Directions:
This exam has 8 pages, including this page. Please make sure you have all 8 pages.
You have 75 minutes to complete this exam.
Please answer the following questions and make sure your answer are legible. If you don’t show work and/or I can’t follow it, I won’t give partial credit. You may use a calculator (not the calculator function on other technology) and the Formula Sheet that I provide you, nothing else. Good Luck.

There are 100 points on this test.

<table>
<thead>
<tr>
<th>Page</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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Short Answer: This section is short answer. You should be able to answer these questions without doing any work (other than possibly addition or subtraction). You don’t need to show work for these questions.

1. (4 points) Fill in the blanks with the appropriate vocabulary word:

   (a) **FV**. Annuity factor is the future value that would accumulate if each annuity payment was $1.

   (b) **Annuity** is any collection of equal payments made at regular time intervals.

   (c) **Open-ended** is a type of mutual fund that does not have a fixed number of shares.

   (d) **NAV** is the Net Asset Value of one share of a mutual fund.

2. (1 point) One of the following is an annuity, the other is not an annuity. Circle the annuity.
   - Macklemore is trying to save some money. Every three weeks he adds $20 to his savings account.
   - Ryan Lewis is trying to save money. Every week he takes his spare change and deposits it into his savings account.

3. (1 point) Which is larger $s_{20|0.03/12}$ or $s_{24|0.03/12}$?
   You should be able to answer without working them out.

4. (2 points) Jack Black and Kyle Gass are each looking to take out $10,000 home improvement loans, and both qualify for 5% interest. Jack will take out a 3 year loan, and Kyle will take out a 5 year loan.

   Circle the best answer in each part, remember you should be able to answer without doing calculations.
   - (a) Who will have higher monthly payments? (Jack or Kyle)
   - (b) Who will pay more in interest over the life of the loan? (Jack or Kyle)
5. (1 point) Which of the following asset classes is considered the highest risk? Circle the best answer.
   (a) Equities (e.g. stocks)
   (b) Fixed Income (e.g. bonds)
   (c) Cash (e.g. savings accounts)

6. (1 point) Which of the following investments are guaranteed not to lose money: check all that apply.
   □ Stocks
   □ Bonds
   □ Mutual Funds
   None!!!

7. (1 point) You're an investor considering two stocks:
   - Pandora Media Inc. stock was selling for $12.82 a share in April of 2013, and is now (April 2015) selling for $16.84 a share, which gives a CAGR of 14.61%
   - Sirius XM Radio Inc. stock was selling for $3.20 a share in April of 2014, and is now (April 2015) selling for $3.89 a share, which gives a CAGR of 21.56%
   (a) Assuming you're looking to make the most money, and assuming both stocks continue to perform as they have in the past, which should you choose? (Pandora or Sirius)
   (b) (Bonus 1 pt) Explain how you know to make the choice you made in part (a).

   \[ \text{pick higher CARG.} \]
   \[ \text{(it we're not weighing relative risks, CARG lets us compare growth, choose the one that grows your $ more!!!)} \]

8. (3 points) Indicate if the following are true or false:
   (a) True/False: All stocks pay dividends.
   (b) True/False: Bonds always sell for par value.
   (c) True/False: When you buy a share of a mutual fund, you get to vote on what assets (stocks, bonds, etc) the mutual fund will buy.

9. (1 point) Fill in the blanks to indicate which is a Stock and which is a Bond.
   (a) When you buy a \underline{Bond} you're making a loan to a company/government/etc.
   (b) When you buy a \underline{Stock} you're buying partial ownership of a company.
10. (7 points) John, Ringo, Paul and George are partners in the Abbey Road Hammer Company. Last quarter their profits were $25,023 and they agree to divide this amongst themselves.

(a) If each partner is entitled to an equal share, how much will each receive?

(b) If instead of being entitled to an equal share, John is entitled to 4 shares, Paul is entitled to 3 shares, and George and Ringo are each entitled to 2 shares, how much will each partner receive this quarter?

(c) (Bonus 1pt) Who would prefer the profits were divided equally?

\[
\begin{align*}
\text{a) } \frac{25,023}{4} &= \$6,255.75 \text{ (each gets the same)} \\
\text{b) } 4 + 3 + 2 + 2 &= 11 \text{ shares total} \\
\frac{25,023}{11} &= \$2,274.82/\text{share} \\
\text{or } \frac{2,274.82}{\text{share}} &= \$2,274.82/\text{share} \\
\end{align*}
\]

Note: The next three questions (# 11, #12, and #13) are all Annuity Questions. Make Sure You Choose The Appropriate Formula for Each!

11. (9 points) In 1992 Billy Ray Cyrus and his then-wife Tish realized they were expecting a baby girl (who they would name Miley). They wanted to start a savings account for little Miley’s college, so Billy Ray went immediately (that same day) to open a savings account and deposit $400.\(^1\) Assume that the account earned 2.18% interest, and that Billy Ray made $400 deposits into this account every quarter for 18 years (till 2010). How much would the account be worth in 2010?

\[
FV = \frac{PMT \times \left(1 + \frac{r}{4}\right)^{n \times 4} - 1}{\frac{r}{4}}
\]

\[
FV = 400 \times 87.88 + (1 + 0.02184) \\
FV = 35,344.11
\]

\[
\text{the account would be worth } 35,344.11
\]

\(^{1}\)1992 was before Billy Ray made it big with hits like “Achy Breaky Heart,” so $400 a quarter might have been all he could afford.
12. (10 points) Mr. Bronson wants to buy a Brand New Car. He's saved up $10,000 for a downpayment (from the release of his album Mr. Wonderful) and his accountant has determined that he can afford monthly payments as high as $550 a month. If Mr. Bronson qualifies for a 4-year loan at $4\frac{1}{4}$% interest, what's the most expensive car Mr. Bronson can afford?

\[ PV = PMT \times a_{n|i} \]

\[ PMT = 550 \]
\[ n = 4 \times 12 = 48 \]
\[ i = 0.0425/12 \]

\[ a_{n|i} = \frac{(1 + \frac{0.0425}{12})^{48} - 1}{(1 + \frac{0.0425}{12})^{48}} \]
\[ = 44.07014545 \]

\[ PV = PMT \times a_{n|i} \]

\[ PV = 550 \times 44.07014545 \]
\[ PV = 24,238.58 \]

Mr. Bronson can borrow the much.

The most expensive car he can afford.

\[ \text{Total Amount to Borrow} = 10,000 + 24,238.58 \]
\[ = 34,238.58 \]

13. (10 points) The Barenaked Ladies released the song “If I had $1,000,000” in 1993 (22 years ago). Suppose rather than simply dreaming and singing about the million dollars, one of their members actually tried to save $1,000,000 in 22 years by making payments every 2 weeks into an investment that earns 8.1% interest.

(a) How much does each payment need to be?

(b) How much in interest will the musician earn from this account?

\[ FV = PMT \times s_{n|i} \]

\[ FV = 1,000,000 \]
\[ PMT = ? \]
\[ n = 22 \times 26 = 572 \]
\[ i = 0.081/52 \]

\[ s_{n|i} = \frac{(1 + \frac{0.081}{52})^{572} - 1}{(0.081/52)} \]
\[ = 1580.957979 \]

\[ PMT = \frac{FV}{1580.957979} \]
\[ = 632.53 \]

**b)**

\[ FV = \text{Total Deposits} = \text{Int} + \]
\[ 1,000,000 = 572 \times 632.53 \]
\[ \text{Int} = 638,192.84 \]

Most of it is from interest.
14. (7 points) The members of Spinal Tap took out a loan last year for the newest, most state-of-the-art Amp (this one goes up to 12). They have 9 monthly payments of $161.70 remaining. If the interest rate on their loan is 4.9%,

(a) what is the remaining balance on this loan?

(b) (Bonus 1 pt) If Spinal Tap just got a $1444.00 royalty check, can they pay off their Amp loan today? Explain.

\[
pV = \frac{PV \times \text{remaining payments}}{\text{remaining balance}}
\]

\[
pV = 161.70 \times 8.8888...
\]

\[
pV = 1426.03
\]

\[
\text{remaining balance} = 1444.00 - 1426.03 = 17.97
\]

\[
\text{remaining balance} = 1426.03
\]

15. (4 points) Kim Kardashian bought Kanye West a Lamborghini, we'll assume she has 14 monthly payments of $9013 left at 3.9% interest and the remaining balance of $123,158.90 on the car loan.

(a) How much will Kim (and Kayne) spend paying off the $123,158.90 remaining balance on this car loan?

(b) Kanye and Kim are also rumored to be buying the $3,000,000 house next to the one they already own. If they decide to consolidate the Lamborghini car loan with the mortgage for their new house, how much will they need to borrow with their new mortgage?

A) They will make 14 payments of $9013 each

\[
14 \times 9013 = 126,182 \quad \text{paying off loan}
\]

we expect this to be more than the remaining balance because of interest

B) They will borrow $3,000,000 + $123,158.90 = $3,123,158.90

with the mortgage.
16. (6 points) The Deere & Company stock paid out a quarterly dividend of $0.60 per share in February, 2015. The current selling price of the Deere & Co. stock is $88.52 (April 7, 2015). The CARG of Deere & Co. stock has been about 2.65% (over the past 3 years). Since Kenny Chesney (and his friends and family) “ain’t into cars or pickup trucks,” we’ll assume Kenny bought some Deere & Co. stock 3 years ago.

(a) Find the current dividend yield of this stock.

(b) Approximately what total rate of return did Kenny earn on this stock?

You may assume the dividend yield hasn’t changed over these 3 years.

\[
a) \text{current div. yield} = \left( \frac{0.60}{88.52} \right) = 0.067 \text{ or 6.7%} \\
\]

\[
b) \text{total rate of return} = \text{Div. Yield} + \text{CARG} = 2.71\% + 2.65\% = 5.36\% \text{ total rate of return.}
\]

17. (8 points) Dr. Dre is always talking about how great Beats are. Unfortunately not everyone is careful with spelling, and one of the Doctor’s financial advisors bought stock in American Crystal Sugar Co, an agricultural cooperative specializing in beet sugar and other sugar products to try and get on the Doctor’s good side.

Assume the stock was purchased back in October 2013 (1.5 years ago), and was selling for $2000.00 a share. Currently, (April 2015) the stock is selling for $2,550.00. Assume the stock hasn’t undergone any splits.

(a) What rate of return (Compound Annual Growth Rate) does this stock’s growth represent?

(b) If we assume that that the stock continues to grow at the same rate, what will we expect the stock to be worth in 2 years (April 2017)?

(c) What can we say for certain about the value of this stock in 2 years?

\[
a) \text{i = } \left( \frac{FV}{PV} \right)^{\frac{1}{n}} - 1 \\
FV = 2550 \quad PV = 2000 \\
n = 1.5 \\
i = \left( \frac{2550}{2000} \right)^{\frac{1}{1.5}} - 1 = 0.1758 \text{ or 17.58%}
\]

\[
b) \text{Compound int. formula} \\
FV = 2550 (1 + 0.1758)^{1.5} \\
FV = 3,525.39 \text{ (best guess at stock value in 2 years)}
\]

\[2\]I made up this investment, I have no idea how Dr. Dre or his associates spend their money.
18. (12 points) Don McLean bought a $1000 par-value General Motors Bond\(^3\) (GM is the company that manufactures Chevy's). The bonds have a 5.2% coupon rate with semiannual payments and a maturity date of April 1, 2045. Currently (March 2015) the bonds are selling at $1077.70.

(a) How much is each interest payment that Don will receive from owning this bond?  $26

(b) How much will Don receive at maturity?  $1000 (par value)

(c) What is the current yield of this bond?  4.83%\(\%\)

(d) Is this bond selling at a discount, at par, or at a premium?  Premium

\[ I = \text{PRF} \]
\[ I = \frac{1000}{2} \times 0.052 \]
\[ I = 26 \]

\[ I = \text{PRF} \]
\[ I = \frac{1077.70}{2} \times 0.052 \]
\[ I = 26 \]

\[ I = \frac{1077.70 + R + 0.5}{1077.70 + R} = R \]
\[ 0.482504 = R \]

19. (3 points) The Hopewell Diversified Value Fund has total assets of $142,575,814. There are 3,475,912 shares outstanding. What is the NAV per share?

\[ \text{NAV} = \frac{\$142,575,814}{3,475,912} = \$41.02 \]

\[ \text{NAV} = \frac{41.0184}{3.475912} = \$41.02 \]

\[ \text{NAV} = \frac{41.0184}{3.475912} = \$41.02 \]

\(^3\)also totally made up, I've never had a celebrity discuss their investments with me.
20. (4 points) The Hopewell Emerging Markets Bonds Fund is an open-ended fund whose NAV is $103.59 The fund charges a 4.75% load. If Brenna invests $2,500 in this fund, how many shares will she own?

\[
\begin{align*}
\text{Load} & \quad 4.75\% \times 2500 \\
& \quad 0.0475 \times 2500 = 118.75 \\
\text{Buy shares} & \quad 2500 - 118.75 \\
& \quad = 2381.25
\end{align*}
\]

\[
\text{How many shares buy with $231.25?} \\
\#\text{shares} = \frac{231.25}{103.59} \\
\#\text{shares} = 2.2987257...
\]

21. (5 points) Sandy has budgeted $450 for back-to-school shopping this year for her son. The sales tax rate where she lives is 6.75%. Assuming this tax rate applies to everything she buys, how much can she spend before tax and still fall within her budget?

\[
T = P(1+r) \\
T = 450 \\
P = ? \\
r = 0.0675 \\
\frac{450}{1 + 0.0675} = P \\
421.545667... = P
\]

\[
\text{she can spend $421.54 before tax.} \\
you should round down here, not up. 421.55 is not correct.
\]

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**BONUS: You May Only Attempt This Question If You Have Finished the Rest of the Test!**

(a) Miss. Lorde has an eccentric shopping list. Some of her purchases were bought in her home country of New Zealand (where the sales tax rate is 15% on all purchases). And some of her purchases were made in California, where the sales tax rate is 7.5%.

If Miss Lorde purchased a bottle of Grey Goose in California, priced at $36.99 and a gold leash for her tiger, priced at $3000 also in California. Finally, she purchased a ball gown in New Zealand, priced at $6,950.

How much total (including tax) did Miss. Lorde spend on her purchases?

\[
\begin{align*}
\text{Cali} & \quad 7.5\% \\
T = ? \\
P = 3036.99 \\
r = 0.075 \\
T = 3036.99 (1 + 0.075) \\
T = 3264.76
\end{align*}
\]

\[
\begin{align*}
\text{NZ} & \quad 15\% \\
T = 6950(1 + 0.15) \\
T = 7992.50
\end{align*}
\]

\[
\text{Total spent: } 3264.76 + 7992.56 \\
= 11,257.36
\]