PART I: Each question is worth 3 marks

`1. Mr. Holt borrowed $3,000 for four years and is charged interest as indicated below:

First year:	5% simple interest
Second year:	6% simple interest
Third year:	7% simple interest
Fourth year	8% simple interest

How much does he have to pay back at the end of year four? Round your answer to the nearest dollar.

a) $3,600
b) $3,650
c) $3,780
d) $3,960
e) None of the above

Find the average interest rate

$$\frac{5\% + 6\% + 7\% + 8\%}{4} = 6.5\%$$

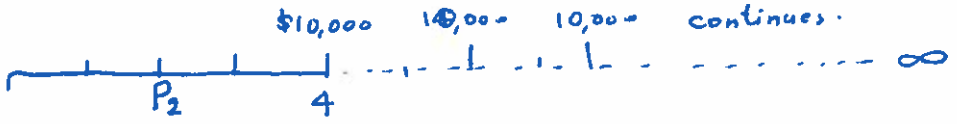
$$FV_4 = 3000\left(1 + .065(4)\right)$$

$$= \boxed{\$3,780}$$

We went over a very similar question in class.

2. What is the maximum dollar amount that you would be willing to pay for an investment that pays $10,000 every other year forever if the 1st payment occurs four years from today and the interest rate is 5% compounded quarterly? Round your answer to the nearest dollar.

a) $200,000
b) $149,364
c) $105,819
d) $86,653
e) $95,707



We need to find the effective 2-year rate

$$EAR = \left[1 + \frac{.05}{4}\right]^4 - 1 = 5.094534\%$$

$\therefore$ The effective 2-year rate $= (1.05094534)^2 - 1 = 10.4486\%$

w.r.t $t=2$, the cash flows represent a perpetuity

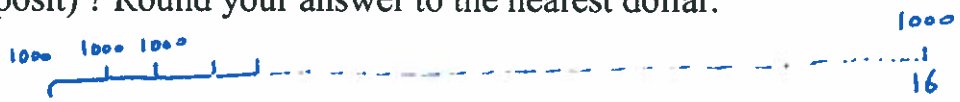
$$\therefore P_2 = \frac{10,000}{.104486}$$

$$\text{And } P_0 = \frac{P_2}{(1.05094534)^2} = \boxed{\$86,653}$$

See Q12 & Q13 on additional Practice problems on TVM

3. Suppose you deposit $1,000 into a savings account today (t = 0) and additionally, $1,000 is deposited at the end of every 6 months for the following 8 years. This means that there will be a total of three deposits in the first year and two deposits in each subsequent year with the last deposit being made at the end of the 8th year. If the interest rate is 6% compounded semi-annually, how much will be in the account at the end of 8years (right after the last deposit) ? Round your answer to the nearest dollar.

a) $19,414
b) $20,762
c) $21,762
d) $22,414
e) $23,414



$FV = FV_{\text{annuity due}} + \text{Last deposit}$

$= 1000\left[\frac{\left(1+\frac{.06}{2}\right)^{16}-1}{\frac{.06}{2}}\right]\left[1+\frac{.06}{2}\right] + 1000$

$= 20,762 + 1000$

$= \$21,762$

Very similar to Q3 & Q4 on additional Practice problems on TVM, Bonds & Stocks.

4. Professor Jane Lamoure just won a big jackpot at the Montreal casino. She has been offered two options:

Option 1: Receive $100,000 at the end of each of the next 30 years
Option 11: Receive a lump sum today (t = 0)

How much should the lump sum be so that Jane would be indifferent between the two options? The interest rate is 5% compounded semi - annually. Round your answer to the nearest dollar.

a) $1,526,353
b) $1,537,245
c) $1,979,277
d) $2,958,555
e) $3,000,000

Find the EAR $= \left(1+\frac{.05}{2}\right)^{2}-1 = 5.0625\%$.

Lump sum = PV of the $100,000 deposits earning the EAR

$= \frac{100,000}{.050625}\left[1-\frac{1}{(1.050625)^{30}}\right]$

$= \$1,526,353$

Please see Q14 on additional Practice problems on TVM

5. Ms. Shillingford agrees to repay a loan by paying \$500 at the end of each month for 5 years. The first payment is due at the end of the 5th month from today. If the interest rate is 4% compounded monthly, find the amount of the loan. Round your answer to the nearest dollar.

a) \$29,852
b) \$29,088
c) \$27,150
d) \$26,791
e) \$24,683

If payments begin in 5 months, then w.r.t. $t=4$, we have a simple annuity

$$PV_4 = \frac{500}{.04/12}\left[1 - \frac{1}{\left(1+\frac{.04}{12}\right)^{60}}\right] = \$27,149.53445$$

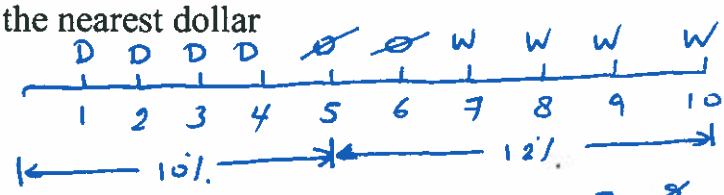
See Q10 on additional Practice problems on TVM

And $PV_0 = \frac{27,149.53445}{\left(1+\frac{.04}{12}\right)^4} = \boxed{\$26,791}$

6. Mr. Dyer wants to make deposits at the end of each of the following four years. Due to other family responsibilities, he will not be able to make any deposits in years 5 & 6. Then he plans to withdraw \$40,000 at the end of years 7,8,9 &10

Very similar to an example done in class. Refer to your class notes on applications to TVM.

W = withdrawal = \$40,000 /year
D = deposit
No deposits in years 5 & 6
K = 10% from today till end of year 5 & 12% thereafter
Find D
Round your answer to the nearest dollar



a) \$21,249
b) \$98,615
c) \$20,634
d) \$21,634
e) None of the above

$$P_6 = \frac{40,000}{.12}\left[1 - \frac{1}{(1.12)^4}\right] = 121,493.9739$$

$$P_5 = \frac{P_6}{1.12} = \$108,476.7624$$

$$P_4 = \frac{P_5}{1.10} = 98,615.23853$$

$$D\left[\frac{(1.10)^4 - 1}{.10}\right] = 98,615.23853 \Rightarrow$$

$$\boxed{D = \$21,249}$$

7. Prof. Sharpe wants to borrow $78,000 to buy his favourite car MB E400. The bank agrees to loan him the money at 10% compounded monthly forthree years. What is the outstanding balance after the 24th payment is made?Round your answer to the nearest dollar

a) $30,202
b) $28,628
c) $32,719
d) $45,281
e) None of the above

Very similar to an example that was done in class. Refer to your notes on applications to TVM (MR. Tomberlin example).

First we need to Find the PMT

$PV = -78{,}000$
$N = 36$
$FV = \cancel{0}$
$I/Y = \frac{10\%}{12} = .8\bar{3}\%$

CPT PMT = $2,516.84

$$PV_{EOM\,24} = \frac{2516.84}{\frac{.10}{12}}\left[1 - \frac{1}{\left(1+\frac{.10}{12}\right)^{12}}\right] = 28628$$

8. Which of the following statements is correct?

a) An investment that compounds interest semi-annually, and has nominal rate of 10 percent, will have an effective rate less than 10 percent
b) The proportion of the payment of an instalment (amortized) loan that goes towards repayment of principalincrease over time.
c) The present value of a 3-year $100 annuity due is less than the present value of a 3-year ordinary annuity.
d) Statements B and C are correct
e) None of statements A, B and C are correct

9. Which of the following statements about preferred stock is most correct?

a) One of the advantages to the firm associated with preferred stock financing rather than common stock financing is that control of the firm is not given up
b) Preferred dividends are usually non-cumulative
c) If a firm declares bankruptcy, common stock shareholders have a lower claim to the remaining assets of the company compared to preferred stock shareholders.
(d) Statements A and C are correct
e) Statements A, B and C are correct.

10. Which of the following statements is most correct? See Fall 2018 Final exam

a) One of the ways in which firms can mitigate or reduce agency problems between bondholders and stock holders is by increasing the amount of debt in the capital structure.
b) The threat of a takeover is one way in which the agency problem between stockholders and management can be alleviated
c) Managerial compensation can be structured to reduce agency problem between stockholders and managers.
(d) Statements b and c are correct
e) All of the statements above are correct

11. Which of the following institutions help corporations issue new stocks or new bonds?

a) Dow Jones Industrial Average
b) Organized exchange, like the New York Stock Exchange
(c) Investment banks
d) Corporation
e) None of the above

12. Big Nile Inc. just paid a dividend of $2.60. The company's stocks are currently selling for $35.25 a share. The stock is expected to grow at a rate of 8% per year for the next three years and then grow at an annual rate of 4% indefinitely. If the required return on Big Nile stock is 14%. is the stock currently see Q9 on additional Practice problems on TVM, Bonds & Stocks.

(a) Overvalued
b) Undervalued
c) Fairly priced
d) Cannot tell without knowledge of the growth rate in GDP

$$P_0 = \frac{2.60(1.08)}{1.14} + \frac{2.60(1.08)^2}{(1.14)^2} + \frac{2.60(1.08)^3}{(1.14)^3} + \frac{\frac{2.60(1.08)^3(1.04)}{.14-.04}}{(1.14)^4}$$

$= \$29.99$ overvalued since it is trading at a price higher than its intrinsic value.

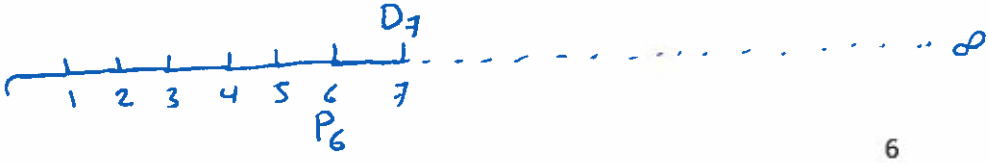
13. MDK. Inc. is a high growth firm that has never paid a dividend. The company just issued press release stating that next year it plans on paying an annual dividend of $0.34. It also stated that dividends are expected increase by 40% a year for each of the following four years and then increase by 4% annually thereafter. The required rate of return on this stock is 15%. What is the expected price per share of MDK stock at the end of year 6.

a) $9,12
b) $9.42
c) $12.35
(d) $12.84
e) $14.14

$$P_6 = \frac{D_7}{k-g}$$

but $D_7 = D_1(1.40)^4(1.04)^2 = 1.412725$

$$\therefore P_6 = \frac{1.412725}{.15-.04} = \$12.84$$



14. You purchase an eight-year corporate bond that sells today at a premium of $23.00 on its face value of $1000. The bond pays $35 of interest once per year. You hold the bond for one year and sell it (just after receiving the coupon interest) to earn an annual return of 2,8375%. What was the bond's price at the time you sold it.

a) $1,048.00
b) $1,023.00
c) $1,025.90
d) $1,020.01
e) $1,017.03

$B_0 = \$1023$

$B_1 = ?$

$$\frac{(B_1 - 1023) + 35}{1023} = 2.8375\%$$

$$\Rightarrow B_1 = \$1,017.03$$

15. Kolb Inc. invested $2.50 million in a project that earned an 7.25% (EAR) rate of return. Kolb sold their investment for $4,313,450. How much sooner could Kolb have sold the company if they only wanted $ 3.65 million from the project?

see Q5 on additional Practice problems on TVM, Bonds & stocks

a) 2.38 years
b) 2.69 years
c) 2.89 years
d) 3.25 years
e) None of the above

PV = 2,500,000
FV = 4,313,450
I/Y = 7.25%
CPT → N
7.79 years

PV = 2,500,000
FV = 3,650,000
I/Y = 7.25%
CPT → N
5.41 years

7.79 - 5.41 = 2.38 years

16. An investor is concerned about the sensitivity of bond prices to changes in interest rates. Which of the following five bonds which are similar apart from coupon and maturity has the HIGHEST sensitivity of price to changes in interest rates?

similar to an example done in class

a) 5% coupon and 15-year maturity
b) 4% coupon and 20 year maturity
c) 4% yield and 15-year maturity
d) 5% coupon and 20-year maturity
e) 5% coupon and 18 -year maturity

17. Chantal invested $1000 and in the first year she earned 5%, and then lost 5% the following year. If this up and down cycle continues for 30 years, how much would she have at the end of 30 years? Round your answer to the nearest dollar?

a) $1,095
b) $1000
c) $ 963
d) $ 928
e) None of the above

$1000 (1.05)^{15} (.95)^{15} = \boxed{963}$

18. On October 31st, 2018, the 8% coupon paying bond of "ABC" company, had a cash price of $965. If the last coupon occurred on July 31st, 2018; the quoted (clean) price of the bond on Oct 31st, 2018 is closest to which of the following alternatives? Assume that the face value of the bond is $1,000 and the coupon interest is paid every 6 months.

a) $950
b) $955
c) $925
d) $945
e) $965

Very similar to an example done in class.

Cash price = Quoted price + Accrued interest (AI)

Quoted price = Cash price − AI

$= 965 - \left(\frac{\$80}{2}\right)\left(\frac{3}{6}\right)$

$= 965 - 20$

$= \boxed{\$945}$

19. The Abel bond pays coupon interest every 6 months, has 5 years remaining to maturity and currently selling for $ 1,100.65 If the Able bond's YTM is 5% and has a par value of $1,000 what is the coupon rate of the bond?

identical to Q3 on additional practice problems on bonds.

a) 4.65%
b) 6.30%
c) 7.30%
d) 3.64%
e) None of the above

FV = 1000, PV = −1,100.65, N = 10, $\frac{I}{Y} = \frac{5\%}{2}$.

CPT → PMT $36.50 semi-annually or $73.00 annually.

∴ Coupon rate = $\frac{73.00}{1000} \times 100 = 7.30\%$

20. The Altimara bond has a coupon rate of 10%, par value of $1,000, and time to maturity (TTM) of 8 years. If the coupon interest is paid semi-annually and the YTM is 8%, what is the bond's current yield?

identical to Q7 on additional practice problems on bonds.

a) 10.00%
b) 8.00%
c) 9.37%
d) 8.96%
e) 13.62%

$B_0 = ?$

FV = 1000, N = 16, $I/Y = \frac{8\%}{2}$, PMT = 50

CPT → PV = 1,116.52 = B_0

∴ Current Yield = $\frac{\text{Coupon interest}}{B_0}$

$= \frac{10\% \times 1000}{1,116.52}$

$= 8.96\%$

MAKE SURE YOUR NAME AND ID HAVE BEEN CORRECTLY ENTERED ON THE ANSWER SHEET

PART II:Problems and Theory

In this part, work must be shown to receive partial marks.

1) In FOUR lines or less, differentiate between price risk and reinvestment rate risk.**(4 marks).** This was discussed at length in class

Price risk refers to the risk that interest rates will rise, thereby reducing a bond's price and resulting in a capital loss. In contrast, RRR is the risk that interest rates will fall so you are investing the coupon interest at lower & lower rates.

2) In THREE lines or less, explain why the Yield-To-Maturity (YTM) is superior to the other bond yield measures.**(4 marks)**

This also was discussed at lenght in class.

The YTM is superior to the other bond yield measures simply because it takes into account all three sources of bond returns.

3) Prof. Modigliani is considering buying a 6% coupon bond paying interest semi-annually and currently selling for $1,038.46. The bond has 14 years remaining to maturity. He is expecting to hold the bond for four years and sell it at the end of year 4. During the holding period, the coupon interest can be reinvested at a 4% quoted interest rate. If the yield to maturity for similar risk bonds is expected to be 6% four years from now, what is Prof. Modigliani's expected annualized rate of return?**(6 marks)**

see Q10 on additional practice problems on bonds. I also went over an identical question in class.

$\rightarrow B_4 = \frac{30}{.03}\left[1 - \frac{1}{(1.03)^{20}}\right] + \frac{1000}{(1.03)^{20}}$ +1,000

but you really did not have to do any calculations since the YTM and coupon rate are the same.

→ Coupon payments + Int-on-Int

$30\left[\frac{(1.02)^8 - 1}{.02}\right]$ 257.49

1,257.49

$\therefore\ 1{,}038.46\left(1 + \frac{k}{2}\right)^8 = 1{,}257.49 \Rightarrow k =$ **4.84%**

4) On November 1st, Mr. & Mrs. Cacchione borrowed $250,000 to buy a house in Mont Orford. The Canadian mortgage rate is quoted at 6 percent (with semi-annual compounding). The loan is to be repaid in equal monthly payments over 20 years. The first payment is due on December 1st. How much of the 10th payment applies to the principal balance? (Assume that each month is equal to 1/12 of a year. **(6 marks)**

see Q18 on additional practice problems on TVM.

Find the EMR = $\left[1 + \frac{.06}{2}\right]^{9/12} - 1 = .493862\%$.

Find the monthly pmt: PV = -250,000, N = 240, FV = 0, $\frac{I}{Y} = .493862\% \Rightarrow$ PMT = $1,780.47

Find the balance after 9 pmts: N = 231, FV = 0, $\frac{I}{Y} = .493862\%$, PMT = -1,780.47 ⇒

balance = $244,989.39

Find interest on 10th PMT: 244,989.39 × .493862% = $1,209.91

Find Principal paid on 10th PMT: 1,780.47 − 1,209.91 = **$570.56**