

FIN 6100

Spring 2017

Name

YOUR NAME HERE!!

NOTE: Type your name in cell G1

Multiple Choice

1	D	0
2	A	0
3	A	0
4	B	0
5	B	0
6	C	0
7	D	0
8	E	0
9	E	0
10	B	0

Total missed 0

Total off 0

YOUR NAME HERE!!

Problem 1 (12 points) You are saving for retirement and currently have \$50,000 in your retirement account. You plan to save \$700 per month in real terms for the next 25 years. When you retire, you will make monthly withdrawals for 30 years. Additionally, you want to go on a trip around the world in 10 years. You expect the cost of the trip will be \$100,000 in nominal terms at that time. You can earn a 12 percent nominal EAR before you retire and a 7 percent nominal EAR after you retire. If the inflation rate is a 3.8 percent EAR over the entire period, how much can you withdraw each month in real terms? What is the nominal value of your last withdrawal?

Value today	\$	50,000
Monthly savings	\$	700
Years to save		25
Years for withdrawals		30
Year of trip		10
Nominal cost of trip	\$	100,000
Nominal preretirement EAR		12%
Nominal post retirement EAR		7%
Inflation EAR		3.8%

Real preretirement EAR	7.900%	Real post retirement EAR	3.0829%
Real preretirement APR	7.627429%	Real post retirement APR	3.0401%
Real value of trip	\$68,869.43		
Savings at time of trip	\$232,383.54		
Value of savings after trip	\$163,514.12		
Value at retirement	\$745,911.70		
Withdrawal value	\$3,160.96		
Nominal value of last withdrawal	\$24,585.19		

YOUR NAME HERE!!

Problem 2 (8 points) You have just won the Joe Schmo Lottery™. You will receive 20 payments of \$500,000 every four years with the first payment 3 years from today. Since you don't think you will be around to receive all of the payments, you go to a broker to sell your winnings. If the appropriate interest rate is a 7 percent APR compounded daily, how much should you receive today for your winnings?

Number of payments	20
Amount of payments	\$ 500,000
Years between payments	4
Year of first payment	3
Interest rate	7%
Compounding periods for interest rate	365

EAR 7.250%
4-year rate 32.309%

Value at Year -1 \$1,541,810.20

Value today **\$1,653,592.95**

YOUR NAME HERE!!

Problem 3 (8 points) An engineer in 1963 earned \$8,000 per year. In 2017, his salary had increased to \$87,000. Over the same period, the average price of goods has increased by 6.2 times. What is his real income in 1963 dollars?

First year		1963
Salary in first year	\$	8,000
Last year		2017
Last year salary	\$	91,000
Increase in price of goods		6.2

Inflation rate 3.437%

Nominal salary increase 4.606%

Real salary increase 1.130%

Salary in 1963 dollars **\$14,677.42**

YOUR NAME HERE!!

Problem 4 (11 points) You have recently won the super jackpot in the Conch Republic Lottery. On reading the fine print, you discover that you have the following three options:

Option 1: You will receive 31 annual payments of \$175,000, with the first payment being delivered today. The payments will be taxed at a rate of 28 percent.

Option 2: You will receive \$530,000 now, and you will not have to pay taxes on this amount. In addition, beginning one year from today, you will receive \$125,000 each year for 30 years. These payments will be taxed at 32 percent.

Option 3: You will receive \$150,000 now, and you will not have to pay taxes on this amount. The payment next year will be \$125,000 and will grow at 4 percent per year for 30 payments. These payments will be taxed at a rate of 30 percent.

All taxes will be withheld when the checks are issued. Using an APR of 10 percent compounded monthly, which option should you select?

Option 1:	
Total annual payments	31
Annual payments	\$ 175,000
Tax rate	28%
Option 2:	
Payment today	\$ 530,000
Total annual payments	30
Annual payments	\$ 125,000
Tax rate	32%
Option 3:	
Payment today	\$ 150,000
Total annual payments	30
Annual payments	\$ 125,000
Payment growth rate	4%
Tax rate	30%
APR	10%
Compounding periods	12

Option 3 alternate solution

	Pretax	Aftertax
1	\$ 125,000	\$ 87,500.00
2	\$ 130,000.00	\$ 91,000.00
3	\$ 135,200.00	\$ 94,640.00
4	\$ 140,608.00	\$ 98,425.60
5	\$ 146,232.32	\$ 102,362.62
6	\$ 152,081.61	\$ 106,457.13
7	\$ 158,164.88	\$ 110,715.41
8	\$ 164,491.47	\$ 115,144.03
9	\$ 171,071.13	\$ 119,749.79
10	\$ 177,913.98	\$ 124,539.78
11	\$ 185,030.54	\$ 129,521.37
12	\$ 192,431.76	\$ 134,702.23
13	\$ 200,129.03	\$ 140,090.32
14	\$ 208,134.19	\$ 145,693.93
15	\$ 216,459.56	\$ 151,521.69
16	\$ 225,117.94	\$ 157,582.56
17	\$ 234,122.66	\$ 163,885.86
18	\$ 243,487.56	\$ 170,441.29
19	\$ 253,227.06	\$ 177,258.95
20	\$ 263,356.15	\$ 184,349.30
21	\$ 273,890.39	\$ 191,723.28
22	\$ 284,846.01	\$ 199,392.21
23	\$ 296,239.85	\$ 207,367.89
24	\$ 308,089.44	\$ 215,662.61
25	\$ 320,413.02	\$ 224,289.11
26	\$ 333,229.54	\$ 233,260.68
27	\$ 346,558.72	\$ 242,591.11
28	\$ 360,421.07	\$ 252,294.75
29	\$ 374,837.91	\$ 262,386.54
30	\$ 389,831.43	\$ 272,882.00

EAR 10.471%

Option 1	
Aftertax payment	\$ 126,000.00
Value today	\$ 1,268,630.66

Option 2	
Aftertax payment	\$ 85,000.00
Value of cash flows today	\$ 770,822.27
Total value	\$ 1,300,822.27

Option 3	
Using 4% as an inflation rate	
Real growth rate	6.222%
Aftertax payment	\$ 87,500.00
"Real" aftertax payment	\$ 84,134.62
Value of cash flows today	\$1,131,051.72
Total value	\$1,281,051.72

PV	\$1,615,788.17	
PV aftertax	\$1,131,051.72	\$1,131,051.72
Total PV	\$1,281,051.72	\$1,281,051.72

You should choose Option 2.

YOUR NAME HERE!!

Problem 5 (12 points) You are planning to save for your retirement in 35 years and the college tuition for your two children. Your current monthly salary is \$9,000 per month and you expect your salary to keep pace with inflation. You expect inflation to be a 3.5 percent EAR for the rest of your life. You plan to deposit 12 percent of your salary each month into a retirement account. Additionally, your employer will deposit 4 percent of your salary into the account. You expect to earn a 10.8 nominal nominal EAR in your retirement savings account until retirement. Your children will begin college 15 years and 17 years from now. The university that you plan for your children to attend has started a new legacy program where for a minimal donation today, the school will guarantee that the tuition for your first child will be \$130,000 and the tuition for your second child will be \$135,000. Each of these tuition payments will be made when your child starts college and will cover the entire four years of tuition. If you can earn an 8.7 percent EAR after you retire, how much can you withdraw each month in real terms for the 25 years of your retirement?

Year until retirement		35
Salary payments per year		12
Monthly salary	\$	9,000
Inflation (EAR)		3.5%
Percentage of salary to save		12.0%
Employer deposit amount		4.0%
Pre-retirement return (EAR)		10.8%
1st child starts college (years)		15
2nd child starts college (years)		17
1st child tuition	\$	130,000
2nd child tuition	\$	135,000
Post-retirement return (EAR)		8.7%
Years in retirement for withdrawals		25

Pre-retirement EAR		7.0531%	Post-retirement EAR		5.0242%
Pre-retirement APR		6.8349%	Post-retirement APR		4.9120%
Monthly deposit	\$	1,080.00			
Employer deposit	\$	360.00			
Total deposit	\$	1,440.00			
Real value of tuition in 15 years	\$	77,595.78			
Real value of tuition in 17 years	\$	75,222.51			
FV of savings in 15 years	\$	449,932.46			
After tuition	\$	372,336.68			
FV of savings in 17 years	\$	463,632.95			
After tuition	\$	388,410.44			
Value of savings in 35 years at retirement	\$	1,933,951.63			
Amount of monthly real retirement withdrawal	\$	11,206.80			

YOUR NAME HERE!!

Problem #6 (9 points) You have successfully started and operated a company for the past 10 years. You have decided that it is time to sell your company and spend time on the beaches of Hawaii. A potential buyer is interested in your company, but does not have the necessary capital to pay you a lump sum. Instead, he has offered \$500,000 today and annuity payments for the balance. The first payment will be for \$150,000 in three months. The payments will increase at 2 percent per quarter and a total of 25 quarterly payments will be made. If you require an EAR of 11 percent, how much are you being offered for your company?

Years company owned		10
Cash today	\$	500,000
First annuity payment	\$	150,000
Months to first payment		3
Quarterly increase in payments		2%
Number of payments		25
Return (EAR)		11%

APR		10.573%
Rate per quarter		2.643%

"Real" rate per quarter		0.631%
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"Real" first quarter payment	\$	147,058.82
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PV of payments	\$	3,391,407.12
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Total value offered	\$	3,891,407.12
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YOUR NAME HERE!!

Problem 7 (11 points)) The most recent financial statements a company are shown below. Sales for next year are projected to grow by 20 percent. Interest expense, notes payable, long-term debt and depreciation will remain constant; the tax rate and the dividend payout rate will also remain constant. Costs, other expenses, current assets, and accounts payable increase spontaneously with sales. Suppose the company is operating at 90 percent capacity and wishes to increase its sales by 20 percent. Prepare the pro forma financial statements and calculate the EFN. Assume fixed assets can be increased in any dollar amount desired and the company wants to operate at full capacity.

Projected growth rate		20%		
Tax rate		40%		
Operating capacity		90%		
Sales	\$	99,000,000		
Cost of goods sold		54,300,000		
Other expenses		10,750,000		
Depreciation		5,252,000		
EBIT	\$	28,698,000		
Interest		2,175,000		
EBT	\$	26,523,000		
Taxes (40%)		10,609,200		
Net income	\$	15,913,800		
Dividends	\$	11,125,100		
Additions to retained earnings		4,788,700		
	Assets		Liabilities & Equity	
Current assets			Current liabilities	
Cash	\$	679,000	Accounts payable	\$ 1,150,000
Accounts receivable		2,090,000	Notes payable	2,915,000
Inventory		4,376,500	Total	\$ 4,065,000
Total	\$	7,145,500	Long-term debt	\$ 33,750,000
Fixed assets			Owners' equity	
Net plant and equipment	\$	62,740,000	Common stock and paid-in surplus	\$ 4,000,000
			Accumulated retained earnings	28,070,500
			Total	\$ 32,070,500
Total assets	\$	69,885,500	Total liabilities and owners' equity	\$ 69,885,500

NOTE: I have included the outline for the pro forma financial statements below to save time. However, other calculations may be required.

Payout ratio	69.909%
Full capacity sales	\$ 110,000,000
Full capacity ratio = Fixed assets / Full capacity sales	0.570363636

Sales	\$	118,800,000
Cost of goods sold		65,160,000
Other expenses		12,900,000
Depreciation		5,252,000
EBIT	\$	35,488,000
Interest		2,175,000
EBT	\$	33,313,000
Taxes (40%)		13,325,200
Net income	\$	19,987,800

Dividends	\$	13,973,173
Additions to retained earnings		6,014,627

	Assets	
Current assets		
Cash	\$	814,800
Accounts receivable		2,508,000
Inventory		5,251,800
Total	\$	8,574,600
Fixed assets		
Net plant and equipment	\$	67,759,200
Total assets	\$	76,333,800

	Liabilities & Equity	
Current liabilities		
Accounts payable	\$	1,380,000
Notes payable		2,915,000
Total	\$	4,295,000
Long-term debt	\$	33,750,000
Owners' equity		
Common stock and paid-in surplus	\$	4,000,000
Accumulated retained earnings		34,085,127
Total	\$	38,085,127
Total liabilities and owners' equity	\$	76,130,127

EFN	\$	203,673
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