

## Multiple Choice

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

Total missed 0

Points off 0

**YOUR NAME HERE**

investment was \$11 million. Each of these values is expected to grow at 20 percent next year, with the growth rate declining by 4 percent per year until the growth rate reaches 4 percent, where it is expected to remain indefinitely. There are 4.8 million shares of stock outstanding and the return on the company's stock is 11 percent return on the company's stock. The corporate tax rate is 40 percent. What is the price per share?

Sales	\$ 117,000,000			
Costs	\$ 53,000,000			
Net investment	\$ 11,000,000			
		<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
Revenue, cost, and investment growth		20%	16%	12%
Terminal growth rate		4%		
Shares outstanding	4,800,000			
Required return	11%			
Tax rate	40%			

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>
Sales	\$ 140,400,000	\$ 162,864,000	\$ 182,407,680	\$ 197,000,294
Costs	63,600,000	73,776,000	82,629,120	89,239,450
Pretax profit	\$ 76,800,000	\$ 89,088,000	\$ 99,778,560	\$ 107,760,845
Taxes	30,720,000	35,635,200	39,911,424	43,104,338
Net income	\$ 46,080,000	\$ 53,452,800	\$ 59,867,136	\$ 64,656,507
Net investment	13,200,000	15,312,000	17,149,440	18,521,395
Cash flow	\$ 32,880,000	\$ 38,140,800	\$ 42,717,696	\$ 46,135,112

Year 5 cash flow \$ 47,980,516

Terminal value in Year 4 \$ 685,435,945

Value of company today \$ 573,720,876

Price per share **\$ 119.53**

**YOUR NAME HERE**

**Problem 2 (9 points)** Babe Ruth was the highest paid baseball player in 1931 with a salary of \$80,000. In 2017, Clayton Kershaw has baseball's highest salary at \$35,571,428. Assume that the inflation index, which stood at 43.16 in 1931, was 637.74 in 2017. What was the real growth rate in the highest baseball salary? What real salary was Clayton Kershaw paid in 2017 assuming he received the same real salary as Babe Ruth?

First year		1931
Salary at first year	\$	80,000
Current year		2017
Current year salary	\$	35,571,428
Original inflation index		43.16
Current inflation index		637.74

Inflation 3.18%

Nominal increase 7.35%

Real increase 

4.04%
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Real current salary 

\$2,407,349.13
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**YOUR NAME HERE**

**Problem 3 (11 points)** You have just won the Forever Lottery and been approached by someone to buy your winnings. You will be paid \$2.5 million today. Additionally, you will receive \$450,000 every other year beginning in one year and \$550,000 every three years beginning two years from today. The appropriate interest rate is an APR of 4.6 percent, compounded monthly. What is the minimum price you should ask for your

Payment today	\$	2,500,000
First payment stream	\$	450,000
Year of payment		1
Years between payments		2
Second payment stream	\$	550,000
Year of payment		2
Years between payments		3
APR		4.6%
Periods in a year		365

EAR	4.707%
Rate for 2 years	9.636%
Rate for 3 years	14.797%

PV of first CF at Time -1	\$	4,670,061.86
PV of first CF at Time -1	\$	3,717,080.98

Value of future cash flows today \$ 8,781,937.19

Total Value today **\$ 11,281,937.19**

**YOUR NAME HERE**

**Problem 4 (12 points)** You want to save for your retirement. You currently have \$125,000 in an account that will earn a nominal EAR of 10.4 percent until you retire in 35 years. After you retire, you want to withdraw \$15,000 per month in real terms for 15 years. For the last 10 years of your retirement, you will slow down so you will only withdraw \$8,500 per month in real terms. When you make the last withdrawal, you believe that you will be hit by a driverless car killed, which means you will need no money after this withdrawal. After you retire, you will earn a nominal EAR of 6.8 percent. Additionally, in 20 years, you would like to give Belmont \$500,000 in nominal terms to name a chair after your favorite Finance professor! The inflation rate will be an effective annual rate of 3.3 percent over the next 60 years. How much will you have to deposit each month to accomplish your goals? What is the nominal value of your account when you retire?

Current account value	\$	125,000
Pre-retirement EAR (nominal)		10.4%
Years until retirement		35
First real retirement withdrawal	\$	15,000
Years for first withdrawal		15
Second real retirement withdrawal	\$	8,500
Years for second withdrawal		10
Post-retirement EAR (nominal)		6.8%
Donation for chair (nominal)	\$	500,000
Year for chair donation		20
Inflation rate (EAR)		3.3%
Periods per year		12

Real pretirement EAR	6.8732%	Real post retirement EAR	3.3882%
Real preretirement APR	6.6657%	Real post retirement APR	3.3367%

Amount for 2nd withdrawals (real) \$ 866,262.76

Amount needed at retirement: (real) \$ 2,647,488.14

PV of chair \$ 69,117.58

Account value today minus chair \$ 55,882.42

Real amount to save **\$ 1,247.15**

Account value at retirement **\$ 8,247,935.90**

**YOUR NAME HERE**

**Problem 5 (9 points)** Credit terms are often stated in the following manner: 1.5/10, net 30. This means that if you pay within 10 days, you can take a 1.5 percent discount on the price, else the full amount is due in 30 days. For example, if you buy \$1,000 in goods, you can pay \$985 within 10 days or pay \$1,000 within 30 days. What is the APR and EAR on this arrangement if you do not take advantage of the discount?

Discount		1.50%
Day to pay for discount		10
Day full amount is due		30
Discount payment	\$	985
Full payment	\$	1,000
Days per year		365

Periods per year 18.25

Rate per period 1.52284%

APR 

27.79%
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EAR 

31.76%
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**YOUR NAME HERE**

**Problem 6 (9 points)** A financial advisor is trying to sell you an increasing perpetuity. One year from today you will receive \$5,000, and the payments will increase at \$5,000 per year. Thus, in 2 years you will receive \$10,000, in 3 years you will receive \$15,000, and so on. If the interest rate is a 3.9 percent APR compounded quarterly, how much should you pay for this perpetuity today?

Perpetuity payment	\$	5,000
APR		4.0%
Compounding periods per year		4

EAR 4.060%

PV of single perpetuity \$ 123,140.55

PV of perpetuities except first \$ 3,032,718.86

Total PV **\$ 3,155,859.41**

\$ 3,155,859.41





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

Payout ratio	47.11%
Retention ratio	52.89%
ROE	10.59%
Sustainable growth rate	5.93%
Full capacity sales	\$ 171,111,111

Sales	\$ 163,137,473
Cost of goods sold	116,685,667
Other expenses	19,491,750
Depreciation	8,400,000
EBIT	<u>\$ 18,560,056</u>
Interest	<u>2,900,000</u>
EBT	\$ 15,660,056
Taxes (40%)	<u>6,264,023</u>
Net income	\$ 9,396,034

Dividends	\$ 4,426,871
Additions to retained earnings	4,969,163

	<b>Assets</b>
Current assets	
Cash	\$ 1,331,583
Accounts receivable	3,983,097
Inventory	7,869,794
Total	<u>\$ 13,184,474</u>
Fixed assets	
Net plant and equipment	\$ 94,157,300
Total assets	<u><u>\$ 107,341,774</u></u>

	<b>Liabilities &amp; Equity</b>
Current liabilities	
Accounts payable	\$ 2,330,853
Notes payable	1,740,000
Total	<u>\$ 4,070,853</u>
Long-term debt	\$ 22,500,000
Owners' equity	
Common stock and paid-in surplus	\$ 7,500,000
Accumulated retained earnings	77,632,163
Total	<u>\$ 85,132,163</u>
Total liabilities and owners' equity	<u><u>\$ 111,703,016</u></u>

EFN **\$ (4,361,242)**