Problem 1									
Year	Beginning BV	Depreciation	Ending BV	Average BV	Revenues	COGS	EBIT	EBIT (1-t)	
1	25	3	22	23.5	$ 20.00	$ 10.00	$ 7.00	$ 4.20	
2	22	3	19	20.5	$ 22.00	$ 11.00	$ 8.00	$ 4.80	
3	19	3	16	17.5	$ 24.20	$ 12.10	$ 9.10	$ 5.46	
4	16	3	13	14.5	$ 26.62	$ 13.31	$ 10.31	$ 6.19	
5	13	3	10	11.5	$ 29.28	$ 14.64	$ 11.64	$ 6.98	
a. Pre-tax Return on Capital									
Year	Average BV	EBIT	Pre-tax ROC						
1	23.5	$ 7.00	29.79%						
2	20.5	$ 8.00	39.02%						
3	17.5	$ 9.10	52.00%						
4	14.5	$ 10.31	71.10%						
5	11.5	$ 11.64	101.23%						
Average			58.63%						
b.									
Year	Average BV	EBIT (1-t)	After-tax ROC						
1	23.5	$ 4.20	17.87%						
2	20.5	$ 4.80	23.41%						
3	17.5	$ 5.46	31.20%						
4	14.5	$ 6.19	42.66%						
5	11.5	$ 6.98	60.74%						
Average			35.18%						
c. Since the return on capital is greater than the cost of capital, I would accept the project.									
Problem 2									
Year	Beginning BV	Depreciation	Ending BV	Average BV	Revenues	COGS	EBIT	EBIT (1-t)	
1	$ 25.00	$ 6.00	$ 19.00	$ 22.00	$ 20.00	$ 10.00	$ 4.00	$ 2.40	
2	$ 19.00	$ 3.60	$ 15.40	$ 17.20	$ 22.00	$ 11.00	$ 7.40	$ 4.44	
3	$ 15.40	$ 2.16	$ 13.24	$ 14.32	$ 24.20	$ 12.10	$ 9.94	$ 5.96	
4	$ 13.24	$ 2.00	$ 11.25	$ 12.24	$ 26.62	$ 13.31	$ 11.32	$ 6.79	
5	$ 11.25	$ 2.00	$ 9.25	$ 10.25	$ 29.28	$ 14.64	$ 12.65	$ 7.59	
a. Pre-tax Return on Capital									
Year	Average BV	EBIT	Pre-tax ROC						
1	$ 22.00	$ 4.00	18.18%						
2	$ 17.20	$ 7.40	43.02%						
3	$ 14.32	$ 9.94	69.41%						
4	$ 12.24	$ 11.32	92.42%						

5	$ 10.25	$ 12.65	123.41%						
Average			69.29%						
b.									
Year	Average BV	EBIT (1-t)	After-tax ROC						
1	$ 22.00	$ 2.40	10.91%						
2	$ 17.20	$ 4.44	25.81%						
3	$ 14.32	$ 5.96	41.65%						
4	$ 12.24	$ 6.79	55.45%						
5	$ 10.25	$ 7.59	74.04%						
Average			41.57%						
c. Since the return on capital is greater than the cost of capital, I would accept the project.									
Problem 3									
Year	Beg BV Equity	Depreciation	End BV Equity	Avg BV Equity	Revenues	COGS	Int Exp	Taxable Inc.	Net Income
1	$ 15.00	$ 3.00	$ 12.00	$ 13.50	$ 20.00	$ 10.00	$ 1.00	$ 6.00	$ 3.60
2	$ 12.00	$ 3.00	$ 9.00	$ 10.50	$ 22.00	$ 11.00	$ 1.00	$ 7.00	$ 4.20
3	$ 9.00	$ 3.00	$ 6.00	$ 7.50	$ 24.20	$ 12.10	$ 1.00	$ 8.10	$ 4.86
4	$ 6.00	$ 3.00	$ 3.00	$ 4.50	$ 26.62	$ 13.31	$ 1.00	$ 9.31	$ 5.59
5	$ 3.00	$ 3.00	$ -	$ 1.50	$ 29.28	$ 14.64	$ 1.00	$ 10.64	$ 6.38
a.									
Year	Avge BV Equity	Net Income	ROE						
1	13.5	$ 3.60	26.67%						
2	10.5	$ 4.20	40.00%						
3	7.5	$ 4.86	64.80%						
4	4.5	$ 5.59	124.13%						
5	1.5	$ 6.38	425.64%						
Average			136.25%						
b. Since the return on equity is greater than the cost of equity, I would accept the project.									
Problem 4									
a. False. This is true only if the project makes a return higher than the after-tax cost of borrowing.									
b. False. The comparison should be to the cost of capital.									
c. False. The book value of equity will also be lower.									
d. False. It will lower earnings and returns.									
e. True. It will accentuate the increase in return on equity as the project ages.									
Problem 5									
This will occur only if									

1. earnings are equal to cash flows to equity, i.e., there are no non-cash charges, working capital or cap ex.									
2. earnings are level over time.									
Problem 6									
Year	0	1	2	3	4				
Investment	15000		2000						
WC Investment	1000								
Salvage					7000	! Book value is salvaged			
Revenues		$ 10,000	$ 11,000	$ 12,000	$ 13,000				
- COGS		$ 4,000	$ 4,400	$ 4,800	$ 5,200				
- Deprec'n		$ 4,000	$ 3,000	$ 2,000	$ 1,000				
EBIT		$ 2,000	$ 3,600	$ 5,200	$ 6,800				
EBIT (1-t)		$ 1,200	$ 2,160	$ 3,120	$ 4,080				
+ Deprec'n		$ 4,000	$ 3,000	$ 2,000	$ 1,000				
- Chg in WC		$ 100	$ 100	$ 100	$ (1,300)				
FCFF	$ (16,000)	$ 5,100	$ 3,060	$ 5,020	$ 13,380				
a. See above									
b. Payback									
Cumulated FCFF	$ (16,000)	$ (10,900)	$ (7,840)	$ (2,820)	$ 10,560				
Pauback is early in the fourth year.									
c. NPV of Project at 12% cost of capital									
PV of Cash flow	$ (16,000)	$ 4,554	$ 2,439	$ 3,573	$ 8,503				
NPV of Project =		$ 3,069.35							
d. IRR of Project		19.26%							
Problem 7									
Year	0	1	2	3	4				
Investment	15000		2000						
WC Investment	1000								
- Debt Issued	6400		800						
+ Salvage					7000				
Revenues		$ 10,000	$ 11,000	$ 12,000	$ 13,000				
- COGS		$ 4,000	$ 4,400	$ 4,800	$ 5,200				
- Deprec'n		$ 4,000	$ 3,000	$ 2,000	$ 1,000				
- Interest Exp.		$ 640	$ 644	$ 728	$ 732				
Taxable Inc.		$ 1,360	$ 2,956	$ 4,472	$ 6,068				
Net Income		$ 816	$ 1,774	$ 2,683	$ 3,641				
+ Deprec'n		$ 4,000	$ 3,000	$ 2,000	$ 1,000				
- Chg in WC		$ 100	$ 100	$ 100	$ (1,300)				
+ new Debt Issued		$ 40	$ 40	$ 40					

- Principal Repaid					$ 7,320					
FCFE	$ (9,600)	$ 4,756	$ 3,514	$ 4,623	$ 5,621					
a. See above										
b. Payback										
Cum. FCFE	$ (9,600)	$ (4,844)	$ (1,330)	$ 3,293	$ 8,914					
Payback is shortly after the end of the second year										
c. NPV										
PV at 16%	$ (9,600.0)	$ 4,100.00	$ 2,611.18	$ 2,961.89	$ 3,104.32					
NPV =		$ 3,177.38								
Problem 8										
Year	FCFF									
0	$ (10,000,000)									
1	$ 4,000,000									
2	$ 5,000,000									
3	$ 6,000,000									
Discount Rate	NPV									
2%	$4,381,347									
4%	$3,802,913									
6%	$3,261,283									
8%	$2,753,391									
10%	$2,276,484									
12%	$1,828,079									
14%	$1,405,939									
16%	$1,008,036									
18%	$632,538									
20%	$277,778									
22%	($57,758)									
24%	($375,449)									
26%	($676,553)									
28%	($962,219)									
30%	($1,233,500)									
The internal rate of return ofthis project is about 215. I would accept the project because its return is greater										
than the cost of capital. (The cost of equity does not apply)										
Problem 9										
Year	FCFE									
0	-4750000									
1	4000000									

2	4000000								
3	-3000000								
Discount Rate	NPV								
2%	$189,277								
4%	$127,390								
6%	$64,713								
8%	$1,562								
10%	($61,796)								
12%	($125,137)								
14%	($188,273)								
16%	($251,046)								
18%	($313,324)								
20%	($375,000)								
22%	($435,983)								
24%	($496,199)								
26%	($555,589)								
28%	($614,105)								
30%	($671,711)								
The IRR for this project is roughly 9%.									
Problem 10									
FV of year 1 cash flow = 4000000* 1.16^2 =				5382400					
FV of year 2 cash flow = 4000000* 1.16 =				4640000					
FV of year 3 cash flow = -3000000				-3000000					
FV of years 1-3 cash flows =				7022400					
Investment in year 0 =				-4750000					
Modified IRR = (7022400/4750000)^(1/3) - 1 =				13.92%					
I would still reject the project									
Problem 11									
Year	A	B							
0	-4000000	-4000000							
1	2000000	1000000							
2	1500000	1500000							
3	1250000	1700000							
4	1000000	2400000							
a. NPV =	$680,008	$1,065,228	! Project B is better						
b. IRR =	18.71%	20.19%	! Project B is still better						
c. NPV assumes that you can reinvest at 10%; IRR assumes reinvestment at IRR.									
d. Modified IRR Calculation									

Year	A	FV of Cash Flow	B	FV of Cash Flow
0	$ (4,000,000)		$ (4,000,000)	
1	$ 2,000,000	$ 2,662,000	$ 1,000,000	$ 1,331,000
2	$ 1,500,000	$ 1,815,000	$ 1,500,000	$ 1,815,000
3	$ 1,250,000	$ 1,375,000	$ 1,700,000	$ 1,870,000
4	$ 1,000,000	$ 1,000,000	$ 2,400,000	$ 2,400,000
		6852000		7416000
MIRR		14.40%		16.69%

Problem 12

Generally not. Because you need a sign change (from negative to positive cash flows) for IRR to be estimated. It is possible that you could still get an operating cash flow that is negative in some year, but the IRR will be huge and meaningless.

Problem 13

Again, generally yes. The principle that all positive NPV projects should be taken does not apply if there are severe capital rationing constraints. In those cases, you want to get the highest return you can on your limited capital budget.

Problem 14

Year	A	B	C	
0	-10000	5000	-15000	
1	8000	5000	10000	
2	7000	-8000	10000	
a. NPV	$2,723.21	$3,086.73	$1,900.51	! B is the best project on a NPV basis
b. IRR	32.74%	-13.99%	21.53%	! A is the best project

c. The reasons can be partially attributed to differences in scale, and difference in reinvestment rate assumptions. The strange pattern of cash flows on B also throws off the IRR rule. The IRR rule is devised with the idea that cash flows go from negative to positive, not the other way around.

Problem 15

a. NPV = -10 million + 2*1.05/(.10-.05) = $ 32

b. IRR of this project =

-10 + 2*1.05/(r-.05) = 0

Solve for r,

r = 26%

Problem 16

a. FCFF each year = 3 (1-.4) + .5 = 2.30

NPV = -20 - 5/1.125^ 10 - 5/1.125^20 + 2.3 (PVA, 12.5%,30) + 15/1.125^30 = $ (3.71)

b. IRR of this project

Discount Rate	NPV								
5%	13.87328541								
10%	-0.129403014	! IRR is close to 10%							
12.50%	-3.713174369								
15%	-6.213125943								
Problem 17									
Year	Cash Flow	Discount Rate		Cumulated Rate					
0	-15000	9.50%	$ (15,000)	1.00	! No discounting				
1	5000	10.50%	$ 4,525	1.105	!1.105				
2	5000	11.50%	$ 4,058	1.232075	! 1.105 * 1.115				
3	10000	12.50%	$ 7,215	1.386084375	! 1.105 * 1.115 * 1.125				
a. NPV =			$ 798						
b. IRR =			13.94%						
You would have to compare the IRR to the geometric average of the discount rates over the									
3 periods. The geometric average is 1.38608^(1/3)-1 =					11.50%				
Take the project									
Problem 18									
Yes. When the cash flow pattern is reversed, i.e., when cash flows are positive up front and negative later on, the IRR									
can be negative while the NPV is positive. (See problem 14)									
Problem 19									
a. NPV = -50 + 5 (PVA, 10%, 20 years) - 20/1.1^10 =				$ (15.14)					
b.									
Discount Rate	NPV								
2%	$ 15.35								
4%	$ 4.44								
6%	$ (3.82)	IRR is about 5%							
8%	$ (10.17)								
10%	$ (15.14)								
12%	$ (19.09)								
14%	$ (22.28)								
16%	$ (24.89)								
18%	$ (27.06)								
20%	$ (28.88)								
c. The IRR is about 5%. The fact that there are two sign changes may lead to two IRRS.									
Problem 20									
The average return on capital is overstated when accelerated depreciation is used because the book value of capital									

drops quickly. The return on capital increases concurrently. The average return on capital is not time-weighted and overstates the true return on the project.

Problem 21

a. If cash flows are equal to accounting earnings

b. The earnings are level over time.

Problem 22

a. Straight line depreciation = ($ 15 - $ 3)/10 = $ 1.20

Annual Tax Savings from Depreciation = $ 1.2 (0.4) = $ 0.48

Present Value of Tax Savings from Depreciation =

$ 0.48 (PVA, 12%, 10 years) = $ 2.71

b. Present Value from Double Declining Balance Deprecition

Year	DDB Depreciation	Rem. Balance	Straight Line	DDB with Switch	Tax Savings	PV of Savings
1	$ 3.00	$ 12.00		$ 3.00	$ 1.20	$ 1.07
2	$ 2.40	$ 9.60	$ 1.00	$ 2.40	$ 0.96	$ 0.77
3	$ 1.92	$ 7.68	$ 0.83	$ 1.92	$ 0.77	$ 0.55
4	$ 1.54	$ 6.14	$ 0.67	$ 1.54	$ 0.61	$ 0.39
5	$ 1.23	$ 4.92	$ 0.52	$ 1.23	$ 0.49	$ 0.28
6	$ 0.98	$ 3.93	$ 0.38	$ 0.98	$ 0.39	$ 0.20
7	$ 0.79	$ 3.15	$ 0.23	$ 0.79	$ 0.31	$ 0.14
8	$ 0.15	$ 3.00	$ 0.05	$ 0.15	$ 0.06	$ 0.02
9	$ -	$ 3.00	$ -	$ -	$ -	$ -
10	$ -	$ 3.00	$ -	$ -	$ -	$ -
				SUM	$ 4.80	$ 3.42

Present Value of Tax Savings from DDB Depreciation = $ 4.29

c. Double declining balance depreciation provides a higher tax benefit because it provides more tax benefits earlier in the process.

Problem 23 With Salvage = $ 0.5 mil

Year	ACRS Rate	Depreciation	Tax Benefit	PV of Tax Benefit
1	20.00%	$ 0.40	$ 0.16	$ 0.15
2	32.00%	$ 0.64	$ 0.26	$ 0.21
3	19.20%	$ 0.38	$ 0.15	$ 0.12
4	11.50%	$ 0.23	$ 0.09	$ 0.06
5	11.50%	$ 0.23	$ 0.09	$ 0.06
6	5.80%	$ 0.12	$ 0.05	$ 0.03

Present Value of Tax Benefits from Deprecn = $ 0.62

c. Tax Benefits from Expensing Asset Immediately = $ 2.5 (0.4) = $ 1 million

Problem 24

In problem 22, if salvage value is ignored,

PV of Tax Savings from Straight line Depreciation = $ 1.5 (PVA,12%,10 years) =	$ 3.39
-PV of Capital Gains Taxes on Salvage = $ 3 (0.2)/1.12^10 =	$ 0.19
PV of Tax Savings from Ignoring Salvage =	$ 3.20

(This is $ 49,000 higher than the PV with salvage considered.

In problem 23, if salvage value is ignored,

Year	ACRS Rate	Depreciation	Tax Benefit	PV of Tax Benefit
1	20.0%	$ 0.50	$ 0.20	$ 0.18
2	32.0%	$ 0.80	$ 0.32	$ 0.26
3	19.2%	$ 0.48	$ 0.19	$ 0.14
4	11.5%	$ 0.29	$ 0.12	$ 0.08
5	11.5%	$ 0.29	$ 0.12	$ 0.07
6	5.8%	$ 0.15	$ 0.06	$ 0.03
Present Value of Tax Benefits from Deprecn =				$ 0.77
- Capital Gains Taxes from SAlvage = $ 0.5*0.2/1.1^5 =				$ 0.06
Present value of Tax Savings from Ignoring Salvage =				$ 0.71

Problem 25

Year	Tax Rate	St. Line Depr	Tax Savings	PV	DDB Deprecn	Tax Savings	PV
1	20%	$ 2.00	$ 0.40	$ 0.36	$ 4.00	$ 0.80	$ 0.71
2	25%	$ 2.00	$ 0.50	$ 0.40	$ 2.40	$ 0.60	$ 0.48
3	30%	$ 2.00	$ 0.60	$ 0.43	$ 1.44	$ 0.43	$ 0.31
4	35%	$ 2.00	$ 0.70	$ 0.44	$ 1.08	$ 0.38	$ 0.24
5	40%	$ 2.00	$ 0.80	$ 0.45	$ 1.08	$ 0.43	$ 0.25
				$ 2.08			$ 1.99

Using no depreciation and accelerated charges provides the highest NPV for this projects.

Problem 26

a. Expected Operating Cash Flows

Revenues	$ 5.00
COGS (wo depr)	$ 1.50
Depreciation	$ 2.00
EBIT	$ 1.50
EBIT (1-t)	$ 0.90

	+ Deprec'n	$ 2.00							
	ATCF	$ 2.90							
b. NPV of Project = - $ 10 million + $ 2.90 (PVA,11%,5 years) =					$ 0.72				
c. PV of Tax benefits from Depreciation = $ 2 (0.4) (PVA,11%,5 years) =					$ 2.96				
d. NPV of Project if the firm is losing money for first 3 years									
	1	2	3	4	5				
Revenues	$ 5.00	$ 5.00	$ 5.00	$ 5.00	$ 5.00				
COGS	$ 1.50	$ 1.50	$ 1.50	$ 1.50	$ 1.50				
Depreciation	$ 2.00	$ 2.00	$ 2.00	$ 2.00	$ 2.00				
EBIT	$ 1.50	$ 1.50	$ 1.50	$ 1.50	$ 1.50				
- Taxes	$ -	$ -	$ -	$ 2.40	$ 0.60				
EBIT (1-t)	$ 1.50	$ 1.50	$ 1.50	$ (0.90)	$ 0.90				
+ Deprec'n	$ 2.00	$ 2.00	$ 2.00	$ 2.00	$ 2.00				
ATCF	$ 3.50	$ 3.50	$ 3.50	$ 1.10	$ 2.90	Sum of PV			
PV of ATCF	$ 3.15	$ 2.84	$ 2.56	$ 0.72	$ 1.72	$ 11.00			
NPV of Project = - $ 10 million + $ 11 million =				$ 1 million					
Problem 27									
a. Unlevered beta (Nuk-Nuk) =			1.3/(1+(1-0.6)0.5) =		1.00				
Unlevered beta (Gerber) =			1.5/(1+ (1-0.5)1.00) =		1.00				
This project has no debt. So the appropriate beta = 1.00									
Appropriate discount rate =			11.5 + 1.0 (5.5) =		17.00%				
b. Revenues	$ 30,000								
Expenses	$ 12,000								
Garage cost	$ 2,000								
BTCF	$ 16,000								
Taxes	$ 4,400	(16000-5000)*0.4							
ATCF	$ 11,600								
Alternatively, you could consider the garaging cost separately as an opportunity cost, in which case ATCF=13600									
If you considered working capital increase in year 1, the ATCF in year 1 alone=4100.									
(Note that since working capital stays at 7500, there are no working capital changes after the inital year.)									
c. NPV = -57500 +11600 (PVA,17%,10 years)+6000(PF,17%,10 years) =						$ (2,211.97)			
Problem 28									
Cost of the new facility =			$ 100,000.00						
- Capital gains from sale of facility =			$ 10,000.00		(100000-60000)*0.25				
-Cost of new facility=			$ 40,000.00						
-Depreciation lost on old facility=			$ 14,746.96		(6000*0.4*(PVA,10%,10))				

+Depreciation gained on new facility=			$ 9,831.31		(4000*0.4*(PVA,10%,10))				
OPPORTUNITY COST=			$ 45,084.35						
Problem 29									
Initial Investment = 50000									
Annual Cashflow									
Revenues	$ 250,000.00								
Rent	$ 48,000.00								
Salary Exp	$ 120,000.00								
Deprec'n	$ 5,000.00								
Taxable Income	$ 77,000.00								
Tax	$ 30,800.00								
Net Income	$ 46,200.00								
+Depreciation	$ 5,000.00								
ATCF	$ 51,200.00								
b.	NPV of Project = -50000 + 51200 (PVA,15%, 10 years) =				$ 206,961.00				
	IRR of Project =		102.31%						
Problem 30									
PV of rental revenues = 100000* 0.6 *(PVA,15%,10) =				301126.118					
(The depreciation is not a cost because you will get it anyway)									
Problem 31									
Initial Investment = - 500000 - 50000 + 50000 = -500000									
ATCF per year = 1000000 - 500000 - 200000 - .5 (300000 -100000) =					$ 200,000.00				
NPV of this project = -500000 + 200000*(AF,10%,5 years)=					$ 258,157.35				
NPV of investment banking job = 75000*.5*(Af,10%,5 years) =					$ 142,154.50				
TAKE THE INVESTMENT!									
ALTERNATIVELY, YOU CAN SHOW THE INVESTMENT BANKING JOB AS AN									
OPPORTUNITY COST IN THE ANALYSIS.									
Remember that the interest you could have made on the CD should not be considered as an explicit opp. cost.									
It is already taken into account through discounting.									
Problem 32									
	1	2	3	4	5				
Revenues	$ 600,000	$ 679,800	$ 770,213	$ 872,652	$ 988,714				
- Rent	$ 50,000	$ 51,500	$ 53,045	$ 54,636	$ 56,275				
- Salaries	$ 250,000	$ 257,500	$ 265,225	$ 273,182	$ 281,377				
- Marketing Cost	$ 100,000	$ 103,000	$ 106,090	$ 109,273	$ 112,551				

- Material	$ 120,000	$ 135,960	$ 154,043	$ 174,530	$ 197,743				
- Depreciation	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000				
Taxable Income	$ 60,000	$ 111,840	$ 171,811	$ 241,031	$ 320,768				
Taxes	$ 24,000	$ 44,736	$ 68,724	$ 96,412	$ 128,307				
Net Income	$ 36,000	$ 67,104	$ 103,086	$ 144,618	$ 192,461				
+ Deprec'n	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000				
- Change in WC	$ 7,980	$ 9,041	$ 10,244	$ 11,606	$ -				
ATCF	$ 48,020	$ 78,063	$ 112,843	$ 153,012	$ 212,461				
b. NPV of Project									
ATCF	$ 48,020	$ 78,063	$ 112,843	$ 153,012	$ 212,461	Sum			
PV of ATCF	$ 42,875	$ 62,231	$ 80,319	$ 97,242	$ 120,556	$ 403,223			
NPV = -$ 160,000 + $ 403,223 +98871/1.12^5=				$ 299,325					
Problem 33									
Year	Potential sales	Lost sales	Lost profits	PV lost profits					
1	$ 27,500	$ -	$ -	$ -					
2	$ 30,250	$ 250	$ 9,000	$ 7,438					
3	$ 33,275	$ 3,275	$ 117,900	$ 88,580					
4	$ 36,603	$ 6,603	$ 237,690	$ 162,345					
5	$ 40,263	$ 10,263	$ 369,459	$ 229,405					
6	$ 44,289	$ 14,289	$ 514,405	$ 290,368					
7	$ 48,718	$ 18,718	$ 673,845	$ 345,789					
8	$ 50,000	$ 20,000	$ 720,000	$ 335,885					
9	$ 50,000	$ 20,000	$ 720,000	$ 305,350					
10	$ 50,000	$ 20,000	$ 720,000	$ 277,591					
	OPPORTUNITY COST			$ 2,042,753					
Problem 34									
a. There is no cost the first three years. The after-tax salary paid in last two years is an opp. cost									
	= 80,000*0.6/1.1^4 + 80000*0.6/1.1^5 =				$ 62,589.00				
b. The opportunity cost is the difference in PV of investing in year 4 instead of year 8									
= 250000/1.1^4 - 250000/1.1^8 =			$ 54,126.00						
c. The present value of after-tax rental payments over five years is the opp. cost									
= 3000*0.6(PVA,10%,5 yrs) =			$ 6,823.42						
d. After-tax cashflow = (400000-160000) - (240000-100000)*0.4 =					$ 184,000.00				
e. NPV = -500000 -62589 - 54126 - 6823 + 184000(1-(.1.1)^-5)/.1=					$ 73,966.77				
Problem 35									
a. Initial investment =		10 million (Distribution system) + 1 million (WC) =				11 million			

b.	Incremental Revenues =		$ 10,000,000						
	Variable costs (40%)=		$ 4,000,000						
	Advertising Costs		$ 1,000,000						
	BTCF		$ 5,000,000						
	Taxes		$ 1,600,000	: (5000000-1000000)*0.4					
	ATCF		$ 3,400,000						
c. NPV = -11,000,000 + 3,400,000 (PVA,10 years,8%) + 1,000,000 (PF, 10 years, 8%) =									
	$ 12,277,470								
Problem 36									
a.	Year	Old Product	New Product	Excess/Shortfall					
	1	50	30	20					
	2	52.5	33	14.5					
	3	55.125	36.3	8.575					
	4	57.88125	39.93	2.18875					
In year 5	5	60.7753125	43.923	-4.6983125	OUT OF CAPACITY				
	6	63.8140781	48.3153	-12.1293781					
	7	67.004782	53.14683	-20.151612					
	8	70.3550211	58.461513	-28.8165341					
	9	73.8727722	64.3076643	-38.1804365					
	10	77.5664108	70.7384307	-48.3048415					
b. Contribution margin for 1% of capacity :			for OLD=	(100-50)/50=	$ 1.00				
			for NEW=	(80-44)/30=	$ 1.20				
YOU WILL LOSE LESS CUTTING BACK ON OLD PRODUCT									
	Year	Lost Capacity	$ BT loss (m)	$AT loss (m)	PV (loss)				
	5	-4.7	$ (4.70)	$ (2.82)	$ (1.75)				
	6	-12.13	$ (12.13)	$ (7.28)	$ (4.11)				
	7	-20.15	$ (20.15)	$ (12.09)	$ (6.20)				
	8	-28.82	$ (28.82)	$ (17.29)	$ (8.07)				
	9	-38.18	$ (38.18)	$ (22.91)	$ (9.72)				
	10	-48.3	$ (48.30)	$ (28.98)	$ (11.17)				
	TOTAL OPPORTUNITY COST=				$ (41.02)				
c. PV of Building facility in year 5 =			$ 31.05						
PV of depreciation benefits on this building =			2 million * 0.4 *(PVa, 10%, 25) * (PF, 10%, 5) =						
		$ 4.51							
Year in which you would have run out of capacity without new product =					14.2066991	! YEAR 14			
(Remember that growth rate on old product is 5%)									

PV of building facility in year 14 =			$ 13.17							
PV of depreciation benefits on this building =			2 million * 0.4 *(PVa, 10%, 25) * (PF, 10%, 14) =							
		$ 1.91								
NET OPPORTUNITY COST										
= (PV of Building in year 5 - PV of Depreciation on this building) - (PV of Building in year 14										
- PV of Depreciation on this building) =										
= (31.05 - 4.51) - (13.17 - 1.91) =			$ 15.28							
Problem 37										
a. Working capital without computer : 0.5*5,000,0000 =				$ 2,500,000						
Working Capital with computer : 0.25 * 8,000,000 =				$ 2,000,000						
Decrease in Working Capital with computer =				$ 500,000						
Cashflow in year 0 = -10,000,000+500000 =				$ 9,500,000						
(The initial investment is $10 million.)										
b. After-tax Cashflow Each Year										
	wo/Computer	w/Computer	Incremental CF							
Revenues	$ 5,000,000	$ 8,000,000	$ 3,000,000							
COGS	$ 2,500,000	$ 4,000,000	$ 1,500,000							
Selling Expenses	$ 1,500,000	$ 500,000	$ (1,000,000)							
Gross Profit	$ 1,000,000	$ 3,500,000	$ 2,500,000							
Depreciation	$ -	$ 1,000,000	$ 1,000,000							
Taxable Income	$ 1,000,000	$ 2,500,000	$ 1,500,000							
Tax	$ 400,000	$ 1,000,000	$ 600,000							
Net Income	$ 600,000	$ 1,500,000	$ 900,000							
+ Deprec'n	$ -	$ 1,000,000	$ 1,000,000							
ATCF	$ 600,000	$ 2,500,000	$ 1,900,000							
c. NPV = -9,500,000 + 1,900,000 (PVA,8%,10 years) - 500000/1.08^10=										
	$ 3,017,558									