Average Investment	=	Annual Rate of Return

Annual Rate of Return
Problem data

Watertown Paper Corporation is considering adding another machine for the manufacture of corrugated cardboard. The machine would cost $900,000. It would have an estimated life of 6 years and no salvage value. The company estimates that annual revenues would increase by $400,000 and that annual expenses excluding depreciation would increase by $190,000. It uses the straight-line method to compute depreciation expense. Management has a required rate of return of 9%.

Compute the annual rate of return.

Annual Rate of Return
Solution

Compute the annual rate of return.

Revenues		$400,000
Less:		
Expenses (excluding depreciation)	$190,000	
Depreciation expense ($900,000 ÷ 6 years)	150,000	340,000
Annual net income		$ 60,000

$$\text{Average investment} = \frac{(\$900{,}000 + \$0)}{2} = \$450{,}000.$$

$$\text{Annual rate of return} = \frac{\$60{,}000}{\$450{,}000} = \$13.3\%.$$

The proposed project is **acceptable**.

TABLE 3 Present Value of 1

(*n*) Periods	4%	5%	6%	7%	8%	9%	10%	11%	12%	15%
1	.96154	.95238	.94340	.93458	.92593	.91743	.90909	.90090	.89286	.86957
2	.92456	.90703	.89000	.87344	.85734	.84168	.82645	.81162	.79719	.75614
3	.88900	.86384	.83962	.81630	.79383	.77218	.75132	.73119	.71178	.65752
4	.85480	.82270	.79209	.76290	.73503	.70843	.68301	.65873	.63552	.57175
5	.82193	.78353	.74726	.71299	.68058	.64993	.62092	.59345	.56743	.49718
6	.79031	.74622	.70496	.66634	.63017	.59627	.56447	.53464	.50663	.43233
7	.75992	.71068	.66506	.62275	.58349	.54703	.51316	.48166	.45235	.37594
8	.73069	.67684	.62741	.58201	.54027	.50187	.46651	.43393	.40388	.32690
9	.70259	.64461	.59190	.54393	.50025	.46043	.42410	.39092	.36061	.28426
10	.67556	.61391	.55839	.50835	.46319	.42241	.38554	.35218	.32197	.24719
11	.64958	.58468	.52679	.47509	.42888	.38753	.35049	.31728	.28748	.21494
12	.62460	.55684	.49697	.44401	.39711	.35554	.31863	.28584	.25668	.18691
13	.60057	.53032	.46884	.41496	.36770	.32618	.28966	.25751	.22917	.16253
14	.57748	.50507	.44230	.38782	.34046	.29925	.26333	.23199	.20462	.14133
15	.55526	.48102	.41727	.36245	.31524	.27454	.23939	.20900	.18270	.12289
16	.53391	.45811	.39365	.33873	.29189	.25187	.21763	.18829	.16312	.10687
17	.51337	.43630	.37136	.31657	.27027	.23107	.19785	.16963	.14564	.09293
18	.49363	.41552	.35034	.29586	.25025	.21199	.17986	.15282	.13004	.08081
19	.47464	.39573	.33051	.27615	.23171	.19449	.16351	.13768	.11611	.07027
20	.45639	.37689	.31180	.25842	.21455	.17843	.14864	.12403	.10367	.06110

TABLE 4 Present Value of an Annuity of 1

(*n*) Payments	4%	5%	6%	7%	8%	9%	10%	11%	12%	15%
1	.96154	.95238	.94340	.93458	.92593	.91743	.90909	.90090	.89286	.86957
2	1.88609	1.85941	1.83339	1.80802	1.78326	1.75911	1.73554	1.71252	1.69005	1.62571
3	2.77509	2.72325	2.67301	2.62432	2.57710	2.53130	2.48685	2.44371	2.40183	2.28323
4	3.62990	3.54595	3.46511	3.38721	3.31213	3.23972	3.16986	3.10245	3.03735	2.85498
5	4.45182	4.32948	4.21236	4.10020	3.99271	3.88965	3.79079	3.69590	3.60478	3.35216
6	5.24214	5.07569	4.91732	4.76654	4.62288	4.48592	4.35526	4.23054	4.11141	3.78448
7	6.00205	5.78637	5.58238	5.38929	5.20637	5.03295	4.86842	4.71220	4.56376	4.16042
8	6.73274	6.46321	6.20979	5.97130	5.74664	5.53482	5.33493	5.14612	4.96764	4.48732
9	7.43533	7.10782	6.80169	6.51523	6.24689	5.99525	5.75902	5.53705	5.32825	4.77158
10	8.11090	7.72173	7.36009	7.02358	6.71008	6.41766	6.14457	5.88923	5.65022	5.01877
11	8.76048	8.30641	7.88687	7.49867	7.13896	6.80519	6.49506	6.20652	5.93770	5.23371
12	9.38507	8.86325	8.38384	7.94269	7.53608	7.16073	6.81369	6.49236	6.19437	5.42062
13	9.98565	9.39357	8.85268	8.35765	7.90378	7.48690	7.10336	6.74987	6.42355	5.58315
14	10.56312	9.89864	9.29498	8.74547	8.24424	7.78615	7.36669	6.98187	6.62817	5.72448
15	11.11839	10.37966	9.71225	9.10791	8.55948	8.06069	7.60608	7.19087	6.81086	5.84737
16	11.65230	10.83777	10.10590	9.44665	8.85137	8.31256	7.82371	7.37916	6.97399	5.95424
17	12.16567	11.27407	10.47726	9.76322	9.12164	8.54363	8.02155	7.54879	7.11963	6.04716
18	12.65930	11.68959	10.82760	10.05909	9.37189	8.75563	8.20141	7.70162	7.24967	6.12797
19	13.13394	12.08532	11.15812	10.33560	9.60360	8.95012	8.36492	7.83929	7.36578	6.19823
20	13.59033	12.46221	11.46992	10.59401	9.81815	9.12855	8.51356	7.96333	7.46944	6.25933

Managerial Accounting 2
Capital Budgeting

اعداد

د. حسين كريم الشمري

E25.10 (LO 1, 2, 5) Vilas Company is considering a capital investment of $190,000 in additional productive facilities. The new machinery is expected to have a useful life of 5 years with no salvage value. Depreciation is by the straight-line method. During the life of the investment, annual net income and net annual cash flows are expected to be $12,000 and $50,000, respectively. Vilas has a 12% cost of capital rate, which is the required rate of return on the investment.

Instructions

(Round to two decimals.)

a. Compute (1) the cash payback period and (2) the annual rate of return on the proposed capital expenditure.

b. Using the discounted cash flow technique, compute the net present value.

E25.11 (LO 1, 2, 5) Drake Corporation is reviewing an investment proposal. The initial cost is $105,000. Estimates of the book value of the investment at the end of each year, the net cash flows for each year, and the net income for each year are presented in the schedule below. All cash flows are assumed to take place at the end of the year. The salvage value of the investment at the end of each year is assumed to equal its book value. There would be no salvage value at the end of the investment's life.

Investment Proposal

Year	Book Value	Annual Cash Flows	Annual Net Income
1	$70,000	$45,000	$10,000
2	42,000	40,000	12,000
3	21,000	35,000	14,000
4	7,000	30,000	16,000
5	0	25,000	18,000

Drake Corporation uses an 11% target rate of return for new investment proposals.

Instructions

a. What is the cash payback period for this proposal?

b. What is the annual rate of return for the investment?

c. What is the net present value of the investment?

EXERCISE 25-10 /A 1

BB-

Cost of Capital Investment	÷	Net Annual Cash Flow	=	Cash Payback Period

190000 / 50000 = 3.8 YEARS

EXERCISE 25-10 /A 2

Expected Annual Net Income	÷	Average Investment	=	Annual Rate of Return

A . I=(190000 + 0)/2 = 95000

A R R = 12000 / 95000 * 100%

= 12.63 %

EXERCISE 25-10 /B

B-

	Present Value 12%
Discounted factor for 5 periods	3.60478
Present value of net cash flows:	
50000*3.60478	180239
Less: Investment	190000
N p v	(9761)

EXERCISE 25-11 /A

Year	Net Annual Cash Flow	Cumulative Net Cash Flow
1	45000	45000
2	40000	85000
3	35000	120000
4	30000	150000
5	25000	175000

Cash payback period =2 + (20000 /35000)

= 2.57 years

EXERCISE 25-11 /b

Expected Annual Net Income	÷	Average Investment	=	Annual Rate of Return

اذا كان معدل العائد السنوي (**ARR**) غير منتظم

اولا : صافي الدخل (**net income**) نقوم بجمع صافي الدخل السنوي للسنوات ويتم تقسيمة على عدد السنوات (10000 + 12000+ 14000 + 16000 + 18000) / 5 = 14000

ثانيا : متوسط كلفة الاستثمار (**Average investment**) = (105000 + 0) / 2 = 52500

A R R = 14000 / 52500 * %100

= 26.67%

EXERCISE 25-11 /c

c

Year	Cash Flow	Discount Factor	Present Value
1	45000	.90090	40541
2	40000	.81162	32465
3	35000	.73119	25592
4	30000	.65873	19762
5	25000	.59395	14836
Total present value			133196
Less: Investment			105000
Net present value			28196

P25.1A (LO 1, 2, 5) U3 Company is considering three long-term capital investment proposals. Each investment has a useful life of 5 years. Relevant data on each project are as follows.

	Project Bono	Project Edge	Project Clayton
Capital investment	$160,000	$175,000	$200,000
Annual net income:			
Year 1	14,000	18,000	27,000
2	14,000	17,000	23,000
3	14,000	16,000	21,000
4	14,000	12,000	13,000
5	14,000	9,000	12,000
Total	$ 70,000	$ 72,000	$ 96,000

Depreciation is computed by the straight-line method with no salvage value. The company's cost of capital is 15%. (Assume that cash flows occur evenly throughout the year.)

Instructions

a. Compute the cash payback period for each project. (Round to two decimals.)

b. Compute the net present value for each project. (Round to nearest dollar.)

c. Compute the annual rate of return for each project. (Round to two decimals.) (*Hint:* Use average annual net income in your computation.)

d. Rank the projects on each of the foregoing bases. Which project do you recommend?

Project Bono

BB-

Cost of Capital Investment	÷	Net Annual Cash Flow	=	Cash Payback Period

Depreciation(الاندثار) = 160000 / 5 = 32000

التدفق النقدي = صافي الدخل + الاندثار

160000 / (14000 + 32000) = 3.48 years

Project Edge

Depreciation(الاندثار) = 175000 / 5 = 35000

Year	Net Annual Cash Flow	Cumulative Net Cash Flow
1	(18000 + 35000)= 53000	53000
2	(17000 + 35000)= 52000	105000
3	(16000 + 35000) = 51000	156000
4	(12000 + 35000) = 47000	203000
5	(9000 + 35000) = 44000	247000

Cash payback period = 3 + (19000 / 47000) = 3.40

Project Clayton

Depreciation(الاندثار) = 200000 / 5 = 40000

Year	Net Annual Cash Flow	Cumulative Net Cash Flow
1	(27000 + 40000)=67000	67000
2	(23000 + 40000)= 63000	130000
3	(21000 + 40000)= 61000	191000
4	(13000 + 40000)= 53000	244000
5	(12000 + 40000)= 52000	296000

Cash payback period = 3 + (9000/ 53000) =3.17

/B

B-

	Present Value 15%
Discounted factor for 5 periods	3.35216
Present value of net cash flows:	
46000 *3.35216	154199
Less: Investment	160000
N p v	(5801)

b

c

Year	Cash Flow	Discount Factor	Present Value
1	53000	0.86957	46087
2	52000	0.75614	39319
3	51000	0.65752	33534
4	47000	0.57175	26872
5	44000	0.49718	21876
Total present value			167688
Less: Investment			175000
Net present value			(7312)

b

c

Year	Cash Flow	Discount Factor	Present Value
1	67000	0.86957	58261
2	63000	0.75614	47637
3	61000	0.65752	40109
4	53000	0.57175	30303
5	52000	0.49718	25853
Total present value			202163
Less: Investment			200000
Net present value			2163

C

Expected Annual Net Income ÷ **Average Investment** = **Annual Rate of Return**

المشروع الاول =

14000/((160000+ 0)/ 2)* 100% = 17.5

المشروع الثاني =

(72000/ 5) = 14400

14400 / ((175000 + 0) / 2) * 100% = 16.5

المشروع الثالث =

(96000 / 5) = 19200

19200 / ((200000 + 0) / 2) *100% = 19.2

TABLE 3 Present Value of 1

(*n*) Periods	4%	5%	6%	7%	8%	9%	10%	11%	12%	15%
1	.96154	.95238	.94340	.93458	.92593	.91743	.90909	.90090	.89286	.86957
2	.92456	.90703	.89000	.87344	.85734	.84168	.82645	.81162	.79719	.75614
3	.88900	.86384	.83962	.81630	.79383	.77218	.75132	.73119	.71178	.65752
4	.85480	.82270	.79209	.76290	.73503	.70843	.68301	.65873	.63552	.57175
5	.82193	.78353	.74726	.71299	.68058	.64993	.62092	.59345	.56743	.49718
6	.79031	.74622	.70496	.66634	.63017	.59627	.56447	.53464	.50663	.43233
7	.75992	.71068	.66506	.62275	.58349	.54703	.51316	.48166	.45235	.37594
8	.73069	.67684	.62741	.58201	.54027	.50187	.46651	.43393	.40388	.32690
9	.70259	.64461	.59190	.54393	.50025	.46043	.42410	.39092	.36061	.28426
10	.67556	.61391	.55839	.50835	.46319	.42241	.38554	.35218	.32197	.24719
11	.64958	.58468	.52679	.47509	.42888	.38753	.35049	.31728	.28748	.21494
12	.62460	.55684	.49697	.44401	.39711	.35554	.31863	.28584	.25668	.18691
13	.60057	.53032	.46884	.41496	.36770	.32618	.28966	.25751	.22917	.16253
14	.57748	.50507	.44230	.38782	.34046	.29925	.26333	.23199	.20462	.14133
15	.55526	.48102	.41727	.36245	.31524	.27454	.23939	.20900	.18270	.12289
16	.53391	.45811	.39365	.33873	.29189	.25187	.21763	.18829	.16312	.10687
17	.51337	.43630	.37136	.31657	.27027	.23107	.19785	.16963	.14564	.09293
18	.49363	.41552	.35034	.29586	.25025	.21199	.17986	.15282	.13004	.08081
19	.47464	.39573	.33051	.27615	.23171	.19449	.16351	.13768	.11611	.07027
20	.45639	.37689	.31180	.25842	.21455	.17843	.14864	.12403	.10367	.06110

TABLE 4 Present Value of an Annuity of 1

(*n*) Payments	4%	5%	6%	7%	8%	9%	10%	11%	12%	15%
1	.96154	.95238	.94340	.93458	.92593	.91743	.90909	.90090	.89286	.86957
2	1.88609	1.85941	1.83339	1.80802	1.78326	1.75911	1.73554	1.71252	1.69005	1.62571
3	2.77509	2.72325	2.67301	2.62432	2.57710	2.53130	2.48685	2.44371	2.40183	2.28323
4	3.62990	3.54595	3.46511	3.38721	3.31213	3.23972	3.16986	3.10245	3.03735	2.85498
5	4.45182	4.32948	4.21236	4.10020	3.99271	3.88965	3.79079	3.69590	3.60478	3.35216
6	5.24214	5.07569	4.91732	4.76654	4.62288	4.48592	4.35526	4.23054	4.11141	3.78448
7	6.00205	5.78637	5.58238	5.38929	5.20637	5.03295	4.86842	4.71220	4.56376	4.16042
8	6.73274	6.46321	6.20979	5.97130	5.74664	5.53482	5.33493	5.14612	4.96764	4.48732
9	7.43533	7.10782	6.80169	6.51523	6.24689	5.99525	5.75902	5.53705	5.32825	4.77158
10	8.11090	7.72173	7.36009	7.02358	6.71008	6.41766	6.14457	5.88923	5.65022	5.01877
11	8.76048	8.30641	7.88687	7.49867	7.13896	6.80519	6.49506	6.20652	5.93770	5.23371
12	9.38507	8.86325	8.38384	7.94269	7.53608	7.16073	6.81369	6.49236	6.19437	5.42062
13	9.98565	9.39357	8.85268	8.35765	7.90378	7.48690	7.10336	6.74987	6.42355	5.58315
14	10.56312	9.89864	9.29498	8.74547	8.24424	7.78615	7.36669	6.98187	6.62817	5.72448
15	11.11839	10.37966	9.71225	9.10791	8.55948	8.06069	7.60608	7.19087	6.81086	5.84737
16	11.65230	10.83777	10.10590	9.44665	8.85137	8.31256	7.82371	7.37916	6.97399	5.95424
17	12.16567	11.27407	10.47726	9.76322	9.12164	8.54363	8.02155	7.54879	7.11963	6.04716
18	12.65930	11.68959	10.82760	10.05909	9.37189	8.75563	8.20141	7.70162	7.24967	6.12797
19	13.13394	12.08532	11.15812	10.33560	9.60360	8.95012	8.36492	7.83929	7.36578	6.19823
20	13.59033	12.46221	11.46992	10.59401	9.81815	9.12855	8.51356	7.96333	7.46944	6.25933