

■ Solutions to Problems

Note: The MACRS depreciation percentages used in the following problems appear in Chapter 3, Table 3.2. The percentages are rounded to the nearest integer for ease in calculation.

For simplification, five-year-lived projects with 5 years of cash inflows are typically used throughout this chapter. Projects with usable lives equal to the number of years of cash inflows are also included in the end-of-chapter problems. It is important to recall from Chapter 3 that, under the Tax Reform Act of 1986, MACRS depreciation results in $n + 1$ years of depreciation for an n -year class asset. This means that in actual practice projects will typically have at least one year of cash flow beyond their recovery period.

P8-1. LG 1: Classification of expenditures

Basic

- Operating expenditure—lease expires within one year
- Capital expenditure—patent rights exist for many years
- Capital expenditure—research and development benefits last many years
- Operating expenditure—marketable securities mature in under one year
- Capital expenditure—machine will last over one year
- Capital expenditure—building tool will last over one year
- Capital expenditure—building will last for more than one year
- Operating expenditure—market changes require obtaining another report within a year

P8-2. LG 2: Basic terminology

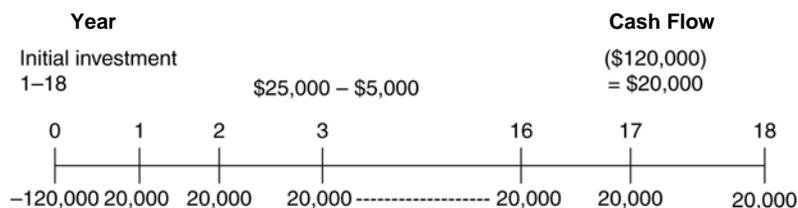
Basic

	Situation A	Situation B	Situation C
a.	mutually exclusive	mutually exclusive	independent
b.	unlimited	unlimited	capital rationing
c.	ranking	accept-reject	ranking
d.	conventional	nonconventional	conventional (2&4) nonconventional (1&3)

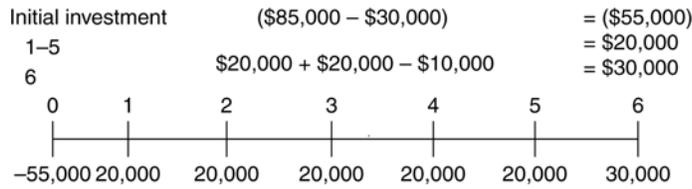
P8-3. LG 3: Relevant cash flow pattern fundamentals

Intermediate

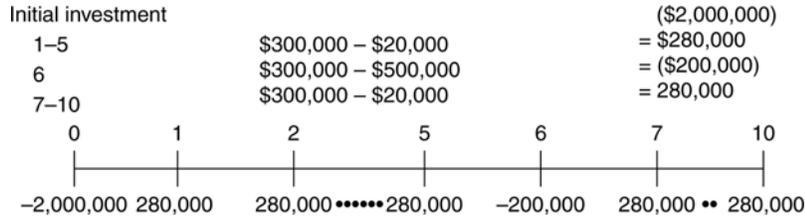
a.



b.



c.



P8-4. LG 3: Expansion versus replacement cash flows

Intermediate

a.

Year	Relevant Cash Flows
Initial investment	(\$28,000)
1	4,000
2	6,000
3	8,000
4	10,000
5	4,000

b. An expansion project is simply a replacement decision in which all cash flows from the old asset are zero.

P8-5. LG 3: Sunk costs and opportunity costs

Basic

- a. The \$1,000,000 development costs should not be considered part of the decision to go ahead with the new production. This money has already been spent and cannot be retrieved so it is a sunk cost.
- b. The \$250,000 sale price of the existing line is an opportunity cost. If Masters Golf Products does not proceed with the new line of clubs they will not receive the \$250,000.

Intermediate

- a. Sunk cost—The funds for the tooling had already been expended and would not change, no matter whether the new technology would be acquired or not.
- b. Opportunity cost—The development of the computer programs can be done without additional expenditures on the computers; however, the loss of the cash inflow from the leasing arrangement would be a lost opportunity to the firm.
- c. Opportunity cost—Covol will not have to spend any funds for floor space but the lost cash inflow from the rent would be a cost to the firm.

- d. Sunk cost—The money for the storage facility has already been spent, and no matter what decision the company makes there is no incremental cash flow generated or lost from the storage building.
- e. Opportunity cost—Foregoing the sale of the crane costs the firm \$180,000 of potential cash inflows.

P8-6. LG 3: Personal finance: Sunk and opportunity cash flows

- a. The sunk costs or cash outlays are expenditures that have been made in the past and have no effect on the cash flows relevant to a current situation. The cash outlays done before David and Ann decided to rent out their home would be classified as sunk costs. An opportunity cost or cash flow is one that can be realized from an alternative use of an existing asset. Here, David and Ann have decided to rent out their home, and all the costs associated with getting the home in “rentable” condition would be relevant.
- b. Sunk costs (cash flows):
 - Replace water heater
 - Replace dish washer
 - Miscellaneous repairs and maintenance
 Opportunity costs cash flows:
 - Rental income
 - Advertising
 - House paint and power wash

P8-7. LG 4: Book value

Basic

Asset	Installed Cost	Accumulated Depreciation	Book Value
A	\$ 950,000	\$ 674,500	\$275,500
B	40,000	13,200	26,800
C	96,000	79,680	16,320
D	350,000	70,000	280,000
E	1,500,000	1,170,000	330,000

P8-8. LG 4: Book value and taxes on sale of assets

Intermediate

a. $\text{Book value} = \$80,000 - (0.71 \times \$80,000)$
 $= \$23,200$

b.

Sale Price	Capital Gain	Tax on Capital Gain	Depreciation Recovery	Tax on Recovery	Total Tax
\$100,000	\$20,000	\$8,000	\$56,800	\$22,720	\$30,720
56,000	0	0	32,800	13,120	13,120
23,200	0	0	0	0	0
15,000	0	0	(8,200)	(3,280)	(3,280)

P8-9. LG 4: Tax calculations

Intermediate

$$\text{Current book value} = \$200,000 - [(0.52 \times (\$200,000))] = \$96,000$$

	(a)	(b)	(c)	(d)
Capital gain	\$ 20,000	\$ 0	\$0	\$ 0
Recaptured depreciation	104,000	54,000	0	(16,000)
Tax on capital gain	8,000	0	0	0
Tax on depreciation				
Recovery	<u>41,600</u>	<u>21,600</u>	<u>0</u>	<u>(6,400)</u>
Total tax	\$ 49,600	\$21,600	\$0	(\$6,400)

P8-10. LG 4: Change in net working capital calculation

Basic

a.

Current Assets		Current Liabilities	
Cash	+\$15,000	Accounts payable	+\$90,000
Accounts receivable	+150,000	Accruals	+ 40,000
Inventory	<u>- 10,000</u>		<u> </u>
Net change	\$155,000		\$130,000

$$\text{Net working capital} = \text{current assets} - \text{current liabilities}$$

$$\Delta\text{NWC} = \$155,000 - \$130,000$$

$$\Delta\text{NWC} = \$25,000$$

- b. Analysis of the purchase of a new machine reveals an increase in net working capital. This increase should be treated as an initial outlay and is a cost of acquiring the new machine.
- c. Yes, in computing the terminal cash flow, the net working capital increase should be reversed.

P8-11. LG 4: Calculating initial investment

Intermediate

a. $\text{Book value} = \$325,000 \times (1 - 0.20 - 0.32) = \$325,000 \times 0.48 = \$156,000$

b. $\text{Sales price of old equipment} = \$200,000$

$\text{Book value of old equipment} = \underline{156,000}$

$\text{Recapture of depreciation} = \$44,000$

$\text{Taxes on recapture of depreciation} = \$44,000 \times 0.40 = \$17,600$

$\text{After-tax proceeds} = \$200,000 - \$17,600 = \$182,400$

c. $\text{Cost of new machine} = \$500,000$

$\text{Less sales price of old machine} = (200,000)$

$\text{Plus tax on recapture of depreciation} = \underline{17,600}$

$\text{Initial investment} = \$317,600$

P8-12. LG 4: Initial investment–basic calculation

Intermediate

Installed cost of new asset =

Cost of new asset	\$ 35,000	
+ Installation costs	<u>5,000</u>	
Total installed cost (depreciable value)		\$40,000

After-tax proceeds from sale of old asset =

Proceeds from sale of old asset	(\$25,000)	
+ Tax on sale of old asset	<u>7,680</u>	
Total after-tax proceeds-old asset		<u>(\$17,320)</u>

Initial investment \$22,680

Book value of existing machine = $\$20,000 \times (1 - (0.20 + 0.32 + 0.19)) = \$5,800$

Recaptured depreciation = $\$20,000 - \$5,800 = \$14,200$

Capital gain = $\$25,000 - \$20,000 = \$5,000$

Tax on recaptured depreciation = $\$14,200 \times (0.40) = \$5,680$

Tax on capital gain = $\$5,000 \times (0.40) = \underline{2,000}$

Total tax = \$7,680

P8-13. LG 4: Initial investment at various sale prices

Intermediate

	(a)	(b)	(c)	(d)
Installed cost of new asset:				
Cost of new asset	\$24,000	\$24,000	\$24,000	\$24,000
+ Installation cost	<u>2,000</u>	<u>2,000</u>	<u>2,000</u>	<u>2,000</u>
Total installed-cost	26,000	26,000	26,000	26,000
After-tax proceeds from sale of old asset				
Proceeds from sale of old asset	(11,000)	(7,000)	(2,900)	(1,500)
+ Tax on sale of old asset*	<u>3,240</u>	<u>1,640</u>	<u>0</u>	<u>(560)</u>
Total after-tax proceeds	<u>(7,760)</u>	<u>(5,360)</u>	<u>(2,900)</u>	<u>(2,060)</u>
Initial investment	\$18,240	\$20,640	\$23,100	\$23,940

Book value of existing machine = $\$10,000 \times [1 - (0.20 - 0.32 - 0.19)] = \$2,900$

*Tax Calculations:

a. Recaptured depreciation	=	$\$10,000 - \$2,900$	=	\$7,100
Capital gain	=	$\$11,000 - \$10,000$	=	\$1,000
Tax on ordinary gain	=	$\$7,100 \times (0.40)$	=	\$2,840
Tax on capital gain	=	$\$1,000 \times (0.40)$	=	<u>400</u>
Total tax	=		=	\$3,240

- b. Recaptured depreciation = $\$7,000 - \$2,900 = \$4,100$
 Tax on ordinary gain = $\$4,100 \times (0.40) = \$1,640$
- c. 0 tax liability
- d. Loss on sale of existing asset = $\$1,500 - \$2,900 = (\$1,400)$
 Tax benefit = $-\$1,400 \times (0.40) = \$ 560$

P8-14. LG 4: Depreciation

Basic

Depreciation Schedule	
Year	Depreciation Expense
1	$\$68,000 \times 0.20 = \$13,600$
2	$68,000 \times 0.32 = 21,760$
3	$68,000 \times 0.19 = 12,920$
4	$68,000 \times 0.12 = 8,160$
5	$68,000 \times 0.12 = 8,160$
6	$68,000 \times 0.05 = 3,400$

P8-15. LG 5: Incremental operating cash inflows

Intermediate

- a. Incremental profits before depreciation and tax = $\$1,200,000 - \$480,000$
 = $\$720,000$ each year
- b.

Year	(1)	(2)	(3)	(4)	(5)	(6)
PBDT	\$720,000	\$720,000	\$720,000	\$720,000	\$720,000	\$720,000
Depr.	<u>400,000</u>	<u>640,000</u>	<u>80,000</u>	<u>240,000</u>	<u>240,000</u>	<u>100,000</u>
NPBT	320,000	80,000	340,000	480,000	480,000	620,000
Tax	128,000	32,000	136,000	192,000	192,000	248,000
NPAT	192,000	48,000	204,000	288,000	288,000	372,000

- c.

Cash flow	(1)	(2)	(3)	(4)	(5)	(6)
	\$592,000	\$688,000	\$584,000	\$528,000	\$528,000	\$472,000

(NPAT + depreciation)

PBDT = Profits before depreciation and taxes

NPBT = Net profits before taxes

NPAT = Net profits after taxes

P8-16. LG5: Personal finance: Incremental operating cash inflows

Richard and Linda Thomson Incremental Operating Cash Flows Replacement of John Deere Riding Mower						
	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
Savings from new and improved mower	\$500	\$ 500	\$500	\$500	\$500	—
Annual maintenance cost	120	120	120	120	120	0
Depreciation*	<u>360</u>	<u>576</u>	<u>342</u>	<u>216</u>	<u>216</u>	<u>90</u>
Savings (loss) before taxes	20	(196)	38	164	164	(90)
Taxes (40%)	<u>8</u>	<u>(78)</u>	<u>15</u>	<u>66</u>	<u>66</u>	<u>(36)</u>
Savings (loss) after taxes	12	(118)	23	98	98	(54)
Depreciation	<u>360</u>	<u>576</u>	<u>342</u>	<u>216</u>	<u>216</u>	<u>90</u>
Incremental operating cash flow	<u>\$372</u>	<u>\$ 458</u>	<u>\$365</u>	<u>\$314</u>	<u>\$314</u>	<u>\$ 36</u>

*MACRS Depreciation Schedule

<u>Year</u>	<u>Base</u>	<u>MACRS</u>	<u>Depreciation</u>
Year 1	\$1,800	20.0%	\$360
Year 2	1,800	32.0%	576
Year 3	1,800	19.0%	342
Year 4	1,800	12.0%	216
Year 5	1,800	12.0%	216
Year 6	1,800	5.0%	90

P8-17. LG 5: Incremental operating cash inflows—expense reduction

Intermediate

<u>Year</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>
Incremental expense savings	\$16,000	\$16,000	\$16,000	\$16,000	\$16,000	\$ 0
Incremental profits before dep. and taxes*	16,000	16,000	16,000	16,000	16,000	0
Depreciation	<u>9,600</u>	<u>15,360</u>	<u>9,120</u>	<u>5,760</u>	<u>5,760</u>	<u>2,400</u>
Net profits before taxes	6,400	640	6,880	10,240	10,240	-2,400
Taxes	2,560	256	2,752	4,096	4,096	-960
Net profits after taxes	3,840	384	4,128	6,144	6,144	-1,440
Operating cash inflows**	13,440	15,744	13,248	11,904	11,904	960

*Incremental profits before depreciation and taxes will increase the same amount as the decrease in expenses.

**Net profits after taxes plus depreciation expense.

P8-18. LG 5: Incremental operating cash inflows

Intermediate

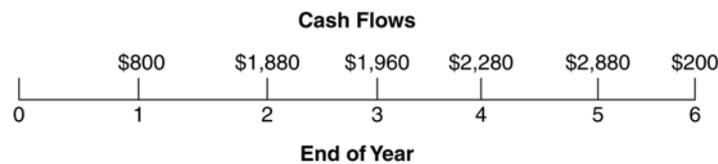
a.

Year	Revenue	Expenses (excluding depreciation and interest)	Profits before Depreciation and Taxes	Depre- ciation	Net Profits before Taxes	Taxes	Net Profits after Tax	Operating Cash Inflows
New Lathe								
1	\$40,000	\$30,000	\$10,000	\$2,000	\$8,000	\$3,200	\$4,800	\$6,800
2	41,000	30,000	11,000	3,200	7,800	3,120	4,680	7,880
3	42,000	30,000	12,000	1,900	10,100	4,040	6,060	7,960
4	43,000	30,000	13,000	1,200	11,800	4,720	7,080	8,280
5	44,000	30,000	14,000	1,200	12,800	5,120	7,680	8,880
6	0	0	0	500	(500)	(200)	(300)	200
Old Lathe								
1-5	\$35,000	\$25,000	\$10,000	0	\$10,000	\$4,000	\$6,000	\$6,000

b. Calculation of incremental cash inflows

Year	New Lathe	Old Lathe	Incremental Cash Flows
1	\$6,800	\$6,000	\$800
2	7,880	6,000	1,880
3	7,960	6,000	1,960
4	8,280	6,000	2,280
5	8,880	6,000	2,880
6	200	0	200

c.



P8-19. LG 6: Terminal cash flows—various lives and sale prices

Challenge

a.

After-tax proceeds from sale of new asset =	3-year*	5-year*	7-year*
Proceeds from sale of proposed asset	\$10,000	\$10,000	\$10,000
± Tax on sale of proposed asset*	<u>+16,880</u>	<u>-400</u>	<u>-4,000</u>
Total after-tax proceeds-new	\$26,880	\$9,600	\$6,000
+ Change in net working capital	<u>+30,000</u>	<u>+30,000</u>	<u>+30,000</u>
Terminal cash flow	\$56,880	\$39,600	\$36,000

*1. Book value of asset = $[1 - (0.20 + 0.32 + 0.19)] \times \$180,000 = \$52,200$

Proceeds from sale = \$10,000

\$10,000 - \$52,200 = (\$42,200) loss

\$42,200 × (0.40) = \$16,880 tax benefit

2. Book value of asset = $[1 - (0.20 + 0.32 + 0.19 + 0.12 + 0.12)] \times \$180,000 = \$9,000$
 $\$10,000 - \$9,000 = \$1,000$ recaptured depreciation
 $\$1,000 \times (0.40) = \400 tax liability
3. Book value of asset = \$0
 $\$10,000 - \$0 = \$10,000$ recaptured depreciation
 $\$10,000 \times (0.40) = \$4,000$ tax liability
- b. If the usable life is less than the normal recovery period, the asset has not been depreciated fully and a tax benefit may be taken on the loss; therefore, the terminal cash flow is higher.
- c.

	(1)	(2)
After-tax proceeds from sale of new asset =		
Proceeds from sale of new asset	\$ 9,000	\$170,000
+ Tax on sale of proposed asset*	0	(64,400)
+ Change in net working capital	<u>+30,000</u>	<u>+30,000</u>
Terminal cash flow	\$39,000	\$135,600

- *1. Book value of the asset = $\$180,000 \times 0.05 = \$9,000$; no taxes are due
2. Tax = $(\$170,000 - \$9,000) \times 0.4 = \$64,400$.

- d. The higher the sale price, the higher the terminal cash flow.

P8-20. LG 6: Terminal cash flow–replacement decision

Challenge

After-tax proceeds from sale of new asset =	
Proceeds from sale of new machine	\$75,000
– Tax on sale of new machine ¹	<u>(14,360)</u>
Total after-tax proceeds–new asset	\$60,640
– After-tax proceeds from sale of old asset	
Proceeds from sale of old machine	(15,000)
+ Tax on sale of old machine ²	<u>6,000</u>
Total after-tax proceeds–old asset	(9,000)
+ Change in net working capital	<u>25,000</u>
Terminal cash flow	<u>\$76,640</u>

¹Book value of new machine at end of year 4:

$$[1 - (0.20 + 0.32 + 0.19 + 0.12) \times (\$230,000)] = \$39,100$$

$$\$75,000 - \$39,100 = \$35,900 \text{ recaptured depreciation}$$

$$\$35,900 \times (0.40) = \$14,360 \text{ tax liability}$$

²Book value of old machine at end of year 4:

$$\$0$$

$$\$15,000 - \$0 = \$15,000 \text{ recaptured depreciation}$$

$$\$15,000 \times (0.40) = \$6,000 \text{ tax benefit}$$

P8-21. LG 4, 5, 6: Relevant cash flows for a marketing campaign

Challenge

Marcus Tube
Calculation of Relevant Cash Flow (\$000)

**Calculation of Net Profits after Taxes and Operating Cash Flow:
with Marketing Campaign**

	2010	2011	2012	2013	2014
Sales	\$20,500	\$21,000	\$21,500	\$22,500	\$23,500
CGS (@ 80%)	<u>16,400</u>	<u>16,800</u>	<u>17,200</u>	<u>18,000</u>	<u>18,800</u>
Gross profit	\$ 4,100	\$ 4,200	\$ 4,300	\$ 4,500	\$ 4,700
Less: Operating expenses					
General and administrative (10% of sales)	\$ 2,050	\$ 2,100	\$ 2,150	\$ 2,250	\$ 2,350
Marketing campaign	150	150	150	150	150
Depreciation	<u>500</u>	<u>500</u>	<u>500</u>	<u>500</u>	<u>500</u>
Total operating expenses	2,700	2,750	2,800	2,900	3,000
Net profit before taxes	\$ 1,400	\$ 1,450	\$ 1,500	\$ 1,600	\$ 1,700
Less: Taxes 40%	<u>560</u>	<u>580</u>	<u>600</u>	<u>640</u>	<u>680</u>
Net profit after taxes	\$ 840	\$ 870	\$ 900	\$ 960	\$ 1,020
+Depreciation	<u>500</u>	<u>500</u>	<u>500</u>	<u>500</u>	<u>500</u>
Operating CF	\$ 1,340	\$ 1,370	\$ 1,400	\$ 1,460	\$ 1,520

Without Marketing Campaign
Years 2007–2011

Net profit after taxes	\$ 900
+ Depreciation	<u>500</u>
Operating cash flow	\$1,400

Relevant Cash Flow (\$000)

Year	With Marketing Campaign	Without Marketing Campaign	Incremental Cash Flow
2010	\$1,340	\$1,400	\$(60)
2011	1,370	1,400	(30)
2012	1,400	1,400	0
2013	1,460	1,400	60
2014	1,520	1,400	120

P8-22. LG 4, 5: Relevant cash flows—no terminal value

Challenge

a. Installed cost of new asset		
Cost of new asset	\$76,000	
+ Installation costs	<u>4,000</u>	
Total cost of new asset		\$80,000
– After-tax proceeds from sale of old asset		
Proceeds from sale of old asset	(55,000)	
+ Tax on sale of old asset*	<u>16,200</u>	
Total proceeds, sale of old asset		<u>(38,800)</u>
Initial investment		<u>\$41,200</u>

*Book value of old machine:

$[1 - (0.20 + 0.32 + 0.19)] \times \$50,000$	= \$14,500
$\$55,000 - \$14,500$	= \$40,500 gain on asset
$\$35,500 \text{ recaptured depreciation} \times 0.40$	= \$14,200
$\$5,000 \text{ capital gain} \times 0.40$	= <u>2,000</u>
Total tax on sale of asset	= <u>\$16,200</u>

b.

Calculation of Operating Cash Flow						
Year	(1)	(2)	(3)	(4)	(5)	(6)
Old Machine						
PBDT	\$14,000	\$16,000	\$20,000	\$18,000	\$14,000	\$ 0
Depreciation	<u>6,000</u>	<u>6,000</u>	<u>2,500</u>	<u>0</u>	<u>0</u>	<u>0</u>
NPBT	\$ 8,000	\$10,000	\$17,500	\$18,000	\$14,000	<u>0</u>
Taxes	<u>3,200</u>	<u>4,000</u>	<u>7,000</u>	<u>7,200</u>	<u>5,600</u>	0
NPAT	\$ 4,800	\$ 6,000	\$10,500	\$10,800	\$ 8,400	\$ 0
Depreciation	6,000	6,000	2,500	0	0	0
Cash flow	<u>\$10,800</u>	<u>\$12,000</u>	<u>\$13,000</u>	<u>\$10,800</u>	<u>\$ 8,400</u>	<u>\$ 0</u>
New Machine						
PBDT	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$ 0
Depreciation	<u>16,000</u>	<u>25,600</u>	<u>15,200</u>	<u>9,600</u>	<u>9,600</u>	<u>4,000</u>
NPBT	\$14,000	\$ 4,400	\$14,800	\$20,400	\$20,400	–\$4,000
Taxes	<u>5,600</u>	<u>1,760</u>	<u>5,920</u>	<u>8,160</u>	<u>8,160</u>	<u>–1,600</u>
NPAT	\$ 8,400	\$ 2,640	\$ 8,880	\$12,240	\$12,240	–\$2,400
Depreciation	<u>16,000</u>	<u>25,600</u>	<u>15,200</u>	<u>9,600</u>	<u>9,600</u>	<u>4,000</u>
Cash flow	<u>\$24,400</u>	<u>\$28,240</u>	<u>\$24,080</u>	<u>\$21,840</u>	<u>\$21,840</u>	<u>\$1,600</u>
Incremental						
After-tax						
Cash flows	\$13,600	\$16,240	\$11,080	\$11,040	\$13,440	\$1,600

Calculation of Incremental Cash Inflows			
Year	New Grinder	Existing Grinder	Incremental Operating Cash Flow
1	\$34,600	\$20,160	\$14,440
2	39,880	17,280	22,600
3	34,160	16,080	18,080
4	31,080	13,200	17,880
5	31,080	10,800	20,280
6	2,200	0	2,200

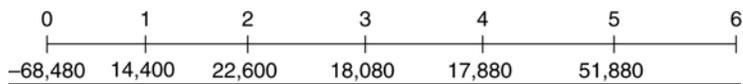
c. Terminal cash flow:

After-tax proceeds from sale of new asset =		
Proceeds from sale of new asset	\$29,000	
– Tax on sale of new asset*	<u>(9,400)</u>	
Total proceeds from sale of new asset		<u>19,600</u>
– After-tax proceeds from sale of old asset =		
Proceeds from sale of old asset	0	
+ Tax on sale of old asset	<u>0</u>	
Total proceeds from sale of old asset		0
+ Change in net working capital		<u>12,000</u>
Terminal cash flow		<u><u>\$31,600</u></u>

*Book value of asset at end of year 5 = \$5,500
 \$29,000 – \$5,500 = \$23,500 recaptured depreciation
 \$23,500 × 0.40 = \$9,400

d. Year 5 relevant cash flow:

Operating cash flow	\$20,280
Terminal cash flow	<u>31,600</u>
Total inflow	<u><u>\$51,880</u></u>



P8-24. LG 4, 5,6: Personal finance: Determining relevant cash flows for a cash budget

Jan and Deana Cash Flow Budget Purchase of Boat				
a. Initial investment				
Total cost of new boat	\$ (70,000)			
Add: Taxes (6.5%)	<u>(4,550)</u>			
Initial investment	\$ (74,550)			
b. Operating cash flows				
	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
Maint. & repair 12 months at \$800	\$ (9,600)	\$ (9,600)	\$ (9,600)	\$ (9,600)
Docking fees 12 months at \$500	<u>\$ (6,000)</u>	<u>\$ (6,000)</u>	<u>\$ (6,000)</u>	<u>\$ (6,000)</u>
Operating cash flows	\$ (15,600)	\$ (15,600)	\$ (15,600)	\$ (15,600)
c. Terminal cash flow—end of Year 4				
Proceeds from the sale of boat				\$ 40,000
d. Summary of cash flows				
	<u>Cash Flow</u>			
Year zero	\$(74,550)			
End of Year 1	\$(15,600)			
End of Year 2	\$(15,600)			
End of Year 3	\$(15,600)			
End of Year 4	\$ 24,400			
e. The ownership of the boat is virtually just an annual outflow of money. Across the four years, \$96,950 will be spent in excess of the anticipated sales price in Year 4. Over the same time period, the disposable income is only \$96,000. Consequently, if the costs exceed the expected disposable income. If cash flows were adjusted for their timing, and noting that the proceeds from the sale of the new boat comes in first at the end of Year 4, Jan and Deana are in a position where they will have to increase their disposable income in order to accommodate boat ownership. If a loan is needed, the monthly interest payment would be another burden. However, there is no attempt here to measure satisfaction of ownership.				

P8-25. Ethics problem

Intermediate

The likely explanation is that loan officers and bank credit analysts are often more preoccupied with a firm's ability to repay the loan and how soon rather than internal rate of return of the project or its discounted cash flow. Another reason is maybe that owners or managers of small businesses may not have sufficient skills to conduct the more tedious financial analysis.

■ Case

Developing Relevant Cash Flows for Clark Upholstery Company's Machine Renewal or Replacement Decision

Clark Upholstery is faced with a decision to either renew its major piece of machinery or to replace the machine. The case tests the students' understanding of the concepts of initial investment and relevant cash flows.

1. Initial Investment:

	<u>Alternative 1</u>	<u>Alternative 2</u>	
Installed cost of new asset			
Cost of asset	\$90,000	\$100,000	
+ Installation costs	<u>0</u>	<u>10,000</u>	
Total proceeds, sale of new asset	90,000		110,000
– After-tax proceeds from sale of old asset			
Proceeds from sale of old asset	0	(20,000)	
+ Tax on sale of old asset*	<u>0</u>	<u>8,000</u>	
Total proceeds, sale of old asset	0		(12,000)
+ Change in working capital	<u>15,000</u>		<u>22,000</u>
Initial investment	<u>\$105,000</u>		<u>\$120,000</u>

*Book value of old asset = 0

\$20,000 – \$0 = \$20,000 recaptured depreciation

\$20,000 × (0.40) = \$8,000 tax

2.

Calculation of Operating Cash Inflows

Year	Profits before Depreciation and Taxes	Depre- ciation	Net Profits before Taxes	Taxes	Net Profits after Taxes	Operating Cash Inflows
Alternative 1						
1	\$198,500	\$18,000	\$180,500	\$72,200	\$108,300	\$126,300
2	290,800	28,800	262,000	104,800	157,200	186,000
3	381,900	17,100	364,800	145,920	218,880	235,980
4	481,900	10,800	471,100	188,440	282,660	293,460
5	581,900	10,800	571,100	228,440	342,660	353,460
6	0	4,500	–4,500	–1,800	–2,700	1,800
Alternative 2						
1	\$235,500	\$22,000	\$213,500	\$85,400	\$128,100	\$150,100
2	335,200	35,200	300,000	120,000	180,000	215,200
3	385,100	20,900	364,200	145,680	218,520	239,420
4	435,100	13,200	421,900	168,760	253,140	266,340
5	551,100	13,200	537,900	215,160	322,740	335,940
6	0	5,500	–5,500	–2,200	–3,300	2,200

Calculation of Incremental Cash Inflows					
Year	Alternative 1	Alternative 2	Existing	Incremental Cash Flow	
				Alt. 1	Alt. 2
1	\$126,300	\$150,100	\$100,000	\$26,300	\$50,100
2	186,000	215,200	150,000	36,000	65,200
3	235,980	239,420	200,000	35,980	39,420
4	293,460	266,340	250,000	43,460	16,340
5	353,460	335,940	320,000	33,460	15,940
6	1,800	2,200	0	1,800	2,200

3. Terminal Cash Flow:

	<u>Alternative 1</u>	<u>Alternative 2</u>
After-tax proceeds from		
sale of new asset =		
Proceeds from sale of new asset	\$8,000	\$25,000
– Tax on sale of new asset ¹	<u>(1,400)</u>	<u>(7,800)</u>
Total proceeds, sale of new asset	6,600	17,200
– After-tax proceeds from sale of old asset =		
Proceeds from sale of old asset	(2,000)	(2,000)
+ Tax on sale of old asset ²	<u>800</u>	<u>800</u>
Total proceeds, sale of old asset	(1,200)	(1,200)
+ Change in working capital	<u>15,000</u>	<u>22,000</u>
Terminal cash flow	<u>\$20,400</u>	<u>\$38,000</u>

¹Book value of Alternative 1 at end of Year 5: = \$4,500
 $\$8,000 - \$4,500 = \$3,500$ recaptured depreciation
 $\$3,500 \times (0.40) = \$1,400$ tax

Book value of Alternative 2 at end of Year 5: = \$5,500
 $\$25,000 - \$5,500 = \$19,500$ recaptured depreciation
 $\$19,500 \times (0.40) = \$7,800$ tax

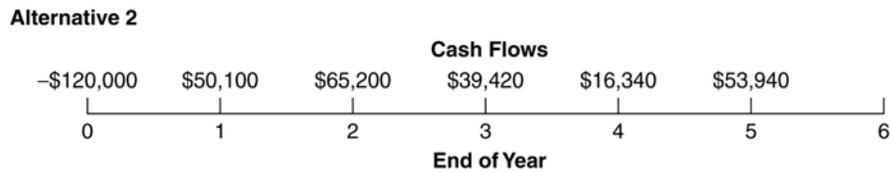
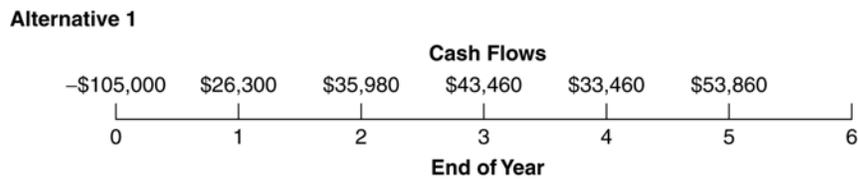
²Book value of old asset at end of Year 5: = \$0
 $\$2,000 - \$0 = \$2,000$ recaptured depreciation
 $\$2,000 \times (0.40) = \800 tax

Alternative 1

Year 5 relevant cash flow:	Operating cash flow:	\$33,460
	Terminal cash flow	<u>20,400</u>
	Total cash inflow	<u>\$53,860</u>

Alternative 2

Year 5 relevant cash flow:	Operating cash flow:	\$15,940
	Terminal cash flow	<u>38,000</u>
	Total cash inflow	<u>\$53,940</u>

4. **Alternative 1**

5. Alternative 2 appears to be slightly better because it has the larger incremental cash flow amounts in the early years.

■ Spreadsheet Exercise

The answer to Chapter 8's Damon Corporation spreadsheet problem is located in the Instructor's Resource Center at www.prenhall.com/irc.

■ A Note on Web Exercises

A series of chapter-relevant assignments requiring Internet access can be found at the book's Companion Website at <http://www.prenhall.com/gitman>. In the course of completing the assignments students access information about a firm, its industry, and the macro economy, and conduct analyses consistent with those found in each respective chapter.