NAME (PRINT IN FULL ON LINE BELOW) SECTION:

Werner 8am=1, Werner 10am=3,
Pfleiderer 10am=2,
Pfleiderer 1pm=4, Pfleiderer 3pm = 5

F220
Midterm Examination
Winter, 1998
February 11, 1998
Professors Pfleiderer and Werner

Exam Poems
Pfleiderer: 70*, 71, 62, 81, 82, 83
Werner: 50*, 51, 52, 61, 72

At the end of the examination put your exam in the lockboxes at Central Services according to your section number:

[redacted]
Section 2: 30, 31
Section 3: 37, 38.
Section 4: 43, 44
Section 5: 50, 51

THERE ARE 22 PAGES IN THIS EXAM.
PLEASE CHECK TO MAKE SURE THAT YOU HAVE ALL PAGES.

PLEASE SEE NEXT PAGE FOR ADDITIONAL INSTRUCTIONS

[redacted]

In recognition and spirit of the Honor Code, I certify that I have not and will not receive or give aid on the examination and that I will report, to the best of my ability, all Honor Code violations observed by me.

Signed_____

You have exactly three hours to complete this examination. All answers must be recorded on the examination. Many questions ask that some value or values be calculated. For all these questions you should show on the exam itself all of the intermediate steps involved in the calculations. This allows us to give you partial credit if you approach the question in a generally correct manner but nevertheless fail to arrive at the correct answer. You may consult the textbook, handouts and your notes. Instructors will check back occasionally to answer questions. One of the instructors will be available in Arbuckle Lounge to answer questions. ***Print your name and section number at the top of the first page. Also read and sign the honor code on the first page. Do not write below the line on this page.***

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(1) **(10)**_____

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(11) **(10)**_____

(12) **(10)**_____

(Total) **(120)**_____

1. (10 points) Indicate which of the following are true statements and which are false. *Briefly* explain your answer in the space provided. *To receive full credit you must provide an explanation.*

A. *Ira Shunnel* is convinced that she has an edge over the market when it comes to picking stocks. She proudly proclaims that her portfolio of stocks has beaten the market every year for the last three years. Therefore the market does not know how to value stocks correctly. In other words, the stock market must be inefficient.

❑ **True**

❑ **False**

Explanation:

B. *Tech Nickell* has a fondness for studying charts of stock prices that he downloads from the Web. He particularly likes the multi-colored ones. *Tech* has noticed that stock prices have generally increased over the most recent ten year period. Therefore, he concludes, stock returns cannot be random walks.

❑ **True**

❑ **False**

Explanation:

C. *Segmend Tedd*, a German business man, and *Glow Ball*, the CEO of an American high tech firm, end up sitting next to each other on a flight from San Francisco to Frankfurt. *Glow Ball* indicates that he is traveling to Germany to look into the possibility of raising capital for his US firm in the German Market. *Segmend*, upon hearing this, begins laughing uncontrollably. He says that *Glow* should bail out of the plane immediately. He says, "Recent studies German investors will demand a higher required rate of return on any stock you issue in Germany than US investors would demand if you sold your stock in the US." Assuming that the risk free rate is the same in Germany and the United States and that exchange rate risk is irrelevant, is *Segmend's* statement that *Glow* will necessarily face a higher required rate of return in Germany true or false?

❑ **True**

❑ **False**

Explanation:

2. **(10 points)** For this problem assume that the Capital Asset Pricing Model holds and that the riskfree rate is 5%, the expected return on the market is 13% and the standard deviation of the market is 22%.

Huck Ster is an investment advisor. He is recommending that his client, *Meenvar Eance*, invest some of his money in T-Bills and the remainder in the Supra Fund, a portfolio of risky securities. In fact, *Huck Ster* is recommending a particular combination of investment in T-Bills and the Supra Fund to *Meenvar Eance*. He claims that this combination will give *Meenvar Eance* an investment position with an expected return of 9% and a standard deviation of 12%. Is the claim made by *Huck Ster* potentially an honest claim? In other words, is it possible that the portfolio position recommended by *Huck Ster* has an expected return of 9% and a standard deviation of 12%?

❑ **The claim is possibly true because a position with an expected return of 9% and a standard deviation of 12% is feasible.**

❑ **The claim is false because a position with an expected return of 9% and a standard deviation of 12% is infeasible.**

3. **(10 points)** *Fidel Ittee* is a portfolio manager who is concerned about his ranking relative to other portfolio managers, especially his close friend from business school, *Van Guard*. In practice portfolio managers are often evaluated by a measure called the Sharpe Ratio (formulated by and named after Professor William F. Sharpe, a member of our faculty). The Sharpe Ratio is defined as the average historical return earned on a managed portfolio over a period of time minus the

$$\text{Sharpe Ratio} = \frac{\text{average return over period} - R_f}{}$$

Assume that *Fidel* is trading in a market where all securities are priced according to

market portfolio is 14.5%. Also assume that the standard deviation on the market is 25%. If *Fidel* has no special information or ability and his objective is to attain the highest possible ratio, what is your prediction for the Sharpe Ratio he will obtain?

_____ is my prediction for the Sharpe Ratio Fidel will attain.

4. **(10 points)** *Arb I. Trage* is evaluating a three year, 10% coupon bond. The table below gives information about this bond and the prices of Treasury Strips.

Year t	Received In year t On a 10% bond	Price Of a dollar Received in Year t
1	10	0.92
2	10	0.81
3	110	0.69

Arb has calculated that the Yield to Maturity of the 3 year, 10% bond is exactly 12.52%. Assuming that one can buy or sell the bond and can buy or sell the Treasury Strips as the prices quoted above, determine whether *Arb* has an arbitrage opportunity in the bond market using the three year bond and the treasury strips.

☐ **There is no arbitrage opportunity available.**

☐ **There is an arbitrage opportunity available.**

Important: If you check that there is no arbitrage opportunity, you must show below that the bonds are priced in a way that does not allow arbitrage. If you check that there is arbitrage opportunity, you should show how Arb can trade to realize arbitrage profits.

5. (10 points) For this problem assume that the capital asset pricing model holds. *Cap Spending* is in charge of investment project evaluation at Conglomerate industries. CH is an all equity firm. The beta of the company's stock is 0.9. *Cap* is now evaluating two projects that would be undertaken in its consumer electronics division. Recent studies report that consumer electronics companies have betas equal to 1.6. Company policy dictates that all projects be evaluated using the discount rate based on the company's overall risk as measured by the beta of 0.9. The two consumer electronics projects under consideration are:

Year	Project A	Project B
0	-10	-20
1	4	12
2	7	12

Additional information that is available to *Cap* is that the expected return on the market is 12.50% and the risk free rate is 6.50%. The company can take either or both of the projects. Assuming that the company follows the procedure of using the company cost of capital to discount all cash flows, which project(s) does the company undertake? Assume that the company undertakes any and all projects that have positive net present values (NPV) according to its calculations using the company-wide discount rate.

- ❑ **Company takes project A.**
- ❑ **Company takes project B.**
- ❑ **Company takes both projects A and B.**
- ❑ **Company takes neither project A nor project B.**

Based on the company action that you selected above, what is the change in the value of CH from the point of view of its shareholders?

_____ is the change in the value of Conglomerate Holdings.

6. **(10 points)** *Anne Ouhitee* read in the Economist (May 3rd, 1997) about a new bond issue that Eurotunnel is planning to bring to the market. The text of the article is on the next page, but you do not need to read it to solve this problem. Suppose that Eurotunnel has previously issued bonds with a 65 year maturity. The novelty with the current bond issue is that the bonds will have a maturity of 999 years. Suppose that both types of bonds pay a constant payment of FF15,000 per bond

assume that Eurotunnel's cash flows are riskless(!) Finally, assume that neither bond pays principal at maturity. (This type of bonds are called annuities.) What is the difference in price that *Anne* should be willing to pay for the 999 year bond compared to the 65 year bond?

Hint: For simplicity, assume that the bonds are issued on the same date. The textbook has a discussion concerning the valuation of annuities on p. 87-93. These are a special case of regular coupon paying bonds.

_____is the difference in price Anne should be willing to pay.

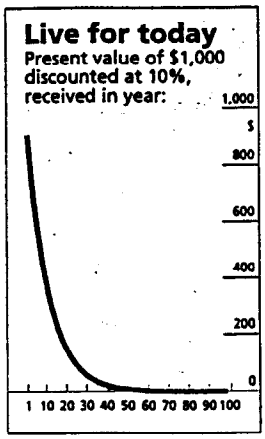
From here to eternity

POLITICIANS, you may be aware, are fond of urging people to invest in the future. It would appear that some investors are taking them a bit too literally of late. The latest fad among emerging-market bond investors, eager to get a piece of the action, is to queue up for bonds with 100-year maturities, such as those issued by the Chinese government and Tenaga Nasional, a Malaysian electrical utility.

Not to be outdone by these century bonds, Eurotunnel, the beleaguered company that operates the railway beneath the English Channel, is trying to tempt investors with a millennium's worth of profits. Last week, in a bid to sweeten the pot for its shareholders and creditors, who must agree on an unpalatable financial restructuring, it asked the British and French governments to extend its operating franchise from a mere 65 years to 999 years. By offering investors some windfall profits, the firm hopes they will be more likely to ratify its plan. Has the distant future become the latest place to make a financial killing?

Alas, the future is not all that it is cracked up to be. Although at first glance 999 years of profits would seem far better than 65 years, those last nine centuries are really nothing to get excited about. The reason is that a dollar spent today, human nature being what it is, is worth more to people than a dollar spent tomorrow. So when comparing profits in the future with those in the present, the future profits must be "discounted" by a suitable interest rate.

Under the relentless pressures of compound interest, the value of future profits is ground to nothing as the years go by. Suppose, for example, that you had a choice between making the following two gifts to a university: you could write a cheque for $10,000 today, or give $1,000 a year for the next century. The latter donation might seem the more generous one, but at a 10% interest rate, they are worth the same amount. By the time compound discounting had finished with it, that final $1,000 payment would be worth only 7 cents today (see chart).



Company shares adhere to a similar logic. Their value derives ultimately from the never-ending stream of dividends they are expected to spit out. But for a typical blue-chip stock, around a third of its value derives from dividends during the first decade, according to Paul Marsh of the London Business School.

What does this mean for Eurotunnel's investors? According to the back of Mr Marsh's envelope, extending its franchise by 934 years should increase its value to today's investors by only 10-15%, after discounting. If they are feeling generous, perhaps the British and French governments should toss in another year and make the franchise an even 1,000.

dividends at all over the next seven years. She predicts that in exactly eight years DGI will pay a dividend of $2.0 per share. *Val* expects that dividends will grow at a rate of 4% per year after that. In other words, in year nine the dividends will be $2.08 and so forth. If *Val* uses the discount rate of 11% to discount DGI's future cash flows, what is her assessment of the *current* value of DGI's stock?

_____**is the value of DGI's stock.**

in the tiny island kingdom of Dur Aish Un. He is looking at a Dur Bond which has been issued by the tiny government of Dur Aish Un. The government perceives a need for additional cash in year 2 and so it has structured the bond to have the following payments (cash flows):

Year t	Payments on Dur Bond In Year t
1	10
2	15
3	5

The current yield curve for zero coupon government bonds in Dur Aish Un is flat at a rate of 15%. What is the current price of the Dur Bond having the cash flows given above?

_____ **is the current price of the Dur Bond.**

What is the duration of the Dur Bond?

_____ **is the duration of the Dur Bond.**

(Note: Question 4 continues on the next page!)

(Question 4 continued) What will happen to the price of the Dur bond if interest rates rise a tiny bit in the tiny island kingdom of Dur Aish Un?

- ❑ **The price will go up.**
- ❑ **The price will remain unchanged.**
- ❑ **The price will go down.**

evaluating a proposal from the head of the marketing department, *Mark Etting*. This past year EGC's free cash flow was $15 million. Under the current marketing plan, free cash flows are expected to grow at a rate of 2% per year into the indefinite future. This means that the free cash flow generated over the next year and available at the end of the year (exactly one year from today) will be $15.3 million. *Mark Etting* is proposing that the firm launch an advertising campaign to increase the rate of growth of sales and thus free cash flows. He claims that his proposal will cause the growth rate to increase to 3% per year into the indefinite future. To put this plan in place, *Etting* claims that $1 million must be spent immediately, and then each year $1 million must be spent. This means that if *Etting's* plan is adopted, there will be an immediate cash outflow of $1 million. At the end of the first year, sales will generate $15.45 million in cash for shareholders but $1 million of this must be subtracted to pay for the ongoing advertising campaign, leaving $14.45 million as free cash flow. Assume that *Perpy* uses a discount rate of 15% for cash flows, and the advertising campaign does not change the riskiness of EGC's future cash flows. Should *Perpy* accept *Mark's* proposal for a new advertising campaign?

- ☐ **Yes, Perpy should accept Mark's proposal for a new advertising campaign.**
- ☐ **No, Perpy should not accept Mark's proposal for a new advertising campaign.**

Motivate your answer by quantifying the value of the advertising campaign below.

_____ **is the NPV of the advertising campaign.**

(There is space for your calculations on the next page)

(Space for calculations for Question 9.)

10. (10 points) *Max Reyturn* is a wealthy private investor who prides himself on his ability to pick good portfolios. Unlike many investors, he understands that a good portfolio maximizes expected return for the risk taken on. *Max* has invested some of his money in T-Bills and has put the rest in a portfolio of risky securities which *Max* calls the *Max Fund*. Max is concerned that the *Max Fund* may not be the best fund for him to invest in. He is looking at data he has gathered on some of the securities that are in the fund. This data is reproduced below.

Stock or Fund	Expected Return	Standard Deviation	Correlation with the *Max Fund*
Caterpillar	18.0%	30.0%	0.70
Harley Davidson	19.5%	45.0%	0.50
Homestake Mining	2.0%	25.0%	-0.30
Max Fund	15.0%	15.0%	1.00
T-Bills	7.0%	0.0%	0.00

Based on the data above, which of the following statements is true?

☐ ***Max Fund* is the optimal fund for Max to hold.**

☐ ***Max Fund* is <u>not</u> the optimal fund for Max to hold. (If you check this box also complete the part immediately below.)**

By circling the appropriate response, indicate below in what direction Max should adjust the portfolio weights for each of the three stocks

Caterpillar	*Increase*	*No Change*	*Decrease*
Harley Davidson	*Increase*	*No Change*	*Decrease*
Homestake Mining	*Increase*	*No Change*	*Decrease*

☐ **There is not enough information given to determine whether or not the *Max Fund* is the optimal fund for Max to hold.**

(There is space for your calculations on the next page.)

(Space for calculations Question 10.)

11. (10 points) *Connie Glomerate* (called *Con Glom*erate by her friends) works for the prestigious investment banking firm Silverman Bags. She is arranging a merger between Rain and Shine. The merged company will be called RainBow. The boys who work for *Connie* down in research provided the following information.

	Expected	Standard	Correlation with the Market	Total Market
Rain		45%	-0.2	$450 million
Shine		30%	0.8	$750 million
Market portfolio	13.50%	20%	1	
Riskfree asset	6.25%	0%	0	

$Corr(R_R, R_S) = 0.3$

Assume that the merger is simply a financial event. This means that there is no change in the two companies' operations once the two are merged and therefore each continues to generate exactly the same cash flows as before. The merged company will therefore be worth a total of $1.200 billion. Answer the following two questions.

A. What is the standard deviation of the merged company's return?

_____**is the standard deviation of RainBow's return.**

B. What is the expected retun of the merged company?

_____**is the expected return of RainBow.**

(There is space for your calculations on the next page.)

(Space for calculations Question 11.)

has a beta equal to 1.2. Current earnings are $2.50 per share and these earnings are expected to grow at 5% into the indefinite future. In order to sustain this earnings growth, Pro Forma must retain 40% of its earnings for reinvestment. Thus, only 60% of its earnings are paid out to shareholders. Assume that the capital asset pricing model holds and that the expected return on the market is 11.5% and the rate of return on the riskless asset is 5%. What should the Price/Earnings Ratio (PE ratio) for Pro Forma, Inc. be based on this information?

_____ is the PE ratio for Pro Forma, Inc.

13. (OPTIONAL) As you undoubtedly (and much to your regret) have noticed, all of *Huck Ster* and *Perpy Tuity*. These are puns of the very lowest order and we are not proud of them. In fact, we think that they are all extremely bad and could easily be taken to be the products of juvenile minds. We know that we should be embarrassed. Unfortunately for you, we have no shame. To make it a bit more exciting for us and the graders to correct these exams, we thought we might include a survey at the end which would give you a chance to vote for the worst pun. The graders can then amuse themselves by betting on the outcome of the survey, and we will announce the results of the survey in a future class session. Please indicate below your choice for the worst pun in this exam.

- ☐ **Glow Ball (a CEO whose house in Silicon Valley will be flooded out by El Nino while he is drinking beer in Bavaria.)**
- ☐ **Meenvar Eance (a trusting client of Huck Ster and an all around**
- ☐ **Val U. Eckwitty (an expert assessor of stock value who refuses to tell anyone her middle name)**
- ☐ **Mark Etting (advertising guru and nephew of the CEO at EGC)**
- ☐ **Connie (Con) Glomerate (a rising star at Silverman Bags who studiously avoids eating health food and writes mystery novels under a psuedonym.)**
- ☐ **Van Guard (Fidel's rival and a darn good basketball player)**
- ☐ **Fidel Ittee (a stressed out portfolio manager who has a fondness for**
- ☐ **Zero Kupon (a proud citizen of the tiny island kingdom of Dur Aish Un)**
- ☐ **Tech Nickell (a boring person who is so boring we can't even come up with something funny about him)**
- ☐ **Anne Ouhitee (an investor with tunnel vision)**
- ☐ **Max Reyturn (a thoroughly obnoxious person who spends most of his free time blow drying his hair.)**
- ☐ **Ray Sho (calculator extraordinaire of the PE ratio)**

- ❑ **Ira Shunnel (a person who believes that her life is controlled by one of the Emperor Penguins at the San Diego Zoo)**
- ❑ **Cap Spending (a simple-minded yes-man who made the mistake of going to a business school located in a place near where they once had**
- ❑ **Huck Ster (has three gold chains around his neck and that says it all)**
- ❑ **Segmend Tedd (a German tourist returning to his home in Hamburg after an extremely wet stay in San Francisco)**
- ❑ **Arb I. Trage (a greedy person whose mother still loves him)**
- ❑ **Perpy Tuity (an energetic employee of EGC who doesn't know when to stop)**