MIDTERM; OCTOBER 1985

Problem 1

PV of annual expenses from age 65 to 85 = 170271.274

Annuity needed each year for 40 years to have FV of 170271= 384.712752

PROBLEM 2

Initial Investment = 50000

Annual Cashflow

NPV= -50000 +51200 (PVA, 10, 15%)= 206960.954

Revenues	250000
Rent	48000
Salary Exp	120000
Deprec'n	5000
Taxable Income	77000
Tax	30800
Net Income	46200
+Depreciation	5000
ATCF	51200

B. BREAKEVEN

Breakeven ATCF =	9962.60313	! NPV = -50000 + X (PVA, 10, 15%) = 0 ! Solve for X
Breakeven net income=	4962.60313	! Y + 5000 = 9962 ! Solve for Y
Breakeven taxable income=	8271.00521	! Taxable income = 4962.60 / (1 - 0.4)
Breakeven revenue=	181271.005	! 8271 + 5000 + 120000 + 48000 ! All your costs are fixed.
Breakeven # members=	362.54201	! 181271 / 500

PROBLEM 3

PV of tax savings using straight line depreciation= 3032.62942

PV of tax savings using DDB = 3243.99103

(I switched to straightline in year 4 because it was higher)

B. OPPORTUNITY COST

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 4

See Risk & Return problem set

MIDTERM: SPRING 1988

AD	M	(AD-ÅD)SQ	(M-M)SQ	(AD-ÅD)(M-M)
10	5	25	4	-10
5	15	0	64	0
-5	8	100	1	-10
20	12	225	25	75
-5	-5	100	144	120
5	7	450	238	175

BETA = 175/238 = 0.73529412

ALPHA = 5 - 0.74 (7) = -0.145

b. EXPECTED RETURN = 6 +0.74 (8.5) = 12.29

c. AD did worse than expected. Compare alpha to Riskfree rate (1-Beta) = .06*(1-0.735) =

=0.0159

d. The variance would be a good measure if undiversified = 112.5

Proportion that can be diversified = 1-ßsq*Var(m)/Var(j) 71.41%

We know the Beta of AD before divestment = 0.735.

Then the beta of divested division = 1.47

Let the beta after divestment be X

Then, 0.735 = 0.8 X + 0.2 (1.47)

Solving for X, 0.55125

2. Initial Investment = - 500000 - 50000 + 50000 = -500000

ATCF per year = 1000000 - 500000 - 200000 - .5 (300000 -100000) = 200000

NPV of this project = -500000 + 200000*(AF,10%,5 years)= 258157.354

NPV of investment banking job = 75000*.5*(Af,10%,5 years) = 142154.504

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.

3. Annual payment on loan (at 8%)= 50091.2909

NPV of loan at 12% = +200000 - 50091 (AF, 12%,5 years) = 19433.1552

Adding on the loan will make your NPV positive.

To be precise, this payment should have been broken down into interest and principal since interest will provide added tax savings.

4. (1) True (2) False (Different lives) (3) False (Think of the two IRRs case)

CORPORATE FINANCE: SPRING 1989

Problem 1

NPV = -100000 + 56000 (PVA,12%,5 yrs) = 101867.467

Breakeven number of units = **5411** (100X-20X-400000-((100X-20X-400000-20000)*0.4)= 27740)

Problem 2

Year	Potential sales	Lost sales	Lost profits	PV lost profits
1	27500	0	$0	$0
2	30250	250	$9,000	$7,438
3	33275	3275	$117,900	$88,580
4	36603	6603	$237,690	$162,345
5	40263	10263	$369,459	$229,405
6	44289	14289	$514,405	$290,368
7	48718	18718	$673,845	$345,789
8	50000	20000	$720,000	$335,885
9	50000	20000	$720,000	$305,350
10	50000	20000	$720,000	$277,591

OPPORTUNITY COST **2042752.6**

Problem 3

XYZ	M	(XYZ-XYZ)SQ	(M-M)SQ	(XYZ-XYZ)(M-M)
20	15	100	49	70
-10	-5	400	169	260
30	25	400	289	340
10	15	0	49	0
0	-10	100	324	180
10	8	1000	880	850

BETA = 850/880 = 0.96590909

ALPHA = 10-8*0.97= 2.27272727 ! IT DID BETTER THAN EXPECTED

EXPECTED RETURN = 9 +0.97 *8.3 (OR 8.5) = **17.0170455**

Problem 4

PV of obligations = 1 (PVA,5 yrs, 10%) + 2 (PVA,5 yrs,10%)(PF,5 yrs,10%)
+ 5 (PVA,10 yrs,10%)(PF,10 yrs,10%) = **20.343331**

SPRING 1990 MIDTERM

PROBLEM 1

Present Value of Liabilities = 100000(PVA,8%,5 yrs) (1/1.08^5) + 250000(PVA,8%,10yrs)(1/1.08^10)

+100000(PVA,8%,5 yrs) (1/1.08^20) =271737+777016+85662 =1134416

Current Assets = 500000

Remaining liabilities = 1134416 - 500000 = 634416

Annual cashflow required over next five years = 634416 (APV,8%,5 yrs) = 158894

PROBLEM 2

1. 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 = 62589

2. 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

3. 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

4. After-tax cashflow = (400000-160000) - (240000-100000)*0.4 = 184000

5. NPV = -500000 -62589 - 54126 - 6823 + 184000(1-(.1.1)^-5)/.1= 73966.7656

PROBLEM 3

NPV(I) = -12000 - 500/0.1 = -17000 EAC(I) = -17000*0.1 = -1700

! Remember this is a perpetuity: PV = A/i; A = PV*i;

NPV(II) = -5000 - 1000(1-(1.1)^(-20))/.1 = -13514 EAC(II) = -1587

NPV(III) = -3500 -1200(1-(1.1)^(-15))/0.1 = -12627 EAC(III) = -1660

CHOOSE OPTION II (GAS HEATING SYSTEM)

PROBLEM 4

a. (R) = 6 + 1.5*8.3 = 18.45%

b. 1 - R squared = 60% is diversifiable

c. First unlever the firm's beta = 1.5/(1+(0.6)(1)) = 0.9375

! 0.9375 = (0.33) (1) + (0.67) (Beta of remaining company)! Solve for this beta.

Estimate the beta of the firm after divestment = (0.9375 - 0.33)/0.67 = 0.90671642

(The divested division has a beta of one and a market value of $20 million.

This is one-third of the market value of the firm ($60 million))

Estimate the unlevered beta of the firm after new acquizition = 0.91 * (4/9) + 2 (5/9) = 1.515

! Equity : Existing= 40; Equity: New =50

(The new division has a market value of $ 50 million, and the value of the total firm is $90 million)

Estimate the levered beta after acquizition =1.52(1+(0.6)(2)) = 3.344

(The new debt equity ratio is 2. The new debt ($30 million) plus old debt ($30 million) equals $60 million. The equity stays at $ 30 million.

FALL 1990 MIDTERM EXAM

Problem 1

a. PV of Strawberry's offer = 4,000,000 (PVA, 10%, 5 years) = $15163147

PV of counter offer = 3,000,000 (PVA,10%,5)+1,000,000(PVA,10%,5)(PF,10%,5) = $1376,2141

Difference in PV = 1437006.43

b. 3,000,000 (PVA,10%,5)+ (X-1,000,000)(PVA,10%,5)(PF,10%,5) = 1437006.43

Solving for X, we get X= $ 610,510

Problem 2

a. Unlevered beta (Nuk-Nuk) = 1.3/(1+(1-0.6)0.5) = 1

Unlevered beta (Gerber) = 1.5/(1+ (1-0.5)1.00) = 1

This project has no debt. So the appropriate beta = 1.00

Appropriate discount rate = 8.5 + 1.0 (8.5) = 0.17

(If you use 8.3% the discount rate = 16.8%)

b. Revenues	30000	
Expenses	12000	
Garage cost	2000	
BTCF	16000	
Taxes	4400	(16000-5000)*0.4
ATCF	11600	

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=4600.

(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) = -2211.97362

Problem 3

Cost of the new facility =	100000	
- Capital gains from sale of facility =	10000	(100000-60000)*0.25
-Cost of new facility=	40000	
-Depreciation lost on old facility=	14746.9611	(6000*0.4*(PVA,10%,10))
+Depreciation gained on new facility=	9831.30737	(4000*0.4*(PVA,10%,10))
OPPORTUNITY COST=	45084.3463	

Problem 4

Unlevered beta of the firm = 1.5/(1+(1-0.5)1) = 1

(Remember regression betas are always levered betas)

Unlevered beta for division A = 1.31/(1+(1-0.5)0.2)= 1.19090909

(Divisional betas are asset betas; hence the unleveraged beta will do)

Setting the unlevered beta of the firm to the weighted averages of the divisonal betas,

1.00 = 0.6 (1.19) + 0.4 X

Solving for X, X = 0.715

b. If the company divests itself of B, it is left with division A (and its unlevered beta of 1.19)

New levered beta = 1.19 (1+ (1-0.5) 2) = 2..38

SOLUTIONS TO SPRING 1991 FINAL EXAM

1a. Annuity needed to get $10 million in 10 years at 8% =	690294.887	
1b. Amount that you will have in the bank at the end of yr 5 =	4049684.65	
Future value of $4049684 in year 10 at 6%=	5419391.58	
Shortfall that will have to be covered by annuity 6-10=	4580608.42	
Annuity needed to get 4580608 in 5 years @ 6%=	812583.446	1014269.66
Increase in annuity needed because of rate drop=	122288.559	

2a. Initial investment = 10 million (Distribution system) + 1 million (WC) = 11 million

2b.

Incremental Revenues =	10000000
Variable costs (40%)=	4000000
Advertising Costs	1000000
BTCF	5000000
Taxes	1600000 : (5000000-1000000)*0.4
ATCF	3400000

2c. NPV = -11,000,000 + 3,400,000 (PVA,10 years,8%) + 1,000,000 (PF, 10 years, 8%) =
12277470.2

2d. Precise Breakeven :

(-10000000 -.1x)+(.6x-1000000-(.6x-1000000-1000000)*.4)(PVA,10yrs,8%)+.1x/1.08^10=0

(-10000000-.1x)+(.6x-1000000-(.6x-1000000-1000000)*.4)(6.71)+.1x*0.4632=0

-.1x+2.4156x+.04632x = 10000000 +200000*6.71

2.36192x = 11342000

x = 4802025.47 or INCREASE 4.80% from initial level of 10%

Approximate Breakeven

(-11,000,000)+(.6x-1000000-(.6x-1000000-1000000)*.4)(PVA,10yrs,8%)+1000000/1.08^10=0

2.4156x = 11,000,000+200000*6.71-100000*0.4632

2.4156x = 12295680

x = 5090114.26 OF INCREASE 5.09% from initial level of 10%

3a.

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	
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	

3b. Contribution margin for 1% of capacity : for OLD= (100-50)/50= 1

for NEW= (80-44)/30= 1.2

YOU WILL LOSE LESS CUTTING BACK ON OLD PRODUCT

Year	Lost Capacity	$ BT loss (m)	$AT loss (m)	PV (loss)
5	-4.7	-4.7	-2.82	-1.75099813
6	-12.13	-12.13	-7.278	-4.10824126
7	-20.15	-20.15	-12.09	-6.20408165
8	-28.82	-28.82	-17.292	-8.06684562
9	-38.18	-38.18	-22.908	-9.71522824
10	-48.3	-48.3	-28.98	-11.1730445

TOTAL OPPORTUNITY COST= -41.0184394

3c. PV of Building facility in year 5 = 31.0460662

PV of depreciation benefits on this building = 2 million * 0.4 *(PVa, 10%, 25) * (PF, 10%, 5) = 4.50890216

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 = 13.1665627

PV of depreciation benefits on this building = 2 million * 0.4 *(PVa, 10%, 25) * (PF, 10%, 14) = 1.91221467

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) = 15.2828159

4a. Riskfree rate during the five-year period = 6%

(Whether this was annualized or monthly was not specified; I assumed that it was annual)

Riskfree rate (1- beta) = .5%(1-1.2) = -0.001

Alpha (Intercept) = 0.002

Alpha - Riskfree rate(1-Beta) = 0.20 - (-0.10) = 0.30% better than expected

4b. R squared = (1.2^2) (20^2)/(40^2) = 0.36

Hence 64% of this firm's risk is diversifiable

(If stated in terms of %, Unsystematic risk = 40^2 - 1.2^2 (20^2) = 1024%)

4c. Expected Return = Current riskfree rate + beta * 8.5% = 7% + 1.2*8.5 = 17.2%

Dividend Yield = 4%

Expected price appreciation = 17.2% - 4% = 13.2 %

Expected price = 50*(1.132) = 56.6

4d. Current levered beta = 1.2

Current Debt = 5 million Current equity = 5 million Current D/E ratio= 1

Unlevered beta = 1.2/(1+0.6*1) = 0.75

0.75 = 0.5 X + 0.5 (0.5) ! X is the unlevered beta of what's left of the firm

X = 1.00

New Debt = 3 million New Equity = 2 million New D/E ratio = 1.5

New levered beta = 1.00 *(1+0.6*1.5) = 1.9

MIDTERM - FALL 1992

Problem 1

a. FV of $ 5 million at the end of year 10 =	10.794625		(FV,10yrs,8%)
FV of $ 2 million in years 1-5 at the end of yr 10=		17.239923	(FVA,5 yrs,8%)(FV,5yrs,8%)
FV of $ 3 million outflow in years 6-10 in year 10=		-17.5998029	(FVA,5 yrs,8%)
FV in year 10 = 10.7946 + 17.2399 - 17.5998 =		10.4357	
b. Annuity per year = 10.4357 * .08 =	0.834856		

Problem 2

a. PV of lost rent (in after-tax terms) =	14000*0.6*(PVA,5 yrs,10%) =		31842.6089
PV of tax savings from depreciation =	10000*0.4*(PVA,5 yrs,10%) =		15163.1471
Opportunity Cost = 31842.61-15163.15 =		16679.46	
b. Opportunity Cost of Salary = 50000*0.6*(PVA,5 yrs, 10%) =			113723.603

c. Revenues	500000
Fixed Costs	50000
Var. Costs	200000
BTCF	250000
Tax	80000
ATCF	170000

BTCF	250000
Deprec'n	50000
Taxable Inc.	200000
Tax	80000
Net income	120000

d. NPV = -350000 - 16679 - 113724 + 170000 (PVA,5,10%) + 100000(PV,5,10%) =

226122.883 ! Accept the project

Problem 3

NPV of Wood Siding = -5000 - 1000 (PVA.10,10%) =	-11144.5671
EAC of Wood Siding = -11144*(APV,10,10%) =	-1813.63468

EAC of Aluminium Siding investment = -15000*.1 = -1500

Maintenance Cost for Aluminium Siding = 1813.63-1500 = 313.63

Problem 4

a. Expected Return = 3% + 1.2(8.5%) = 13.2%

b. Expected Price one year from today = 50*(1.132)-2.50 = 54.10

c. Actual Return on XYZ Stock = (50-54+2)/54 = -0.03703704

Expected Return on XYZ Stock = 5% + 1.2(-2-5) = -3.4% Return on mkt= -5% + 3% =

Excess Return = -3.70% - (-3.4%) = -0.3%

d. R squared = 1.44 * 20 / 50 = 56.60%

SOLUTION TO FALL 1993 EXAM

1a. Present Value of this contract = $9 m (PVA,8%,3 years) + $12 m(PVA,8%,4 years) (PF,8%, 3 years) =

54.7451497 millions

1b. Present Value of alternative contract = $8m(PVA,8%,7 years) + $25m(PF,8%,7 years) =

56.2382204 millions

1c. Breakeven Payment needed at end of seventh year = $25 million - FV of Difference in PV between contracts

22.4411394 millions

2a. Initial Investment = $10 mil + $5 mil (PF,15%,1 year) +$5 mil(PF,15%,2 years) =

18.1285444 millions

Opportunity Cost of the land = $200,000*0.6*(PVA,15%,12 years) =

650474.28

(The land cannot be leased out even in the first two years, since you are building a park on top of it.)

2b. After-tax cashflow each year:

Revenues	10
- Op. costs	3
- Deprec'n	1
Taxable Inc.	6
Tax (40%)	2.4
Net Income	3.6
+ Deprecn	1
ATCF	4.6

Note: The opporunity cost of the land could have been shown here and added on to the expenses.

2c. NPV of the project = -18,128,540 - 650,474 + 4,600,000 (PVA,15%,10) (PF,15%,2) + 10,000,000 (PF,15%,12) =

546644.027

I have assumed the following:

(1) The cashflows start in year 3 and go through year 12.

(2) The book value of the park = Initial Investment ($20 mil) - Depreciation ($1 mil * 10 years)

2d. If the project runs an extra ten years:

Initial Investment =	-18128540	
Opportunity cost =	-763039.529	(PV of 120,000 for 22 years)
PV of operating CF =	21771587.7	(4.6 mill in years 3-22)

NPV =		2880008.21

The book value of the park is zero.

(The salvage value of land is irrelevant, since it would apply even if the land were leased.)

3. EAC of using outside printer = -2000

(It is already an annual cost. What is the point of calculating the NPV, and then recalculating the EAC?)

NPV of buying printer = -10000 - 500 (PVA,10%,10 years) =	-13072.2836
EAC of buying printer =	-2127.45395

4a. R squared = (Beta^2)(Variance of the market)/Variance of the stock) =	0.48
Beta =√((.48*.6)/.2) =	1.2

4b. Intercept - Riskfree rate (1-Beta) = Jensen's Alpha

Intercept - 0.07% (1-1.2) = -0.01%

Solving for the intercept,

Intercept = -0.024 %

4c. Not necessarily. It also depends upon the variance of the stock.

Solution to Midterm: Fall 1994

PROBLEM 1

a. Present Value of $ 80,000 for 25 years @ 5% =	**$1,127,516**
b. Future Value of $250,000 in ten years at 5% =	$407,224
Shortfall in year 10 =	$720,292
Annual Savings needed to make up shortfall (in year 10) =	**$57,267**
c. Annuity that can be paid out @ 4% =	$72,174
Reduction in annuity as a consequence of 4% rate =	**$7,826**

PROBLEM 2

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	$0	$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	$0	$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

PROBLEM 3

NPV of Project A = -5,000,000 + 2,500,000 (PVA,10%,5) =	$4,476,967
Equivalent Annuity for Project A = 4476967 (APV,10%,5) =	**$1,181,013**
NPV of Project B = 1,000,000 (PVA,10%,10) + 2,000,000/1.1^10 =	$6,915,654
Equivalent Annuity for Project B = 6915654 (APV,10%,10) =	**$1,125,491**
NPV of Project C = 2,500,000/.1 - 10,000,000 -5,000,000/1.1^10 =	$13,072,284
Equivalent Annuity for Project C = 13072284 *0.1 =	**$1,307,228**

PROBLEM 4

a. Expected return over next year = 4.8% + 1.25 (8.5%) = **15.43%**

b. I would use the thirty-year bond rate as the riskfree rate

Expected return for project = 8% + 1.25* (5.5%) = **14.88%**

c.

Intercept - Rf(1-Beta) =	0%	[1.042^(1/12)-1]
		Remember that regression is monthly
0.25 - Rf (1-1.25) =	0.34%	
0.25 Rf =	0.09%	
Monthly Rf =	0.37%	
Annualized Riskfree Rate =	**4.58%**	

d. Unlevered Beta = 1.25/(1+(1-0.4)(0.5)) = 0.961538462

New Debt Equity Ratio = (50 + 50)/100 = 1.00

New Levered Beta = 0.96 (1+0.6*1) = 1.536

Solution to Midterm: Fall 1995

Problem 1

a. Future Value of Current Savings =	$ 265,329.77	*c. If interest rate after year 10 rises to 6%,*			
Future Value of Proceeds from House Sale =	$ 130,311.57	Future Value of Current Savings =	$ 291,710.2		
Future Value of Savings from 1st 10 years =	$ 204,880.62	Future Value of Proceeds from House Sale =	$ 143,267.8		
Future Value of Savings from next 10 years=	$ 188,668.39	Future Value of Savings from 1st 10 years =	$ 225,250.9		
	$789,190.34	Future Value of Savings from next 10 years=	$ 197,711.9		
				$ 857,940.86	
b. Annuity for 15 years based upon FV =	$ 76,032.40				

Problem 2

Initial Investment =	$150,000.00	
Opp. Cost of Apartment =	$ 32,442.99	
Initial Working Capital =	$ 50,000.00	(If calculated as 25% of Revenues)

Annual Operating Cash Flow

Revenues	$200,000.00
Material & Labor	$ 50,000.00
Advertising Expense	$ 50,000.00
BTCF	$100,000.00
- Depreciation	$ 25,000.00
Taxable Income	$ 75,000.00
Taxes	$ 30,000.00
Net Income	$ 45,000.00
+ Depreciation	$ 25,000.00
ATCF	$ 70,000.00

If working capital is calculated as 25% of COGS ($ 12,500), the net present value would be $78,670

Salvage of Working Capital -	$50,000
Salvage of Equipment =	$25,000

Net Present Value =	$ 62,448.36

Problem 3

Annual Pre-tax REAL Savings =	$30,000
Depreciation =	$20,000
REAL Taxable Income =	$10,000
Taxes at 30% =	$3,000
Net Income =	$7,000
Add back Depreciation to get ATCF of	$27,000

The net present value should be the same, whether real CF are discounted at real rates, or nominal cash flows are discounted at the nominal rate . Therefore, we can solve for the real rate –
NPV = $ 10,705 = – $ 100,000 + $ 27,000 (PVA,r, 5 years) The IRR is 7%
Inflation Rate = (1 + Nominal Rate) / (1 + Real Rate) - 1 = 1.10/1.07 - 1 = 2.80%
Approximate solution: Inflation Rate = Nominal Rate - Real Rate = 10% - 7% = 3%

Problem 4

a. Jensen's Alpha = -0.05% - (.5%(1-1.2)) = .05%

b. Before the Restructuring …

Debt	$ 20	Other	$ 160

Equity	$ 160	Magazine	$ 20	
Unlevered Beta before restructuring = 1.2/(1+0.6*(20/160)) =				1.12

Set as a weighted average of the magazine and other, (.6) (20./180) + X (160/180) = 1.12

Unlevered Beta after the sale of magazine division = (1.12 - (20/180)(0.6))/(160/180)

	1.19		
New Debt Equity Ratio after the restructuring = 40/120 =		0.333333333	
New Levered Beta after the restructuring = 1.19 (1+0.6*0.333) =			1.42

Solutions to Midterm: Spring 1996

Problem 1a	*PV today*	
PV of $ 50 mil/yr in years 1- 5	$ 189.54	
PV of $ 100 mil/yr in years 6 -10	$ 235.38	(PV of annuity in year 5; Discount back 5 years)
PV of $120 mi/yr @ 5% forever	$ 971.57	(PV in year 10 = $ 126/(.1-.05); Discount back 10 yrs)
PV of Cash Outflows =	$ 1,396.49	

Problem 1b

Value of Assets in Plan =	$	1,000
- PV of Cash Outflows in yrs 1-5	$	190
- PV of Cash Outflows in yrs 6-10	$	235
PV of Remnant	$	575
FV of Remnant - move to year 10	$	1,492
Cash needed in year 10	$	2,520
Cash Shortfall	$	1,028

Problem 1c

Cash Annuity to cover shortfall	$	65

Problem 2a. Initial Investment in Project

Packaging Equipment =	$	12,000,000
Working Capital =	$	2,500,000
Total Initial Investment =	$	14,500,000

Problem 2b. Opportunity Cost of Computer Facility

PV of Buying in year 3 =	$	3,756,574
PV of Buying in year 6 =	$	2,822,370
Opportunity Cost =	$	934,204

Problem 2c: Annual After-tax Cash Flows

Revenues	$	7,000,000
- Advertising Expense	$	2,000,000
- Salaries of Employees	$	1,000,000
- G & A Cost	$	500,000
= BTCF	$	3,500,000
Taxes	$	1,000,000
= ATCF	$	2,500,000

BTCF	$3,500,000
- Depreci'n	1000000
ATCF	$2,500,000
Taxes	1000000

Problem 2d: NPV

NPV = -14,500 - $ 934 + $ 2,500 (PVA,10%,10) + ($ 2,000 + $ 2,500)/1.1^10 = $ 1,662,158

Problem 3

NPV of Buying Van = -15000 - 3000 (PVA,12%,5) =	$	(25,814)
Equivalent Annual Cost of Buying Van = -25814 (APV,12%,5) =	$	(7,161)

At this stage, this problem can be solved in one of two ways
Compare to the annual cost of using an outside service
Year 1: $ 6000 Year 2: $ 6120... You would not buy a van at least until year 9, assuming the van cost stays fixed.

Alternatively, assume that this service choice can be made only now and is a permanent choice

PV of Growing Perpetutity = 6000*1.02/(.12-.02) =	$ (61,200)
EAC of Growing Perpetuity = $ 61,200 * .12 =	$ (7,344)

Problem 4

a. Performance Analysis

Intercept =	0.13%
Rf (1 - Beta) = 0.5%(1-1.12) =	-0.06%
Intercept - Rf (1 - Beta) =	0.19%

b. Cost of Equity

The only current riskfree rate given is a T.Bond rate.

Cost of Equity = 6.5% + 1.12 (5.5%) = 12.66%

c. Calculating Beta

Unlevered Beta now = (1.12/(1+0.6*0.25)) = 0.973913043 (Use debt/equity ratio during regression)

Calculate unlevered beta after acquisition:

Unlevered Beta after acquisition = 0.97 (150/200) + 1.30 (50/200) = 1.0525

Calculate new debt equity ratio

New Debt = $ 30 + $ 20 =	$ 50
New Equity = $ 120 + $ 30 =	$ 150
New Debt Equity Ratio = 50/150 =	33%

Calculate new beta

New Levered beta = 1.05 (1 + 0.6* 0.33) = 1.2579

Note: I also gave full credit if you assumed that the debt ratio was the debt equity ratio, in this example. In that case the unlevered beta is slightly higher for the existing firm (1.00) and the unlevered beta after the acquisition is also
higher (1.075). The new levered beta is then 1.29.