Final Practice Problems

1. Calculate the WACC for a company with 10B in equity, 2B in debt with an average interest rate of 4%, a beta of 1.2, a risk free rate of 0.5%, and a market risk premium of 5%.

2. You just bought an oil rig. You're thinking of using the futures market to hedge the fluctuations in the price of oil.
a) What would this hedge do to the beta of your investment. Choose the single best answer.
    a) it would increase beta
    b) beta would remain the same
    c) it would decrease beta
b) What would this hedge do to the expected return of your investment. Choose the single best answer.
    a) it would increase it
    b) it would remain the same
    c) it would decrease it

3. You've decided to delay the construction project for three years and invest the 10m in zero-coupon Treasury bonds (they make no coupon payments) that mature in 30 years. Their yield is currently 4%. Suppose that in three years, the yield of these bonds has gone up to 5.5%. How much can you sell them for in three years?

4. Problem 3 focuses on which type of risk. Choose the single best answer.
    a) inflation risk
    b) interest-rate risk
    c) reinvestment risk
    d) credit risk
    e) funding liquidity risk

5. a) Calculate the PV of the following cashflows using a 7% discount rate. You pay 10/yr for 3 years with the first payment being today, and then starting a year from today you will receive $6/yr for 6 years.
b) Is IRR>7%.

6. Greece, a country of 11 million people, is facing a crisis due a budget deficit that is 12.7% of GDP. (GDP is the value of all goods and services produced in the country in a year.) It has a lot of short-term debt that is coming due this month and the government doesn't have the cash on hand to pay. Bond investors are unsure whether they want to buy more Greek government bonds.

6a. Current holders of Greek bonds face which risk?
    a) inflation risk

b) interest-rate risk
c) reinvestment risk
d) credit risk
e) funding liquidity risk

6b. The Greek government faces which risk?
   a) inflation risk
   b) interest-rate risk
   c) reinvestment risk
   d) credit risk
   e) funding liquidity risk

6c. Choose <u>one</u> of the following as the best estimate of the Greek budget deficit?
   a) $300M
   b) $3B
   c) $30B
   d) $300B
   e) $3T

7. The beta of the risk free asset is
   a) negative
   b) 0
   c) positive

8. What is the beta of the market portfolio?

9. According to the CAPM, investment opportunities with larger beta will have
   a) higher returns
   b) same returns
   c) lower returns

10. Calculate the IRR of the following cashflow stream: pay $1m today and then receive $3m in 3 years.

11. Choose <u>one</u> of the following as the best estimate of the costs of running a 6-person internet startup for one year (assume that the employees are paid regular salaries).
   a) $50,000
   b) $500,000
   c) $5 million

12. The GDP is the value of all the goods and services produced in a country in a year. It is best described as
   a) a flow
   b) a stock

13. Currently 16% of the US GDP is being spent on healthcare. The UK spends 8% of GDP. Choose <u>one</u> of the following as the best estimate of the annual savings per person if the US adopted the UK healthcare system.
>   a) $30
>   b) $300
>   c) $3000
>   d) $30,000

14. If a stock's beta is 0.5, its expected return should be:
   a) more than the risk-free rate
   b) equal to the risk-free rate
   c) less than the risk-free rate, but positive
   d) zero
   e) negative

15. The standard deviation of the *average* stock is greater than the standard deviation of the market portfolio made up of all stocks. What is the best explanation for this?
   a) the capital asset pricing model
   b) diversification
   c) the dividend discount model
   d) regression

16. TRUE OR FALSE? "The benefits of diversification increase with increased correlation."

17. What is the current price of a bond with par value $10,000, maturity 10 years, coupon rate 5% with semiannual coupons, and yield to maturity of 8%?

18. MULTIPLE CHOICE: Suppose the yields of all bonds increase from 5% to 6%. What happens to the prices of bonds with long maturities?
   a) They rise more than the prices of bonds with short maturities.
   b) They rise the same amount as the prices of bonds with short maturities.
   c) They rise less than the prices of bonds with short maturities.
   d) They do not change.
   e) They fall less than the prices of bonds with short maturities.
   f) They fall the same amount as the prices of bonds with short maturities.
   g) They fall more than the prices of bonds with short maturities.

19. Northwestern's endowment spent $10,000 a year ago to buy some bonds paying semiannual coupons at an annual coupon rate of 10%. What is the dollar amount of each coupon payment?
>   (a) $1200
>   (b) $1000
>   (c) $600
>   (d) $500
>   (e) zero

(f) Something else.
(g) More information is required to answer the question. State what is needed.

20. You need to invest money for one year and decide to buy a 10-year Treasury bond issued this month with a 4.8% yield. What risk results from this mismatch of when you need the money and when the bond matures?
   a) funding liquidity risk
   b) inflation risk
   c) interest-rate risk
   d) reinvestment risk
   e) credit risk

21. Suppose that on 1/4/2011 the state of Illinois issued at par $200m of 1-year bonds with an annual coupon rate of 5%. It then took this money and invested it in junk bonds with no coupon, a 5-year maturity, and yielding 7%. One week later, the yield of the junk bonds fell by 1% (100 basis points) and that of the Illinois bonds rose by 1% (100 basis points). Did the state of Illinois make a profit, a loss, or is there not enough information to say? Explain. (Hint: suppose the state of Illinois sold its junk bonds and bought back its own bonds.)

Answers

1. 6.1%
2. a) c. b) c.
3. 7.64m
4. b
5a. 0.52. 5b. yes.
6a. d. 6b. e. 6c. c
7. b
8. 1
9. a
10. $0 = -1 + 3/(1+IRR)^3$ --> IRR = $3^{1/3}-1$ = 44%
11. b. Answer a would not even cover one employee's salary. While c would mean spending close to $1m per employee.   Web-startups don't have many costs beside salaries.
12. a. It is the value **per year**.
13. c. GDP is the value produced in a year. Thus it is similar to the money earned in a year. So it is about $50,000 per person (times 300m to get the total GDP). Thus an 8% reduction is about 3000 per person. It is not d, $30,000 because that is a lot of people's yearly income. Thus it is too big to be their yearly savings in healthcare costs. Similarly, the answer is not b, because most people spend a lot more than $600/year on healthcare so a 50% reduction in health care costs will be a lot greater than $300/year.
14. a) Reason: If beta is between 0 and 1, the expected return will be between the risk-free rate and the market's expected return. The market's expected return ought to be more than the risk-free rate: if it were the same, everyone would prefer the riskless investment.

15. b.

16. FALSE. If you consider the same portfolio and imagine the correlations between assets increasing, this will increase the portfolio's variance. See the last formula for portfolio variance in the Probability section of the formula sheet, and notice that increased correlation implies increased covariance. But increasing the portfolio's variance is a *reduction* of the benefit of diversification.

17. The coupon payments are $250 every 6 months.
The yield to maturity gives us the discount rate we use to find present values.
The discount rate for a 6-month period is 4% = 8%/2.
Price = 10000/(1.04^20) + 250 * (1/0.04) * (1 – 1/(1.04^20))
= 4563.87 + 3397.58 = **$7961.45.**

18. **(g).** See class notes on bonds, or consider the derivative of the bond pricing formula with respect to yield.

19. g. We need the face value of the bond.

20. c. You will need to sell the bond after 1 year (i.e., before it matures), so its value depends on the current interest rates.

21. Profit. The change in yield makes the junk bonds more valuable and the Illinois bonds less valuable. So selling the junk bonds and buying back the Illinois bonds give a profit.