**Math 1240 Online Summer 2018** **Mike McCraith**
**Exam 1** **Available: June 21 – June 25, 2018**

**DO NOT TURN THIS PAGE UNTIL YOU ARE INSTRUCTED TO DO SO**

- **Write your name below on the space provided.**
- **This test has a total of 5 pages.**
- **Work the problem in the space provided. If you need more space, write on the back of the test.**
- **To insure maximum credit, show your work. In general, full credit will not be given for unsupported answers.**
- **Look only at your test. Don't give the impression that you are cheating.**
- **Tests must be done in pencil. Otherwise, they will receive a grade of zero.**
- **Be sure to write neatly. If I cannot read what was written, do not expect the problem to be graded.**
- **If you finish early, go over the test again.**

**Good luck!**

| Number | Maximum | Score |
|---|---|---|
| **1** | 6 | |
| **2** | 6 | |
| **3** | 6 | |
| **4** | 6 | |
| **5** | 24 | |
| **6** | 8 | |
| **7** | 12 | |
| **8** | 18 | |
| **9** | 11 | |
| **10** | 3 | |
| **Total** | 100 | |

**Name** _____

# CIRCLE FINAL ANSWERS
# Round to Two Decimal Places
# Unless Otherwise Noted

1) (6 points) Frank invests in the Darko Bank that offers a 2.25% simple interest rate. He invests $550 at this rate for 8 years. How much is in the account after that time?

2) (6 points) If $7500 was deposited into an account that offered a 1.75% annual interest rate compounded monthly for 12 years, how much would be in the account after that time and how much interest was earned? Be sure to label your answers.

3) (6 points) How much should be invested now so that in 15 years there will be $7,000 in an account that offers a 5.35% annual interest rate compounded quarterly?

4) (6 points) Which is a better way to invest? Option A: 6.3% compounded semi-annually or Option B: 6.25% compounded monthly? **Write answer as a percent rounded to two decimal places**.

5) (6 points each) Atrus borrowed $145,000 for a home on a 30-year loan that carried a 5.25% annual interest rate compounded monthly. After 12 years, he was able to refinance down to a 15-year loan that carried a 2.85% annual interest rate compounded monthly.

a) Determine the monthly payment for the beginning 30-year loan:

b) How much was left on the balance after paying for 8 years?

c) Determine the monthly payment for the new 15-year loan:

d) How much money did Atrus save by refinancing his mortgage?

6) (8 points) Ruth and Wallace takes out a loan of $122,000 for a condo. Their loan has a 3.75% annual interest rate compounded monthly for 30 years. Chart the first two months of the loan given the monthly mortgage payment is $565.00. **Be sure to show the numbers that are being multiplied and subtracted. Round to two decimal places as you work**:

| End of Month | Interest | Principal | Balance |
|---|---|---|---|
| 1 | | | |
| 2 | | | |

7) (6 points each) Schmidt works out that he would need $4,000 a month during his retired years. He is currently 25 years old and plans to work until his is 65. He assumes that he would need to make withdraws for 30 years past his retirement and that he's in a 25% tax bracket. Assuming he finds an account that will offer him a 6.25% annual interest rate compounded monthly…

a) How much should he have in his account at retirement?

b) How much should he deposit monthly during his working years to ensure he meets his goal?

8) Balthier is 30 years old and is working as a local sky pirate. He is able to deposit $525 a month into a Pirate Bank 401-k which offers a 7.25% annual interest rate. He does this for 30 years. After that time, he will retire. He wishes, over the next 25 years, to take out equal withdraws until the account is emptied. Assume the interest rate is the same after retirement.

a) (12 points) What are the equal withdraws he is able to take out?

b) (2 points) How much did he deposit before retirement?

c) (2 points) How much did he withdraw after retirement?

d) (2 points) How much interest did he earn overall?

9) Mike goes game-shopping several times during the month of July. His Eye-Key-Ah credit card has a $0 balance as of July 1.

a) (8 points) Based on the purchases below, fill in the last column of the table and determine the average daily balance for the account.

| Day of Purchase | Game Purchased | Purchase Price | Daily Balance |
|---|---|---|---|
| July 1 | Gaflunkenfurter Couch | $659.00 | |
| July 12 | Schoo Moo Chair | $249.00 | |
| July 18 | Myshoono Lamp | $49.00 | |
| July 22 | Rubadubdub Rug | $79.00 | |

b) (3 points) Assuming there is a 16.75% annual finance charge on the card and that Mike made no payment on the card, what will be the finance charge for the month of July? Use the $I=Prt$ formula where $t$ is the number of days in cycle divided by 365.

10) (3 points) What is the **major theoretical** distinction between Compound Interest and Future Value of an Annuity?

# Chapter 1 Formulas

Simple Interest: $I = Prt$

Amount of Simple Interest: $A = P + Prt = P(1 + rt)$

Compound Interest: $A = P\left(1 + \frac{r}{n}\right)^{nt}$

Present Value: $P = A\left(1 + \frac{r}{n}\right)^{-nt}$

Annual Percentage Yield: $APY = \left(1 + \frac{r}{n}\right)^{n} - 1$

Amortization: $PMT = \frac{PV\left(\frac{r}{n}\right)}{\left(1 - \left(1 + \frac{r}{n}\right)^{-nt}\right)}$

Amount Owed on a Loan: $A\left(1 + \frac{r}{n}\right)^{nt} - \frac{PMT\left(\left(1 + \frac{r}{n}\right)^{nt} - 1\right)}{\left(\frac{r}{n}\right)}$

Present Value of an Annuity: $PV = \frac{PMT\left(1 - \left(1 + \frac{r}{n}\right)^{-nt}\right)}{\left(\frac{r}{n}\right)}$

Future Value of an Annuity: $FV = \frac{PMT\left(\left(1 + \frac{r}{n}\right)^{nt} - 1\right)}{\left(\frac{r}{n}\right)}$

Sinking Fund: $PMT = \frac{FV\left(\frac{r}{n}\right)}{\left(\left(1 + \frac{r}{n}\right)^{nt} - 1\right)}$

Average Daily Balance: $ADB = \frac{(\text{number of days})(\text{beginning balance}) + (\text{number of days})(\text{new balance}) + \ldots}{\text{total number of days}}$