Print Last Name: ➔	**Print First Name:** ➔	**ID Number:** ➔	
COURSE FINANCE	**NUMBER** COMM 308	**SECTIONS: (➔ Circle your section)** A, AA, B, BB, C, D, E, F	
EXAMINATION Final Exam **VERSION BLUE**	**DATE** December 8, 2012	**TIME** 3 hours	**# OF PAGES 18** including cover
INSTRUCTOR: **(➔ Underline your instructor's name)** Ali Boloor Foroosh — Kaveh Moradi Dezfouli Ravi Mateti — Rahul Ravi Monir Wahhab — Derek Hirsch		**DIVISION** John Molson School of Business Concordia University	

READ THESE SPECIAL INSTRUCTIONS CAREFULLY

- You must submit a BLUE computer answer sheet.

- You are allowed to bring/use one or more calculators

- You are allowed to bring one language dictionary (no finance/ mathematics/economics etc. dictionary)

- For Multiple Choice Questions: All answers must be recorded IN PENCIL on the computer sheet.

- For Problems:

All answers must be recorded IN INK within this exam.
Show your calculations to earn part marks. Write in the space provided.
If you are using the back of the exam for answering any question, you should label it clearly

- **Please ensure you have 18 pages (including the cover page) in this exam.**

- **Fill in your name and other required information IN PENCIL on the Computer Answer sheet as well as IN INK on this cover sheet.**

- **Blank questions or those with multiple answers will not receive any credit.**

SCORES (FOR INTERNAL USE ONLY)

Part I Multiple Choice Questions	**Part II Long Answer Questions**				
	Question 1	Question 2	Question 3	Question 4	
(Max: 70 Points)	(Max: 10 Points)	(Max: 6 Points)	(Max: 8 Points)	(Max: 6 Points)	**Total**

Part I: Multiple Choice Questions (28 Questions, 70 Points Total):

- This part consists of 28 Multiple Choice Questions.
- Each question is worth 2.5 points for a total of 70 points.
  - **Only answers on the computer answer sheet will be graded.**
  - **Use a pencil to mark your answers on the Computer Sheet.**

1. Which of the following is the best example of a conflict of interest between management and shareholders?

   A. Management borrows heavily to fund risky projects.
   B. Management moves production overseas to take advantage of low-cost labor.
   C. Management fights against a takeover bid despite the market consensus that it is the most reasonable bid.
   D. Management voluntarily recalls defective products.
   E. All of the above.

2. Which of the following statements is/are correct?

   A. If an investment has interest compounded annually, its nominal rate must always equal its effective rate.
   B. The present value of a 5-year ordinary annuity will be greater than the present value of a 5-year annuity due. (Assume that both annuities pay $100 per period, and that there is no chance of default).
   C. In an amortized loan with monthly payments, the proportion of the payment that goes toward repayment of principal increases steadily over time.
   D. Answers a and b are correct.
   E. Answers a and c are correct.

3. "We pay you $1,000 a year for 10 years and thereafter you will pay us $1,000 a year forever!" – reads the Highlander (who lives forever) in an ad. What must be the rate of interest (EAR) in order for this to be a fair deal (i.e. the rate of interest that makes the present value of these two series of cash flows equal). Assume that all payments occur at the end of the year, so the Highlander receives the first payment at the end of year one, and he makes his first payment at the end of year 11.

   A. No such interest rate exists.
   B. 0%.
   C. 6.82979%.
   D. 7.1773%.
   E. 10%.

$$\frac{1000}{k}\left[\left(1+k\right)^{10}-1\right]=\frac{1000}{k}$$

$$\therefore \left(1+k\right)^{10}-1=1$$

$$\Rightarrow k=7.1773\%$$

4. Everything else held constant, the yield-to-maturity (YTM) of a bond _____.

   A. will equal the coupon rate if the bond sells at par value
   B. will decrease if the price of the bond increases
   C. will be lower than the coupon rate if the bond sells below par value
   D. A and B are both correct
   E. A, B and C are all correct

5. Which bond's price would be the least sensitive to an unexpected change in the interest rate? *(Assume assumes all the bonds have the same YTM)*

   A. A discount (or zero coupon) bond with 12 years to maturity
   B. A discount (or zero coupon) bond with 8 years to maturity
   C. A bond with a 10% coupon rate and 8 years to maturity
   D. A bond with a 5% coupon rate and 8 years to maturity
   E. A bond with 5% coupon rate and 10 years to maturity.

6. A bond's call provision _____

   A. indicates preference in position over other lenders.
   B. is that part of the loan agreement that limits certain actions a company might otherwise wish to take during the term of the loan.
   C. is an account managed by the bond trustee for the purpose of repaying the bonds.
   D. allows the company to repurchase all or part of a bond issue at stated prices over a specific period.
   E. is a description of the property used as security (or collateral).

7. Perpetual Inc stock currently sells for $40 per share (immediately after mailing out its most recent dividend). The required rate of return for Perpetual's equity is 10%. If the company maintains a constant 4% growth rate in dividends, what was the most recent dividend per share paid on the stock?

   A. $4.00.
   B. $1.60
   C. $2.40
   D. $2.31
   E. $3.85

$$P_0 = \frac{D_0 \times 1.04}{0.1 - 0.04} = 40$$

$$D_0 = \frac{40 \times 0.06}{1.04} = \$2.31$$

8. A stock is not expected to pay a dividend over the next four years. Five years from now, the company anticipates that it will establish a dividend of $1.00 per share (i.e., D_5 = $1.00). Once the dividend is established, the market expects that the dividend will grow at a constant rate of 5 percent per year forever. The risk-free rate is 5 percent, the company's beta is 1.2 and the market risk premium is 5 percent. The required rate of return on the company's stock is expected to remain constant. What is the current stock price?

A. $7.36
B. $8.62
C. $9.89
D. $10.98
E. $11.53

$$E(r) = 0.05 + 1.2 \times 0.05 = 11\%$$

$$P_0 = \frac{1}{0.11 - 0.05} \times \frac{1}{1.11^4} = \$10.98$$

9. Which of the following statements is most correct?

A. Assume that the required rate of return on a given stock is 13%. If the stock's dividend is growing at a constant rate of 5%, its expected dividend yield is 5% as well.
B. The dividend yield on a stock is equal to the expected return less the expected capital gain.
C. A stock's dividend yield can never exceed the expected growth rate.
D. All of the answers above are correct
E. Answers B and C are correct.

10. In a portfolio of three different stocks, which of the following could not be true? Assume that the portfolio weight of each stock is less than 1.

A. The riskiness of the portfolio is less than the riskiness of each of the stocks if they were held in isolation.
B. The riskiness of the portfolio is greater than the riskiness of one or two of the stocks.
C. The beta of the portfolio is less than the beta of each of the individual stocks.
D. The beta of the portfolio is greater than the beta of one or two of the individual stock's betas.
E. None of the above (That is, they all could be true, but not necessarily at the same time).

11. Which of the following statements is correct?

A. If you add enough randomly selected stocks to a portfolio, you can completely eliminate all the market risk from the portfolio.

B. If you form a large portfolio of stocks each with a beta greater than 1.0, this portfolio will have more market risk than a single stock with beta of 0.8.

C. Company specific (or unsystematic) risk can be reduced by forming a large portfolio, but normally even highly diversified portfolios are subject to market (or systematic) risk.

D. Choices A, B, and C are correct

E. Choices B and C are correct.

12. With regards to market efficiency, identify the INCORRECT statement.

A. Information is the central issue of the efficient markets concept.

B. The most stringent form of market efficiency is the strong form.

C. Following any adjustment, the new price does not have to be the new equilibrium price.

D. A perfect adjustment in price occurs following any new information.

E. Investors will use all available data in making their decisions.

13. You purchased WPC common shares for $50 one year ago. You have received total dividends equal to $8 during the year. If your total return during the period is 12%, then what was the price of WPC when you sold the stock today?

A. $48

B. $52

C. $56

D. $98

E. None of the above

$$50 = \frac{8 + P_0}{1.12}$$

$$P_0 = 50 \times 1.12 - 8 = \$48$$

14. If the standard deviation of an equally weighted portfolio is 20%, then what would we expect the average standard deviation of stocks in that portfolio to be?

A. Less than 20%.

B. Equal to 20%.

C. Greater than 20%.

D. Less than or equal to 20%.

E. Greater than or equal to 20%.

$$\sqrt{0.5^2 \times \sigma_1^2 + 0.5^2 \times \sigma_2^2 + 2 \times \rho_{1,2} \times 0.5^2 \times \sigma_1 \times \sigma_2} = 0.2$$

$$\therefore \sqrt{0.5^2 \times \sigma_1^2 + 0.5^2 \times \sigma_2^2 + 2 \times 0.5^2 \times \sigma_1 \times \sigma_2} \geq 0.2$$

$$\therefore \frac{\sqrt{\sigma_1^2 + \sigma_2^2 + 2 \times \sigma_1 \times \sigma_2}}{2} \geq 0.2$$

$$\therefore \frac{\sigma_1 + \sigma_2}{2} \geq 0.2$$

15. You have done a thorough study of the economy and Stock X and concluded that: (1) the probability of having a boom next year is 20 percent, a stable economy is 55 percent, and a recession is 25 percent, and (2) the price of Stock X will be $45 if there is a boom, $25 if the economy is stable, and $15 if there is a recession. What is the ex ante expected return on Stock X if it is currently selling for $24?

A. –9.43%
B. 10.42%
C. 18.06%
D. 26.5%
E. None of the above

	Prob	Price	E(return)	Prob*E(return)
Boom	0.2	45	87.50%	0.175
Stable	0.55	25	4.17%	0.022916667
Recession	0.25	15	-37.50%	-0.09375
				10.417%

16. A local retail store allows you to return the merchandise you purchase and get your money back for up to 30 days after the purchase date. The store has, in effect, provided each shopper with _____ options.

A. American Call.
B. European Call.
C. American Put.
D. European Put.
E. Convertible bond.

17. A money manager is managing the account of a large investor. The investor holds the following stocks:

Stock	Amount Invested	**Weight (wi)**	Estimated Beta
A	$2,000,000	13.33%	0.8
B	$5,000,000	33.33%	1.1
C	$3,000,000	20.00%	1.4
D	$5,000,000	33.33%	???

The portfolio's required rate of return is 17%. The risk-free rate is 7% and the return on the market is expected to be 14%. What is stock D's estimated beta?

A. 1.256
B. 1.389
C. 1.429
D. 2.026
E. 2.154

$$0.17 = 0.07 + \beta_p \times (0.14 - 0.07)$$

$$\beta_p = \frac{0.17 - 0.07}{0.07} = 1.42857$$

$$0.1333 \times 0.8 + 0.33333 \times 1.1 + 0.20 \times 1.4 + 0.33333 \times x = 1.42857$$

$$x = 2.0257$$

18. Everything else being equal a higher corporate tax rate will _____

A. increase the WACC of a firm with debt and equity in its capital structure
B. not affect the WACC of a firm with debt in its capital structure
C. decrease the WACC of a firm with some debt in its capital structure
D. decrease the WACC of a firm with only equity in its capital structure
E. C and D

19. A project may have multiple IRRs when _____

A. the project generates an alternating series of net cash inflows and outflows
B. the project generates an immediate cash inflow followed by cash outflow
C. the project has a negative NPV
D. the project is of considerably large scale
E. None of the above

20. An entrepreneur is offered a service contract that will cost him $600,000 initially. The contract has a life of 5 years and will generate an after tax cash inflow of $160,000 per year. The cost of capital of this project is 12%. What is the NPV of the project? Should the entrepreneur accept or reject the contract?

A. -$23,236; reject
B. $23,236; accept
C. -$20,746; reject
D. $576,764; reject
E. $41,050; accept

$$NPV = -600,000 + \frac{160,000}{0.12} \times \left[1 - \frac{1}{1.12^5}\right] = -\$23,235.808$$

21. The Commerce Company is evaluating a project with the following cash flows:

Year	0	1	2	3	4	5
Cash Flow	($10,000)	$2,000	$3,000	$4,000	$5,000	$6,000

What is the profitability index of the proposed Commerce Company project if the discount rate is 7%?

A. -1.58
B. 0
C. 0.58
D. 1.58
E. 2.58

$$PV_{outflow} = \$10,000$$

$$PV_{inflow} = \frac{2000}{1.07} + \frac{3000}{1.07^2} + \frac{4000}{1.07^3} + \frac{5000}{1.07^4} + \frac{6000}{1.07^5} = \$15,847.06$$

$$PI = \frac{PV_{inflow}}{PV_{outflow}} = \frac{\$15,847.06}{\$10,000} = 1.584706$$

22. The government has been trying to decide whether or not to purchase any of the new, advanced missiles it has developed. One of the arguments in favour of purchasing the missiles is that since so much money has been spent on their development it would be a waste of money not to buy them now. What is the major problem with this argument?

    A. It includes financing costs in the decision-making process.

    B. It includes sunk costs in the decision-making process.

    C. It includes opportunity costs in the decision-making process.

    D. It includes net working capital changes in the decision-making process.

    E. There is no problem with the argument.

23. A company is considering the purchase of a new industrial washer. It can purchase the washer for $6,000 and sell its old washer for $2,000. The new washer will last for 6 year. The washers fall into an asset class with a CCA rate of 30%. The cost of capital is 15% and the firm's tax rate is 40%. If the salvage value of the new washer is expected to be zero at the end of six-year life, what is the present value of the CCA tax shield? *(Assume that in six years, salvage value of the old washer is expected to be zero)*

    A. $1,040.80

    B. $997.10

    C. $886.35

    D. $775.48

    E. None of the above

$$PVCCATS = \frac{4000 \times 0.3 \times 0.4}{0.3 + 0.15} \times \frac{1 + 0.5 \times 0.15}{1.15} = \$997.10$$

24. If a project is expected to increase inventory by $15,000, increase accounts payable by $10,000, and decrease accounts receivable by $1,000, what is the net increase in working capital during the life of the project?

    A. $4,000

    B. $5,000

    C. $6,000

    D. $7,000

    E. None of the above.

$$\Delta NWC = \Delta Inventory + \Delta\left(Accounts\ receivables\right) - \Delta\left(Accounts\ payables\right)$$
$$\therefore \Delta NWC = \$15,000 - \$1,000 - \$10,000 = \$4,000$$

25. With the half year rule, the depreciation percentage is lower in the first year than in the second year. This due to the fact that _____

    A. The depreciation percentage increases in each year.

    B. Assets in the first year are assumed to be acquired at mid-year.

    C. Depreciation expense increases at the rate of inflation.

    D. Declining balance depreciation is less attractive than straight-line depreciation.

    E. None of the above.

26. Suppose someone offered you the choice of two equally risky annuities, each paying $10,000 per year for five years. One is an ordinary annuity; the other is an annuity due. Which of the following statements is most correct? Assume that the prevailing interest rate is greater than zero.

A. The present value of the ordinary annuity must exceed the present value of the annuity due, but the future value of an ordinary annuity may be less than the future value of the annuity due.
B. The present value of the annuity due exceeds the present value of the ordinary annuity, while the future value of the annuity due is less than the future value of the ordinary annuity.
C. The present value of the annuity due exceeds the present value of the ordinary annuity, and the future value of the annuity due also exceeds the future value of the ordinary annuity.
D. If interest rates increase, the difference between the present value of the ordinary annuity and the present value of the annuity due remains the same.
E. Insufficient information. Answer depends on the prevailing interest rate.

27. Your company is planning to borrow $2,500,000. It will repay this loan in ten equal annual installments (first payment at the end of year 1). The quoted rate is 9 percent (EAR). What fraction of the payment made at the end of the third year will represent repayment of principal?

A. 46.04%.
B. 50.19%.
C. 54.70%.
D. 59.63%.
E. 64.99%.

$$PMT = 2,500,000 \times 0.09 \times \left[1 - \frac{1}{1.09^{10}}\right]^{-1} = 389,550.2248$$

$$OB_2 = \frac{389,550.2248}{0.09} \times \left[1 - \frac{1}{1.09^{8}}\right] = \$2,156,090.03$$

$$Interest_3 = 0.09 \times 2,156,090.03 = \$194,048.10 \Rightarrow Principal_3 = \$195,502.12$$

$$Principal_3 / PMT = 50.19\%$$

28. You are considering two perpetuities which are identical in every way, except that perpetuity A will begin making annual payments of $1,000 to you one year from today while the first payment of $1,000 for perpetuity B will take place eleven years from today. It must be true that the present value of perpetuity A minus that of perpetuity B:

A. is equal to $1,000 × 10 = 10,000.
B. is equal to the present value of an annuity paying $1,000 dollars each year for 11 years..
C. is equal to the present value of an annuity DUE paying $1,000 dollars each year for ten years.
D. is equal to the present value of an ordinary annuity paying $1,000 dollars each year for ten years.
E. is greater than the present value of perpetuity B.

Part II: Problems (30 Points Total)

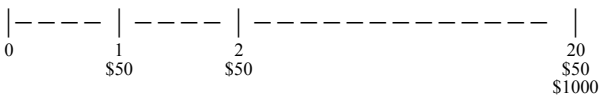
- Answer on this document, in the space provided. Use the back of the sheet if you need additional space. Label it clearly. Any work on the back of the sheet, which is not labeled clearly, will not be graded.
- Show all your work. Unsupported statements or numbers will not receive any credit.

Q1. (10 Points) Application of Time Value Mechanics: This question has two unrelated parts. Part (a) is bond valuation. Part (b) is equity valuation. Information from part (a) should not be used in part (b)

Q1 Part a) (4 Points) Bond Valuation

JRJ Corporation recently issued 10-year bonds at a price of $1,000. These bonds pay $70 in interest each six months. Their price has remained stable since they were issued, i.e., they still sell for $1,000. Due to additional financing needs, the firm wishes to issue new bonds that would have a maturity of 10 years, a par value of $1,000, and pay $50 in interest every six months. If both bonds have the same yield, how many new bonds must JRJ issue to raise $2,000,000 cash? *Round your final answer to the next integer.*

Solution:



$n = 20$

$k_D = 7\%$

$$P_0 = \frac{50}{0.07} \times \left(1 - \frac{1}{1.07^{20}}\right) + \frac{1000}{1.07^{20}} = \$788.12$$

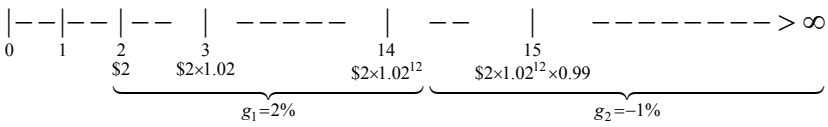
$$Number\ of\ new\ bonds = \frac{2,000,000}{\$788.12} = 2537.69 \approx 2538$$

Q1 Part b) (6 Points) Equity valuation

Note: *Information from part (a) should not be used in part (b)*

ABC Inc.'s first quarterly dividend of \$2 per share is expected to be paid 6 months from today. From then on, dividends will grow by 2% per quarter for three years (for 12 quarters following the first payment). After three years, the dividends will start declining by 1% per quarter in perpetuity. Assume that ABC's required rate of return is 15% (Effective semi-annual rate). What is the price of a share of ABC today?

Solution:



$ESR = 15\%$

$\therefore \textit{Effective Quarterly Rate} = (1.15)^{\frac{1}{2}} - 1 = 0.07238 \approx 7.238\%$

$$PV_1(\textit{Annuity}) = \frac{2}{0.07238 - 0.02}\left(1 - \left(\frac{1.02}{1.07238}\right)^{13}\right) = \$18.2696$$

$$PV_{14}(\textit{Perpetuity}) = \frac{\$2 \times 1.02^{12} \times 0.99}{0.07238 + 0.01} = \$30.4819$$

$$P_0 = \frac{PV_1(\textit{Annuity})}{1.07238} + \frac{PV_{14}(\textit{Perpetuity})}{1.07238^{14}} = \$28.50$$

Q2. **(6 Points)** *This question has three related parts (you can use information from part (i) to aswer (ii) and from (i) and (ii) to answer part (iii)*

Consider a project with the following cash flows:

Year	Cash Flow
0	-$16,000
1	42,000
2	-27,000

i. (2 Points) Calculate the NPV of the project for the following interest rates:

k	5.17%	12.5%	30%	50%
NPV	?	?	?	?

Solution:

		5.17%	12.50%	30.00%	50.00%
t	Cash Flow	Present Values			
0	-16,000.00	-16,000.00	-16,000.00	-16,000.00	-16,000.00
1	42,000.00	39,935.34	37,333.33	42,000.00	28,000.00
2	-27,000.00	-24,410.69	-21,333.33	-27,000.00	-12,000.00
NPV	-1,000	-475	0	-1,000	0

ii. (2 Points) What is/are the IRR of this project?

This project has two IRR

$IRR_1 = 12.5\%$

$IRR_2 = 50.00\%$

iii. (2 Points) Using the information from part (i) and (ii) create a capital budgeting decision rule for the above project. (That is, for what values of k will you accept the project?)

Accept the project if:

$$IRR_1 \le k \le IRR_2$$

$$\Rightarrow Accept\ if: \quad 12.5\% \le k \le 50.00\%$$

Q3. (8 Points)

Note: *When drawing diagrams, you need to show the location of each important point on the diagram by writing down the relevant numbers next to each point (i.e. indicate intersections with the horizontal and vertical axes and any points where the graph changes abruptly).*

Part a: (5 Points) The WinnersRus Corporation (WC) has offered its president, Ms. Jane, the following incentive scheme: At the end of the year Ms. Jane will be paid a bonus of $50,000 for every dollar that the price of WC exceeds its current value of $110. However, the maximum bonus that she can receive is set at $1 million.

You raise your hand at the meeting of WC board of directors and suggest that why not offer Ms. Jane 50,000 long call option with strike price $110 and 50,000 short call option with strike price of $130. One stock underlies each option.

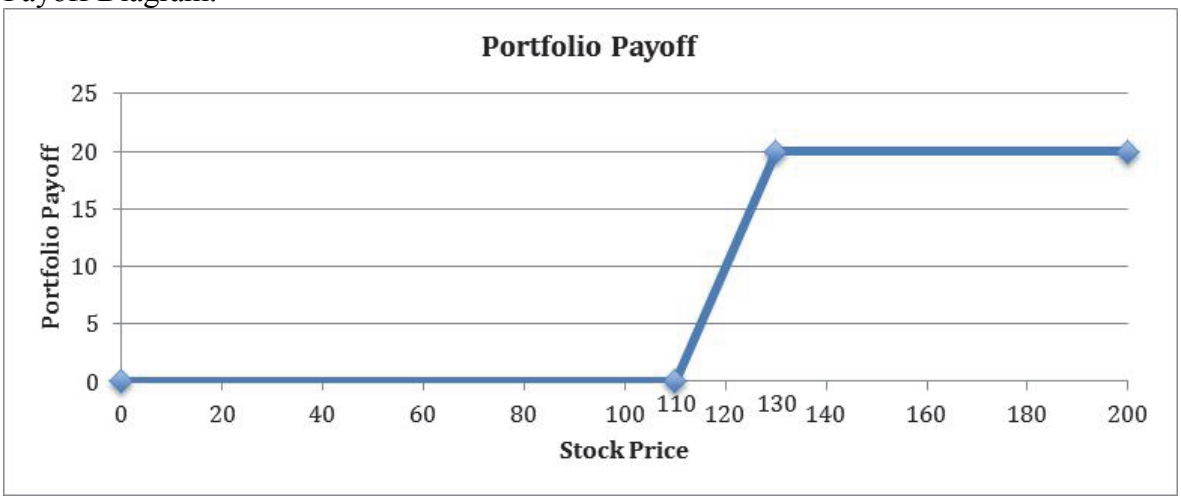
Part a (5 Points): Draw the payoff diagram of your suggested option portfolio (One long call option with strike price $110 and one short call option with strike price of $130).

Solution:

Payoff matrix:

Stock	0	110	130	200
Long C120	0	0	20	80
Short C140	0	0	0	-60
Portfolio Payoff	0	0	20	20

Payoff Diagram:



Part b (3 Point): Explain either in words or through picture how your suggested portfolio is a perfect substitute for the outlined bonus scheme (That is, your suggested portfolio will give the same compensation as the original bonus scheme).

As the stock price increases above the current $110 per share, the long call will start to earn one-dollar payoff for every one-dollar increase in share price.
Therefore, 50,000 of these options will earn $50,000 for every dollar that the price of WC exceeds its current value of $110.

When the share price is at $130, the long position will earn a total of ($130-$110)*50,000 = $1,000,000.

Once the share price crosses $130, the short option will be in the money and each one of these options will cost Ms. Jane one dollar for every one dollar increase in share price. 50,000 of these options will cost $50,000 for every dollar that the price of WC exceeds $130. This will cancel all gains from the long position.

Therefore, the maximum possible portfolio payoff will be $1,000,000.

Q4. **(6 Points) Short Answer:**

Casey, Chuck and Sarah are three fund managers sitting in a coffee shop. To pass the time, they talk about investing in stock markets. Casey started to brag about how his stock investments have consistently beaten the market, and how he is very skilled at picking winning stocks because he knows what to look for in the financial statements of publicly traded companies. Chuck couldn't understand why Casey went to all trouble of reading the financial statements of firms; because he thought picking winning stocks only required an analysis of past stock prices. Sarah, on the other hand, was skeptical of Casey's skill at picking stocks. She said that, if he really had consistently beaten the market returns, he was either extremely lucky or he used insider information to make his high returns.

State and explain how each person below views the efficiency of financial markets (Weak form, semi-strong form, strong form or completely inefficient?).

Chuck:

Markets are not efficient even in weak form.
Therefore, markets are not efficient at-all.

Sarah:

Believes that markets are semi-strong form efficient. However, they are not strong form efficient (money can be made from insider information, but not from publicly available information).

Casey:

Markets are not semi-strong form efficient

Equation List - Comm 308 - Booth-Cleary Text

5.3	Present Value of FV_n : $PV_0 = \frac{FV_n}{(1+k)^n}$
5.4	Future value of an annuity: $FV_n = \frac{PMT}{k}\left[(1+k)^n - 1\right]$
5.5	Present Value of an annuity: $PV_n = \frac{PMT}{k}\left[1 - \frac{1}{(1+k)^n}\right]$
5.8	Present value of perpetuity: $PV_0 = \frac{PMT}{k}$
5.10	Effective rate with continuous compounding: $k = e^{QR} - 1$
5.11	Effective rate: $k = \left(1 + \frac{QR}{m}\right)^{\frac{m}{f}} - 1$
5A-2	Present value of growing perpetuity: $PV_0 = \frac{PMT_0(1+g)}{k-g} = \frac{PMT_1}{k-g}$
5A-4	Present value of growing annuity: $PV_0 = \frac{PMT_1}{k-g}\left[1 - \left(\frac{1+g}{1+k}\right)^n\right]$
6.3	Current Yield: $CY = \frac{Annual\ Interest}{B}$
6.6	Price of T-Bill given BEY: $P = \frac{F}{\left(1 + k_{BEY} \times \frac{n}{365}\right)}$
7.10	Share price with growth opportunities: $P_0 = \frac{EPS_1}{k_c} + PVGO$
7.11	Growth rate: $g = b * ROE$
8.3	Total return = Income yield + Capital gain (loss) yield = $\frac{CF_1}{P_0} + \frac{P_1 - P_0}{P_0}$
8.5	Geometric average (GM) $= \left[(1+r_1)(1+r_2)(1+r_3)\times(1+r_n)\right]^{1/n} - 1 = \left(\prod_{i=1}^{n}(1+r_i)\right)^{\frac{1}{n}} - 1$
8.6	Expected return: $ER = \sum_{i=1}^{n}\left(r_i * \text{Prob}_i\right)$
8.7	Ex-post $\sigma = \sqrt{\frac{\sum_{i=1}^{n}\left(r_i - \bar{r}\right)^2}{n-1}}$
8.8	Ex-ante $\sigma = \sqrt{\sum_{i=1}^{n}\left(\text{Prob}_i\right)\left(r_i - ER\right)^2}$
8.9	Expected portfolio return: $ER_p = \sum_{i=1}^{n}\left(w_i * ER_i\right)$
8.11	Portfolio standard deviation: $\sigma_P = \sqrt{\left(w_A\right)^2\left(\sigma_A\right)^2 + \left(w_B\right)^2\left(\sigma_B\right)^2 + 2\left(w_A\right)\left(w_B\right)\left(COV_{A,B}\right)}$
8.12	$COV_{A,B} = \sum_{i=1}^{n}\text{Prob}_i(r_{A,i} - \bar{r_a})(r_{B,i} - \bar{r_b})$

8.14	$COV_{AB} = \rho_{AB}\sigma_A\sigma_B$
8.16	If $\rho_{AB} = -1$, then: $\sigma_P = w\sigma_A - (1-w)\sigma_B$
9.3	$E(R_P) = RF + \left(\frac{E(R_A) - RF}{\sigma_A}\right)\sigma_P$
9.4	Slope of CML $= \frac{ER_M - RF}{\sigma_M}$
9.6	Sharpe Ratio $= \frac{ER_P - RF}{\sigma_P}$
9.7	$\beta_i = \frac{Cov_{i,M}}{\sigma_M^2} = \frac{\rho_{i,M}\sigma_i}{\sigma_M}$
9.8	$\beta_P = w_A\beta_A + w_B\beta_B + \ldots + w_n\beta_n$
9.9	$k_i = RF + (ER_M - RF)\beta_i$
12.2	*Option* Premium $= IV + TV$
12.5	Put Call Parity: $P + S = C + PV(X)$
13.1	$NPV = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + .. + \frac{CF_n}{(1+k)^n} - CF_0 = \sum_{t=1}^{n}\frac{CF_t}{(1+k)^t} - CF_0$
13.3	$PI = \frac{PV(Cash \text{ inflows})}{PV(Cash \text{ outflows})}$
14.1	$CF_0 = C_0 + \Delta NWC_0 + OC$
14.2	$CF_t = CFBT_t(1-T) + CCA_t(T)$
14.4	$ECF_n = SV_n + \Delta NWC_n$
14.5	$NPV = PV(CF_t) + PV(ECF_n) - CF_0$
14.6	$PV(Operating\ Cash\ Flows) = \frac{CFBT(1-T)}{k}\left[1 - \frac{1}{(1+k)^n}\right]$
14.7	$PV(CCA\ Tax\ Shield) = \frac{(C_0)(d)(T)}{d+k} * \frac{(1+0.5k)}{(1+k)} - \frac{(SV_n)(d)(T)}{d+k} * \frac{1}{(1+k)^n}$
20.8	Cost of Capital: $K_a = \frac{ROI \times IC}{V} = \frac{K_e S + K_d(1-T)D}{V} = K_e\frac{S}{V} + K_d(1-T)\frac{D}{V}$
20.9	$WACC = K_e\frac{S}{V} + K_p\frac{P}{V} + K_i\frac{D}{V}$, Where: $K_i = K_d(1-T)$
20.10	Market value: $S = P_0 \times n$
20.13	Net proceeds: $NP = \frac{I(1-T)}{K_i}\left[1 - \frac{1}{(1+K_i)^n}\right] + F\left(\frac{1}{(1+K_i)^n}\right)$
20.14	Cost of preferred shares: $K_p = D_p \Big/ NP$
20.17	$K_{ne} = \frac{D_1}{NP} + g$
20.21	$K_e = \frac{D_1}{P_0} + g = \frac{X_1(1-b)}{P_0} + b * ROE$
20.27	Cost of new equity: $K_{ne} = K_e * \frac{P_0}{NP}$