COMM 308 - I - Winter 2014

Assignment 1: Solutions

Part 1: Introduction

1) Which of the following is not one of the main functions performed by mutual funds
A) Pooling sums of money to make investments
B) Providing professional management expertise
C) Paying out dividend to their clients based on investors demand
D) Acting as a "pass-through" for individuals to invest in the equity and debt markets
E) None of above

Answer: C

2) Until this year, Cheers Inc. was organized as a partnership. This year, the partners have decided to transfer the business to a corporation. As a result of this change in organizational form, which of the following statements is/are correct?

I. Cheers' shareholders (the ex-partners) will now have limited liability.
II. Cheers will now be subject to fewer regulations.
III. Cheers will now have relatively greater agency problems

A) I only
B) II only
C) III only
D) I and II
E) I and III
Answer: E

Part 2: Time Value of Money

3) Tom has borrowed $20,000 from his local bank. The interest on the loan will be 12% per year for the first 7 years and 4% per year for the next 8 years. The interest is compounded annually and Tom will repay the principal and all the accrued interests at the end of year 15. The amount that Tom should pay back is closest to:
A) $58,232.31
B) $99,532.81
C) $60,509.40
D) $73,224.51
E) $32,567.75

Answer: C
20,000*(1.12^7)*(1.04^8) = 60,509.40

4) An interest rate of 20% compounded monthly is equivalent to a rate of _____ compounded quarterly.

A) 22.22%
B) 20.00%
C) 22.08%
D) 21.38%
E) 20.34%

Answer: E

We are given a quoted rate (QR1= 20%) that is compounded monthly and gives us a certain 'effective' rate(any effective rate will work for our solution). Now, we are looking for another quoted rate(QR2=?) that if compounded quarterly it should give us the same 'effective' rate:

Calculate 'Effective Annual Rate'* for both

QR1: 20% compounded monthly: m=12, f=1, QR1=20%

$$EAR_1 = (1 + \frac{0.20}{12})^{(\frac{12}{1})} - 1 = 0.2194$$

Now we are looking for another quoted rate (QR2) that once compounded quarterly, gives us the same 'Effective Annual Rate'

QR2 compounded quarterly: m=4, f=1, EAR= 0.2194, QR2=?

$$EAR = \left(1 + \frac{QR2}{4}\right)^{\left(\frac{4}{1}\right)} - 1 = 0.2194$$

QR2=20.34%

*Note that if you calculate any other effective rate (i.e: effective quarterly rate or effective monthly rate) for **BOTH** quoted rates, you will get the same result.

5) Elvira is considering buying a 20 year ordinary annuity to provide her with retirement income. The annuity will make annual payments of $25,000. If her opportunity cost is 7%, what is the maximum she should pay for the annuity?

A) $1,096,629.42
B) $1,024,887.31
C) $283,389.88
D) $264,850.36
E) $300,456.78

Answer: D

The question is asking for the present value of 20 years ordinary annuity.

6) The James Co. plans on saving money to buy some new equipment. The company is opening an account today with a deposit of $25,000 and expects to earn 4% interest. After 3 years, the firm wants to add an additional $50,000 to the account. If the account continues to earn 6%, the amount that James Co. will have in their account five years from now will be closest to?
A) $86,872.96
B) $88,249.79
C) $87,777.43
D) $80,329.79
E) $79,082.44

Answer: C
The 25000$ will gain interest of 4% for 3 years and will reach to 25000* (1.04)^3 = 28,121.60$ after three years. Then a 50000$ will be added to the account so the account balance will be 78,121.60$. This amount will gain 2 years of 6% so the amount will be 78121.60*(1.06)^2 = 87777.43

7) Today, Bruce and Brenda each have $200,000 in an investment account. No other contributions will be made to their investment accounts. Both have the same goal: They each want their account to reach $1 million, at which time each will retire. Bruce has his money invested in risk-free securities with an expected annual return of 5 percent. Brenda has her money invested in a stock fund with an expected annual return of 10 percent. How many years after Brenda retires will Bruce retire?
A) 11.6
B) 16.1
C) 19.9
D) 24.4
E) 32.9

Answer: B
Bruce: $1000{,}000 = 200{,}000 * (1 + 0.05)^{n1}$
Will retire in 32.99 years
Brenda: $1000{,}000 = 200{,}000 * (1 + 0.10)^{n2}$
Will retire in 16.89 years

8) You own a furniture store. You normally sell a living room set for $3,500 and finance the full purchase price for 30 monthly payments at 12% APR (compounded monthly). You are planning to run a zero-interest financing sale during which you will finance the set over 30 months at 0% interest. What should be your selling price during the zero-interest financing sale such that you are able to earn your usual combined return on the sale and the financing? Assume all payments are made at the end of the month.

A) $ 3,500.00
B) $ 3,435.00
C) $ 4348.74
D) $4068.55
E) $135.62

Answer: D

12% APR compounded monthly will give us 1% effective monthly rate.
Use ordinary annuity to find the monthly payments for a set of 3500$
PV=3500, I/Y = 1%, N=30 so
PMT= 135.62$ per month
If you offer 0% financing, it means the full amount of living room set will be divided by the number of payments (30) without any interest.
So to get 135.62$ per month for 30 months, the living room set should be priced
30*135.62=4,068.55$

Assume the following scenario:
Bob plans to retire in 15 years from now and wants to have the following stream of CFs after retirement. Monthly payments of $6,000 for 10 years starting right after retirement (the first payment will be at the end of the first month of year 16). He then needs an extra 10000$ with the final payment (that is at the end of the final month of year 25). Starting from year 26 he wants the monthly payments to grow at 0.5% per month for another 15 years. (That is the first payment in year 26 will be 6000*(1+0.005). The APR is 8% with quarterly compounding.

9) What is the present value (at t = 0) of this plan?

A) 251,732.37$
B) 281,907.74$
C) 197,574.22$
D) 323,246.29$

10) Now suppose Bob want to save for this retirement plan. He will be making monthly payments to a saving account that pays the same interest rate. (That is APR=8%, compounded quarterly) His monthly payments will be closest to which of the followings?

A) 1472.55
B) 2764.37

C) 4872.23

D) 2684.95

11) Suppose instead of monthly payments, he will be making quarterly payments to a saving account that pays the same interest rate. (That is APR=8%, compounded quarterly) His quarterly payments will be closest to which of the followings?

A) 8109.91

B) 7874.12

C) 9424.98

D) 2684.95

12) Now suppose he has a business that he will sell right at the time of retirement for 250000$ and contribute all of it to the retirement account. Again, he will be saving for retirement by making monthly payments to a saving account that pays the same interest rate. (That is APR=8%, compounded quarterly) His monthly payments will be closest to which of the followings?

A) 1958.92

B) 2437.25

C) 2898.37

D) 1234.56

Answers:

9) B

10) D

11) A

12) A

9)

Effective monthly rate= 0.00662

Effective annual rate=0.0824

PV (of the growing annuity at time 25) =936,784.01

Total cash at time 25: 936,784.01+10000=946,784.01

PV (of the annuity at time 15) =495,737.11

Discount them to time zero

946,784.01/(1.0824^25)=130,784.51

495,737.11/(1.0824^15)=151,159.23

PV (at time zero) for all future cash flows: 281907.74

10)

Present value of an annuity with 15*12 monthly payments. Effective monthly rate=0.00662 and the PV=281907.74

PMT=2684.95

11)
Effective quarterly rate=0.02
Solve same as 10 note that you will have 15*4=60 quarterly payments
PMT=8109.91

12)
PV at time zero for 250000$ cash received at time 15 will be 250000/(1.0824^15)=76229.53
So instead of 281907.74$ at time zero to fund all the future cash flows he will need 281907.74-76229.53=205678.21 to fund all the cash flows in the retirement period
Solve for a present value of annuity with 15*12=180 payments. Effective monthly rate= 0.00662. And PV of the annuity=205678.21
PMT= 1958.92

Part 3: Bond

13) When computing the yield to maturity, the implicit reinvestment assumption is that the reinvested coupons are reinvested at the _____.
A) coupon rate.
B) prevailing yield to maturity at the time the coupons are received.
C) average yield to maturity over the life of the bond.
D) yield to maturity at the time of the investment.

Answer: D

14) Which of the following statements is FALSE?
A) The longer the time to maturity, the less sensitive the market price of the bond becomes to changes in prevailing market rates.
B) When the prevailing market interest rate is lower than the coupon rate, the bond will be traded at a premium.
C) When the prevailing market interest rate is higher than the coupon rate, the bond will be traded at a discount.
D) The higher the coupon rate, the less sensitive the market price of the bond becomes to changes in prevailing market rates.

Answer: A

15) What is the current yield of a four-year semi-annual pay bond with a par value of $1,000 and a 5 percent coupon rate when the bond is priced at $972.5?

A) 5.14%
B) 5.00%
C) 5.43%
D) 2.57%

Answer: A

Current yield: 0.05*1000/972.5=5.14%

16) The price of a 10 year semi-annual pay bond with a face value of $1,000 and a 7.8% annual coupon and yield to maturity of 5.8% is closest to:

A) $1079.05
B) $1150.16
C) $1,074.30
D) $1,075.08
E) $1,148.61

Answer: B

Part 4: Equity

17) Given no change in required returns, the price of a stock whose dividend is constant will:

A) Increase over time at a rate of r%.
B) Decrease over time at a rate of r%.
C) Increase over time at a rate equal to the dividend growth rate.
D) Decrease over time at a rate equal to the dividend growth rate.
E) Remain unchanged.

Answer: E

Equation 7.2: P=D/k

18) A Transportation company has issued $2.5 million in preferred shares with a par value of $20 each and an annual dividend rate of 8.25 percent. The market value of the preferred shares is closest to _____ if the required rate of return is 12 percent.

A) $3.64 million
B) $1.72 million
C) $17.19 million
D) $34.38 million

Answer: B

Short solution:
Market value of preferred stock = $2.5 million / $20 * $13.75 = $1,718,750.

Long solution:
The company issued 2.5million$ worth of shares with par value of 20$ so 2,500,000/20 = 125000 shares are issued
Each share is paying 20*0.0825=1.65$ of dividend each year.
So each share is priced at 1.65/0.12 = 13.75$
Market value of total issued shares = Total number of shares * price of shares = 125000*13.75=1.718750 million $

19) A variable growth company expects to pay dividends at the end of each of the next four years of $2.00, $5, $2.50, and $1.50 respectively. Starting at the beginning of year 5, dividend growth is expected to remain constant at 7%. If you require a 10% return, what is the price today?

A) $39.12
B) $42.50
C) $45.39
D) $61.00

Answer: C

2/(1.1) +5/(1.1)^2 +2.5/(1.1)^3+1.5/(1.1)^4+((1.5*1.07)/(0.1-0.07))/ (1.1)^4= 1.8181+4.1322+1.8782+1.0245+36.5412= 45.3942

20) 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

Answer: D

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

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