

## Chapter 8 Accounting for Depreciation and Income Taxes

**Note:** For the most up-to-date depreciation and income tax information, consult the book's website at "<http://www.prenhall.com/park>" and click on "Tax Information"

8.1) (a), (b), (e), (f), (h) (amortization, rather than depreciation)

8.2) The loss of value is defined as the purchase price of an asset less its market value, also known as economic depreciation.

- Economic depreciation during 4-year ownership:  $\$5,000 - \$2,300 = \$2,700$
- Economic depreciation during the last 3-year ownership:  $\$2,300 - 0 = \$2,300$

8.3)

- Total property value with the warehouse:

	land	building
Original cost	\$65,000	\$55,000
Adjustments to basis		
add: new warehouse		\$50,000
demolition expense		\$8,000
subtract: building loss		(\$55,000)
adjusted cost basis	\$65,000	\$58,000

$$\text{Total value} = \$65,000 + \$58,000 = \$123,000$$

Note that the old house that was demolished has no value. This loss may be deductible for tax purpose, but this should not be added to the cost basis of the new asset. In general, the property's entire basis is allocated to the land only, if the company intends to demolish the building when they acquire property for business use. Then, the cost basis is increased by the net cost of demolition. (The demolition expense can be treated as a site preparation expense.)

- Cost basis for depreciation:

$$\text{Cost basis} = \$8,000 + \$50,000 = \$58,000$$

8.4) Trade-in allowance:

Old molding machine (Book value)	\$15,000
less: trade-in allowance	\$20,000
Unrecognized gain	\$5,000
Cost of a new molding machine	\$105,000
less: unrecognized gain on trade-in allowance	(\$5,000)
Cost basis of the new molding machine	\$100,000

**Comments:** If the old molding machine is sold on the market (instead of traded in), there will be no unrecognizable gain. In that situation, the cost basis for the new molding machine will be just \$105,000.

8.5) Trade-in allowance:

Old grinder (Book value)	\$12,000
less: trade-in allowance	<u>\$10,000</u>
unrecognized loss	(\$2,000)
cost of a new grinder	\$45,000
plus: unrecognized loss on trade-in allowance	<u>\$2,000</u>
cost basis of new grinder	\$47,000

**Comments:** If the old grinder is sold on the market (instead of traded in), there will be no unrecognized loss. In that situation, the cost basis for the new grinder will be just \$45,000.

8.6) Cost basis for flexible manufacturing cells:

flexible manufacturing cells (@\$400,000×3)	\$1,200,000
freight charges	\$30,000
handling fee	\$15,000
site preparation costs	\$50,000
start up and testing costs	\$18,000
special wiring and material costs	<u>\$2,000</u>
cost basis	\$1,315,000

(Note: start-up and testing costs =  $\$15 \times 40 \times 6 \times 5 = \$18,000$ )

8.7) Depreciation allowances and book values: (a) depreciation rate = 1/5 for SL,  
(b) Depreciation rate = 2/5 for DDB

<i>n</i>	SL		DDB	
	<i>D<sub>n</sub></i>	<i>B<sub>n</sub></i>	<i>D<sub>n</sub></i>	<i>B<sub>n</sub></i>
0		\$110,000		\$110,000
1	\$20,000	\$90,000	\$44,000	\$66,000
2	\$20,000	\$70,000	\$26,400	\$39,600
3	\$20,000	\$50,000	\$15,840	\$23,760
4	\$20,000	\$30,000	\$9,504	\$14,256
5	\$20,000	\$10,000	\$4,256	\$10,000

8.8)

Given:  $I = \$50,000$ ,  $S = \$5,000$ ,  $N = 8$  years;

DDB		
$n$	$D_n$	$B_n$
0		\$50,000
1	\$12,500	\$37,500
2	\$9,375	\$28,125
3	\$7,031	\$21,094
4	\$5,273	\$15,820
5	\$3,955	\$11,865
6	\$2,966	\$8,899
7	\$2,225	\$6,674
8	\$1,674	\$5,000

8.9) Given:  $I = \$200,000$ ,  $n = 3$  years,  $N = 8$  years; Assuming that  $N$  ranges from 5 years to 8 years and the salvage value is no greater than \$21,000, the DDB rates are as follows:

DDB		
$n$	$D_n$	$B_n$
0		\$200,000
1	\$50,000	\$150,000
2	\$37,500	\$112,500
3	\$28,125	\$84,375
4	\$21,094	\$63,281
5	\$15,820	\$47,461
6	\$11,865	\$35,596
7	\$8,899	\$26,697
8	\$6,674	\$20,023

8.10) DDB switching to SL in year 5:

With switching		
$n$	$D_n$	$B_n$
0		\$45,000
1	\$12,857	\$32,143
2	\$9,184	\$22,959
3	\$6,560	\$16,399
4	\$4,685	\$11,714
5	\$3,905	\$7,809
6	\$3,905	\$3,905
7	\$3,905	\$0

8.11) Given:  $I = \$90,000$ ,  $S = \$12,000$ ,  $N = 6$  years

(a)

Without switching		
DDB		
$n$	$D_n$	$B_n$
0		\$90,000
1	\$30,000	\$60,000
2	\$20,000	\$40,000
3	\$13,333	\$26,667
4	\$8,889	\$17,778
5	\$5,778	\$12,000
6	\$0	\$12,000

(b) DDB switching to SL:

with switching		
From DDB to SL		
$n$	$D_n$	$B_n$
0		\$90,000
1	\$30,000	\$60,000
2	\$20,000	\$40,000
3	\$13,333	\$26,667
4	\$8,889	\$17,778
5	\$5,778	\$12,000
6	\$0	\$12,000

**Comments:** The answer is unchanged because the salvage value is relatively high.

8.12)

(a)  $\alpha = \left(\frac{1}{5}\right)1.5 = 0.3$

(b)  $D_1 = (0.3)(15,000) = \$4,500$

(c)  $B_4 = (15,000)(1 - 0.3)^4 = \$3,601.5$

8.13) Given:  $I = \$30,000$ ,  $N = 5$  years,  $S = \$3,000$

(a)			(b)	
DDB			SL	
$n$	$D_n$	$B_n$	$D_n$	$B_n$
0		\$30,000		\$30,000
1	\$5,400	\$24,600	\$12,000	\$24,600
2	\$5,400	\$19,200	\$7,200	\$19,200
3	\$5,400	\$13,800	\$4,320	\$13,800
4	\$5,400	\$8,400	\$2,592	\$8,400
5	\$5,400	\$3,000	\$888	\$3,000

8.14) Given  $I = \$78,000$ ,  $S = \$8,000$ ,  $N = 12$  years

DDB			SL		
$n$	$D_n$	$B_n$	$n$	$D_n$	$B_n$
0		\$78,000	0		\$78,000
1	\$13,000	\$65,000	1	\$5,833	\$72,167
2	\$10,833	\$54,167	2	\$5,833	\$66,333
3	\$9,028	\$45,139	3	\$5,833	\$60,500
4	\$7,523	\$37,616	4	\$5,833	\$54,667
5	\$6,269	\$31,346	5	\$5,833	\$48,833
6	\$5,224	\$26,122	6	\$5,833	\$43,000
7	\$4,354	\$21,768	7	\$5,833	\$37,167
8	\$3,628	\$18,140	8	\$5,833	\$31,333
9	\$3,023	\$15,117	9	\$5,833	\$25,500
10	\$2,519	\$12,597	10	\$5,833	\$19,667
11	\$2,100	\$10,498	11	\$5,833	\$13,833
12	\$1,750	\$8,748	12	\$5,833	\$8,000

(a)

$$D = \frac{(\$78,000 - \$8,000)}{12} = \$5,833.33$$

(b)

$$D_3 = B_2 - B_3 = \$78,000(1 - (2/12))^2 - \$78,000(1 - (2/12))^3 \\ = \$9,027.78$$

8.15) Allowed depreciation amount

$$D = \frac{55,000}{250,000}(\$85,000 - \$5,000) = \$17,600$$

8.16)

$$\begin{aligned} D_{5,000 \text{ hrs}} &= \frac{5000}{50,000}(\$60,000 - \$8,000) \\ &= \$5,200 \end{aligned}$$

8.17)

- Truck A:

$$D = \frac{25,000}{200,000}(\$50,000 - \$5,000) = \$5,625$$

- Truck B:

$$D = \frac{12,000}{120,000}(\$25,000 - \$2,500) = \$2,250$$

- Truck C:

$$D = \frac{15,000}{100,000}(\$18,500 - \$1,500) = \$2,550$$

- Truck D:

$$D = \frac{20,000}{200,000}(\$35,600 - \$3,500) = \$3,210$$

8.18)

(a) Book depreciation:

- Truck

$$D_1 = \frac{22,000}{200,000}(\$25,000 - \$2,000) = \$2,530$$

$$D_2 = \frac{25,000}{200,000}(\$25,000 - \$2,000) = \$2,875$$

- Lathe and building:

Lathe DDB			Building SL		
$n$	$D_n$	$B_n$	$n$	$D_n$	$B_n$
0		\$45,000	0		\$800,000
1	<b>\$7,500</b>	\$37,500	1	<b>\$14,000</b>	\$786,000

Instructor Solutions Manual to accompany Fundamentals of Engineering Economics, Second Edition, by Chan S. Park.

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2	<b>\$6,250</b>	\$31,250	2	<b>\$14,000</b>	\$772,000
3	\$5,208	\$26,042	3	\$14,000	\$758,000
4	\$4,340	\$21,701	4	\$14,000	\$744,000
5	\$3,617	\$18,084	5	\$14,000	\$730,000
6	\$3,014	\$15,070	6	\$14,000	\$716,000
7	\$2,512	\$12,559	7	\$14,000	\$702,000
8	\$2,093	\$10,466	8	\$14,000	\$688,000
9	\$1,744	\$8,721	9	\$14,000	\$674,000
10	\$1,454	\$7,268	10	\$14,000	\$660,000
11	\$1,211	\$6,056	⋮	⋮	⋮
12	\$1,009	\$5,047	50	\$14,000	\$100,000

(b) Allowed annual depreciation:

With switching From DDB to SL		
$n$	$D_n$	$B_n$
0		\$45,000
1	\$7,500	\$37,500
2	\$6,250	\$31,250
3	\$5,208	\$26,042
4	\$4,340	\$21,701
5	\$3,617	\$18,084
6	\$3,014	\$15,070
7	\$2,512	\$12,559
8	\$2,093	\$10,466
9	\$1,866	\$8,599
10	\$1,866	\$6,733
11	\$1,866	\$4,866
12	\$1,866	\$3,000

The switching occurs at the 9th year.

8.19)

(a) Straight-line

SL		
$n$	$D_n$	$B_n$
0		\$135,000
1	\$12,300	\$122,700
2	\$12,300	\$110,400
3	\$12,300	\$98,100
4	\$12,300	\$85,800
5	\$12,300	\$73,500

6	\$12,300	\$61,200
7	\$12,300	\$48,900
8	\$12,300	\$36,600
9	\$12,300	\$24,300
10	\$12,300	\$12,000

(b) Units of production

$$D = \frac{23,450}{250,000}(\$135,000 - \$12,000) = \$11,537.4$$

(c) Working hours

$$D = \frac{2,450}{30,000}(\$135,000 - \$12,000) = \$10,045$$

(d) DDB

without switching		
DDB		
$n$	$D_n$	$B_n$
0		\$135,000
1	\$27,000	\$108,000
2	\$21,600	\$86,400
3	\$17,280	\$69,120
4	\$13,824	\$55,296
5	\$11,059	\$44,237
6	\$8,847	\$35,389
7	\$7,078	\$28,312
8	\$5,662	\$22,649
9	\$4,530	\$18,119
10	\$3,624	\$14,496

8.20)

Given:  $I = \$37,000$ ,  $S = \$6,000$ ,  $N = 8$  years, and 5-year MACRS

Book Depreciation: SL		
$n$	$D_n$	$B_n$
0		\$37,000
1	\$3,875	\$33,125
2	\$3,875	\$29,250
3	\$3,875	\$25,375
4	\$3,875	\$21,500
5	\$3,875	\$17,625
6	\$3,875	\$13,750
7	\$3,875	\$9,875
8	\$3,875	\$6,000



Tax Depreciation: 5-year MACRS			
$n$	Dep. Rate	$D_n$	$B_n$
0			\$37,000.00
1	0.2	\$7,400.00	\$29,600.00
2	0.32	\$11,840.00	\$17,760.00
3	0.192	\$7,104.00	\$10,656.00
4	0.1152	\$4,262.40	\$6,393.60
5	0.1152	\$4,262.40	\$2,131.20
6	0.0576	\$2,131.20	\$0.00

8.21)

(a) Cost basis:  $\$150,000 + \$5,000 = \$155,000$

(b)

$n$	Dep. Rate	$D_n$	$B_n$
0			\$155,000
1	0.1429	\$22,143	\$132,857
2	0.2449	\$37,959	\$94,898
3	0.1749	\$27,114	\$67,784
4	0.1249	\$19,367	\$48,417
5	0.0892	\$13,834	\$34,584
6	0.0892	\$13,834	\$20,750
7	0.0892	\$13,834	\$6,917
8	0.0446	\$6,917	(\$0)

8.22) Let  $I$  denote the cost basis for the equipment.

$n$	Dep. Rate	$D_n$	$B_n$
0			\$100,000
1	0.1429	\$14,286	\$85,714
2	0.2449	\$24,490	\$61,224
3	0.1749	\$17,493	\$43,732
4	0.1249	\$12,495	\$31,237
5	0.0892	\$8,925	\$22,312
6	0.0892	\$8,925	\$13,387
7	0.0892	\$8,925	\$4,462
8	0.0446	\$4,462	(\$0)

- 8.23) Given:  $I = \$58,000$ ,  $S = \$8,000$ ,  $N = 6$  years, tax depreciation method = 7 year MACRS property class

$n$	Dep. Rate	$D_n$	$B_n$
0			\$58,000
1	0.1429	\$8,286	\$49,714
2	0.2449	\$14,204	\$35,510
3	0.1749	\$10,146	\$25,364
4	0.1249	\$7,247	\$18,117
5	0.0892	\$5,176	\$12,941
6	0.0892	\$5,176	\$7,765
7	0.0892	\$5,176	\$2,588
8	0.0446	\$2,588	(\$0)

- 8.24) Given:  $I = \$22,000$  and 7-year MACRS property

$n$	Dep. Rate	$D_n$	$B_n$
0			\$22,000
1	0.1429	\$3,143	\$18,857
2	0.2449	\$5,388	\$13,469
3	0.1749	\$3,848	\$9,621
4	0.1249	\$2,749	\$6,872
5	0.0892	\$1,963	\$4,909
6	0.0892	\$1,963	\$2,945
7	0.0892	\$1,963	\$982
8	0.0446	\$982	(\$0)

- 8.25) Given:  $I_{\text{machine tool}} = \$5,000$ ,  $I_{\text{furniture}} = \$125,000$ , and  $I_{\text{warehouse}} = \$335,000$

● Machine tool

$n$	Dep. Rate	$D_n$	$B_n$
0			\$5,000
1	0.3333	\$1,667	\$3,333
2	0.4444	\$2,222	\$1,111
3	0.1481	\$741	\$370
4	0.0741	\$370	\$0

● CNC machine

$n$	Dep. Rate	$D_n$	$B_n$
0			\$125,000
1	0.1429	\$17,857	\$107,143
2	0.2449	\$30,612	\$76,531
3	0.1749	\$21,866	\$54,665
4	0.1249	\$15,618	\$39,046
5	0.0892	\$11,156	\$27,890
6	0.0892	\$11,156	\$16,734
7	0.0892	\$11,156	\$5,578
8	0.0446	\$5,578	(\$0)

● Warehouse

$n$	Dep. Rate	$D_n$	$B_n$
0			\$335,000
1	0.0139	\$4,653	\$330,347
2	0.0256	\$8,590	\$321,757
3	0.0256	\$8,590	\$313,168
⋮	⋮	⋮	⋮
39	0.0256	\$8,590	\$3,937
40	0.0118	\$3,937	\$0

8.26) Given: Residential real property (27.5-year),  $I = \$120,000$

$n$	Dep. Rate	$D_n$	$B_n$
0			\$170,000
1	0.0076	\$1,288	\$168,712
2	0.0364	\$6,182	\$162,530
3	0.0364	\$6,182	\$156,348
4	0.0364	\$6,182	\$150,167
5	0.0197	\$3,348	\$146,818

8.27) Given: Residential real property (27.5 year),  $I = \$150,000$

(a)

$$\begin{aligned}
 D_1 &= \left( \frac{100\%}{27.5} \right) \frac{5.5}{12} (\$150,000) \\
 &= (0.016667)(\$150,000) = \$2500
 \end{aligned}$$

- (b) Total amount of depreciation over the 4-year ownership, assuming that the asset is sold at the end of the 4<sup>th</sup> calendar year:

$n$	Dep. Rate	$D_n$	$B_n$
0			\$150,000
1	0.01667	\$2,500	\$147,500
2	0.03636	\$5,454	\$142,046
3	0.03636	\$5,454	\$136,592
4	0.03485	\$5,227	\$131,365

Total amount of depreciation allowed = \$18,635. Note that the 4<sup>th</sup> year depreciation reflects the mid-month convention (11.5 months).

$$\begin{aligned}
 B_4 &= \$150,000 - (\$2,500 + 2(\$5,454) + \$5,227) \\
 &= \$150,000 - \$18,635 \\
 &= \$131,365
 \end{aligned}$$

- 8.28) Given:  $I = \$1,000,000$ , 39 years-MACRS real property

$n$	Dep. Rate	$D_n$	$B_n$
0			\$1,000,000
1	0.007479	\$7,479	\$992,521
2	0.025641	\$25,641	\$966,880
⋮	⋮	⋮	⋮

- 8.29) Types of depreciation method

- (a). B
- (b). A
- (c). D
- (d). C
- (e). None

- 8.30)

- (a) Book depreciation methods:

- Straight-line method:

$n$	$D_n$	SL $B_n$	Cum. $D_n$
0		\$80,000	
1	\$14,400	\$65,600	\$14,400

2	\$14,400	\$51,200	\$28,800
3	\$14,400	\$36,800	\$43,200
4	\$14,400	\$22,400	\$57,600
5	\$14,400	\$8,000	\$72,000

- DDB method:

$n$	$D_n$	DDB $B_n$	Cum. $D_n$
0		\$80,000	
1	\$32,000	\$48,000	\$32,000
2	\$19,200	\$28,800	\$51,200
3	\$11,520	\$17,280	\$62,720
4	\$6,912	\$10,368	\$69,632
5	\$2,368	\$8,000	\$72,000

- (b) Tax depreciation: 7-year MACRS

$n$	Dep. Rate	$D_n$	$B_n$	Cum. $D_n$
0			\$80,000	
1	0.1429	\$11,429	\$68,571	\$11,429
2	0.2449	\$19,592	\$48,980	\$31,020
3	0.1749	\$13,994	\$34,985	\$45,015
4	0.1249	\$9,996	\$24,990	\$55,010
5	0.0892	\$7,140	\$17,850	\$62,150
6	0.0892	\$7,140	\$10,710	\$69,290
7	0.0892	\$7,140	\$3,570	\$76,430
8	0.0446	\$3,570	\$0	\$80,000

- (c) Trade-in allowance

Book value of the old equipment ( $B_3$ )	\$34,985
Less: Trade-in allowance	\$10,000
Unrecognized loss	(\$24,985)
Cost of the new equipment	\$92,000
plus: unrecognized loss on trade-in	\$24,985
Cost basis of the new equipment	\$116,985

**Comments:** If the old equipment was sold on the market (instead of trade-in), there would be no unrecognized loss. In that situation, the cost basis for the new equipment will be just \$92,000. No half-year convention is assumed in the analysis.

8.31)

(a) and (b):

$n$	Dep. Rate	$D_n$	$B_n$	$B_{n-1}$	Property taxes
0			\$3,800,000		
1	0.1429	\$542,857	\$3,257,143	\$3,800,000	\$45,600
2	0.2449	\$930,612	\$2,326,531	\$3,257,143	\$39,086
3	0.1749	\$664,723	\$1,661,808	\$2,326,531	\$27,918
4	0.1249	\$474,802	\$1,187,005	\$1,661,808	\$19,942
5	0.0892	\$339,144	\$847,861	\$1,187,005	\$14,244
6	0.0892	\$339,144	\$508,717	\$847,861	\$10,174
7	0.0892	\$339,144	\$169,572	\$508,717	\$6,105
8	0.0446	\$169,572	(\$0)	\$169,572	\$2,035

8.32) Net income calculation:

Gross income	\$ 34,000,000
Expenses:	
Salaries	\$ 5,000,000
Wages	\$ 4,000,000
Depreciation	\$ 1,000,000
Loan interest	\$ 210,000
Taxable income	\$ 23,790,000
Income Taxes	\$ 8,326,499
Net income	\$ 15,463,501

Note: Using the tax formula in Table 8.11,

$$\begin{aligned}\text{Total income taxes} &= \$6,416,666 + 0.35(\$23,790,000 - \$18,333,333) \\ &= \$8,326,499.45\end{aligned}$$

8.33) (a) Taxable income:

$$\$2,500,000 - \$1,280,000 - \$128,000 = \$1,092,000$$

(b) Income tax calculation using the tax formula from Table 8.11:

$$\$113,900 + 0.34(\$1,092,000 - \$335,000) = \$371,280$$

8.34) (a) Depreciation expenses:

- Building (39-year class, placed in service in February):

$$\begin{aligned}D_{\text{building}} &= \$400,000 \left( \frac{100\%}{39} \right) \left( \frac{10.5}{12} \right) \\&= \$400,000(2.2436\%) \\&= \$8,974\end{aligned}$$

- Equipment (5-year MACRS):

$$D_{\text{equipment}} = \$200,000(20\%) = \$40,000$$

- Total depreciation allowed in year 2008:

$$D = \$8,974 + \$40,000 = \$48,974$$

(b) Tax liability:

Sales revenue	\$2,500,000
Expenses:	
Cost of goods sold	\$800,000
Bond interest	\$50,000
Depreciation	\$48,974
Taxable income	<u>\$1,601,026</u>
Income taxes	<u>\$544,349</u>
Net income	\$1,056,677

Note: Income taxes = \$113,900 + 0.34(\$1,601,026 - \$335,000)  
= \$544,349 from Table 8.11.

8.35)

(a) Taxable gain:

$$\begin{aligned}\text{Ordinary gains} &= \text{proceeds from old equipment} - \text{book value} \\&= \$23,000 - \$20,000 \\&= \$3,000\end{aligned}$$

(b) Taxable income:

Gross income	\$ 2,250,000
Interest income	\$ 6,000
Bond interest income	\$ 4,000
Expenses:	
Labor	\$ 550,000
Materials	\$ 385,000
Depreciation	\$ 132,500
Interest	\$ 22,200
Rental	\$ 45,000
Taxable income	\$ 1,125,300
Income taxes	\$ 382,602
Net income	\$ 742,698

Note: Income taxes = \$113,900 + 0.34(\$1,125,300 - \$335,000)  
= \$382,602

Note: Ordinary gains are not included in this calculation, even though these gains will be treated as ordinary income. Of course, these figures can be included to find the total tax liabilities.

(c) Marginal and average tax rates:

Marginal tax rate = 34%

Average (effective) tax rate = \$382,602 / \$1,125,300  
= 34%

(d) Net cash flow:

Net income	\$ 742,698
Adjustments:	
Add depreciation	\$ 132,500
Proceeds from sale	\$ 23,000
Subtract gains tax	\$ (1,020)
Net cash flow	\$ 897,178

8.36) (a) Income tax liability:



Gross revenues	\$ 1,200,000
Expenses:	
Manufacturing	\$ 450,000
Operating	\$ 120,000
Interest	\$ 40,000
Taxable operating income	\$ 590,000
Adjustment: loss	\$ 15,000
Taxable income	\$ 575,000
Income taxes	\$ 195,500
Net income	\$ 379,500

Note 1: book loss = \$60,000 - \$75,000 = (\$15,000)

Note 2: Income taxes = \$113,900 + 0.34(\$575,000 - \$335,000)  
= \$195,500

(b) Operating income:

Taxable operating income	\$590,000
Income taxes	\$200,600
Net operating income	\$389,400

**Note 1:** The loss from disposal of the asset is not a part of operating activities, so it is not included in the operating income calculation.

**Note 2:** Income taxes = \$113,900 + 0.34(\$590,000 - \$335,000)  
= \$200,600

(c) Net cash flow:

Net income	\$ 379,500
Adjustments:	
Add depreciation	\$ 45,000
Proceeds from sale	\$ 60,000
Short-term loan	\$ 50,000
Net cash flow	\$ 534,500

8.37) (a) Disposed of in year 3:

$$\begin{aligned}\text{allowed depreciation} &= \$76,000(0.20 + 0.32 + 0.192 / 2) \\ &= \$46,816\end{aligned}$$

$$\begin{aligned}\text{book value} &= \$76,000 - \$46,816 \\ &= \$29,184\end{aligned}$$

$$\text{loss} = \$20,000 - \$29,184 = (\$9,184)$$

(b) Disposed of in year 5:

$$\begin{aligned}
\text{allowed depreciation} &= \$76,000(0.20 + 0.32 + 0.192 \\
&\quad + 0.1152 + 0.1152 / 2) \\
&= \$67,244.8 \\
\text{book value} &= \$76,000 - \$67,244.8 \\
&= \$8,755.2 \\
\text{Taxable gains} &= \$10,000 - \$8,755.2 = \$1,224.8
\end{aligned}$$

(c) Disposed of in year 6:

$$\begin{aligned}
\text{allowed depreciation} &= \$76,000 \\
\text{book value} &= \$0 \\
\text{Taxable gains} &= \$5,000
\end{aligned}$$

8.38)

$$\begin{aligned}
\text{allowed depreciation} &= \$300,000(0.1429 + 0.2449 + 0.1749 \\
&\quad + 0.1249 + 0.0893 / 2) \\
&= \$219,675 \\
\text{book value} &= \$300,000 - \$219,675 \\
&= \$80,325
\end{aligned}$$

(a) If sold at \$10,000:

$$\begin{aligned}
\text{losses} &= \$10,000 - \$80,325 = (\$70,325) \\
\text{loss credit} &= \$70,325(0.34) = \$23,911 \\
\text{net loss} &= (\$70,325) + \$23,911 = (\$46,414)
\end{aligned}$$

(b) If sold at \$125,460:

$$\begin{aligned}
\text{gains} &= \$125,460 - \$80,325 = \$45,135 \\
\text{gains tax} &= \$45,135(0.34) = \$15,346 \\
\text{net gain} &= \$45,135 - \$15,346 = \$29,789
\end{aligned}$$

(c) If sold at \$200,000:

$$\begin{aligned}
\text{gains} &= \$200,000 - \$80,325 = \$119,675 \\
\text{gains tax} &= \$119,675(0.34) = \$40,689.5 \\
\text{net gain} &= \$119,675 - \$40,689.5 = \$78,985.5
\end{aligned}$$

8.39)

(a) Taxable operating income (Do not include ordinary gains):

Revenues:	
Gross income	\$ 4,250,000
Expenses:	
Labor	\$ 1,550,000
Materials	\$ 785,000
Depreciation	\$ 332,500
Office supplies	\$ 15,000
Interest	\$ 42,200
Rental	\$ 45,000
Taxable income	\$ 1,480,300
Income taxes	\$ 503,302
Net income	\$ 976,998

(b) Taxable gains:

$$\$43,000 - \$30,000 = \$13,000$$

(c) Total taxes:

$$\begin{aligned}
 \text{income taxes} &= \$113,900 + 0.34(\$1,480,300 - \$335,000) \\
 &= \$503,302 \\
 \text{gain taxes} &= (0.34)(\$13,000) \\
 &= \$4,420 \\
 \text{total taxes} &= \$503,302 + \$4,420 \\
 &= \$507,722
 \end{aligned}$$

8.40)

(a) Book value:

$$\begin{aligned}
 \text{Total depreciation} &= \frac{\$4,000 - \$0}{6}(3) \\
 &= \$2,000 \\
 B_3 &= \$4,000 - \$2,000 \\
 &= \$2,000
 \end{aligned}$$

(b) Cost basis:

$$\text{Depreciation base} = \$14,000 + \$800 + \$200 = \$15,000$$

(c) Taxable gains and gains taxes

Instructor Solutions Manual to accompany Fundamentals of Engineering Economics, Second Edition, by Chan S. Park.

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$$\begin{aligned}\text{Taxable gain} &= \$2,500 - \$2,000 \\ &= \$500\end{aligned}$$

$$\begin{aligned}\text{Gains tax} &= (0.40)(\$500) \\ &= \$200\end{aligned}$$

(d) Capital gains:

$$\begin{aligned}B_3 &= \$2,000 \\ \text{ordinary gain} &= \$4,000 - \$2,000 = \$2,000 \\ \text{gain taxes} &= \$2,000(0.40) = \$800 \\ \text{capital gain} &= \$5,000 - \$4,000 = \$1,000 \\ \text{capital gain taxes} &= \$1,000(0.40) = \$400 \\ \text{total gains taxes} &= \$800 + \$400 = \boxed{\$1,200}\end{aligned}$$

(e) Book value at the end of year 3 under 175% DB:

$$B_3 = \$1,422$$

With switching		
From DDB to SL		
$n$	$D_n$	$B_n$
0		\$4,000
1	\$1,167	\$2,833
2	\$826	\$2,007
3	\$585	<b>\$1,422</b>
4	\$474	\$948
5	\$474	\$474
6	\$474	\$0

(f) Optimal time to switch: during the 4<sup>th</sup> year

8.41) Note: Personal income tax brackets and amount of personal exemption are updated yearly, so you need to consult the IRS tax manual for the tax rates as well as the amount of exemption that are applicable to your tax year. In this solution, we assumed the tax rate schedule of year 2007. For 2007, the amount of personal exemption is \$3,400.

(a) Business form: Corporate

- Corporate taxes:

	Year 1	Year 2	Year 3
Gross income	\$180,000	\$195,000	\$210,000
Expenses:			
Salary	\$80,000	\$90,000	\$100,000
Business expenses	\$25,000	\$30,000	\$40,000
Taxable income	\$75,000	\$75,000	\$70,000
Income taxes	\$13,750	\$13,750	\$12,500

- Personal income taxes (assuming that the personal exemptions as well as the individual tax rates remain unchanged over the 3-year period) :

	Year 1	Year 2	Year 3
Gross income	\$ 80,000	\$ 90,000	\$ 100,000
Deductions:			
Exemptions	\$ 13,600	\$ 13,600	\$ 13,600
Itemized deduction	\$ 16,000	\$ 18,000	\$ 20,000
Taxable income	\$ 50,400	\$ 58,400	\$ 66,400
Income taxes	\$ 6,778	\$ 7,978	\$ 9,448

Note that, in Year 2007, the personal income tax rates for married filing jointly are as follows:

Schedule Y-1 — Married Filing Jointly or Qualifying Widow(er)

If taxable income is over--	But not over--	The tax is:
\$0	\$15,650	10% of the amount over \$0
\$15,650	\$63,700	\$1,565.00 plus 15% of the amount over 15,650
\$63,700	\$128,500	\$8,772.50 plus 25% of the amount over 63,700
\$128,500	\$195,850	\$24,972.50 plus 28% of the amount over 128,500
\$195,850	\$349,700	\$43,830.50 plus 33% of the amount over 195,850
\$349,700	no limit	\$94,601.00 plus 35% of the amount over 349,700

- Total taxes = corporate taxes + personal taxes:

$$\text{Year 1} = \$13,750 + \$6,778 = \$20,528$$

$$\text{Year 2} = \$13,750 + \$7,978 = \$21,728$$

$$\text{Year 3} = \$12,500 + \$9,448 = \$21,948$$

(b) Business form: sole ownership

	Year 1	Year 2	Year 3
Gross income	\$180,000	\$195,000	\$210,000
Expense:			
Exemptions	\$13,600	\$13,600	\$13,600
Itemized deduction	\$16,000	\$18,000	\$20,000
Business expenses	\$25,000	\$30,000	\$40,000
Taxable income	\$125,400	\$133,400	\$136,400
Income taxes	\$24,198	\$26,345	\$27,185

The corporate business form is preferred.

8.42) (a) Incremental Operating income:

	Operating Costs	
	Year 1	Year 2
Revenue	\$15,000,000	\$15,000,000
Expenses:		
Mfg. cost	\$6,000,000	\$6,000,000
O&M costs	\$1,200,000	\$1,200,000
Depreciation	\$714,500	\$1,224,500
Taxable income	\$7,085,500	\$6,575,500
Income taxes (35%)	\$2,479,925	\$2,301,425
Net income	\$4,605,575	\$4,274,075

  

	Year 3	Year 4	Year 5
Revenue	\$15,000,000	\$15,000,000	\$15,000,000
Expenses:			
Mfg. cost	\$6,000,000	\$6,000,000	\$6,000,000
O&M costs	\$1,200,000	\$1,200,000	\$1,200,000
Depreciation	\$874,500	\$624,500	\$223,250
Taxable income	\$6,925,500	\$7,175,500	\$7,576,750
Income taxes (35%)	\$2,423,925	\$2,511,425	\$2,651,863
Net income	\$4,501,575	\$4,664,075	\$4,924,887

(b) Gains or losses:

$$\begin{aligned}
 \text{Total depreciation} &= \$3,661,250 \\
 B_5 &= \$5,000,000 - \$3,661,250 \\
 &= \$1,338,750 \\
 \text{Taxable gains} &= \$1,600,000 - \$1,338,750 \\
 &= \$261,250
 \end{aligned}$$

8.43)

(a) Let  $i_c$  denote the interest rate for a corporate bond:

$$9.5\% = i_c(1 - 0.25)$$

$$i_c = 12.67\%$$

(b) Let  $A$  denote the annual interest payment from the corporate bond. Since Julie's opportunity cost rate is 9.5%, we can establish the following equivalence relationship:

$$\begin{aligned} \$50,000 &= (1 - 0.25)A(P/A, 9.5\%, 3) + [\$50,000 \\ &\quad + (1 - 0.25)(0.05)(\$50,000)](P/F, 9.5\%, 3) \\ &= 1.8817A + \$39,510.79 \end{aligned}$$

Solving for  $A$  yields

$$A = \$5,574.39$$

This is equivalent to receiving a bond interest rate of

$$i_c = \$5,574.39 / \$50,000 = 11.15\%$$

(c)

$$\begin{aligned} PW(9.5\%) &= -\$50,000 + [\$75,000 \\ &\quad - (\$75,000 - \$50,000)(0.25)](P/F, 9.5\%, 3) \\ &= \$2,363.70 > 0 \\ IRR &= 11.20\% > 9.5\% \Rightarrow \text{Better than investment in bonds.} \end{aligned}$$

Investment in a tract of land is more economically desirable.