

FINITE MATH, FALL 2016 - PROBLEM SET 2

Name: _____ Score: _____/ 50

Use this worksheet as the cover sheet for your write-up: write your name on this page, and staple this sheet to the front of your homework packet.

You will receive no credit for submitting solutions that the grader cannot read and understand—be sure to write legibly!

Problem 0.1. Find the fifth term of each geometric sequence:

- (1) $a=3$; $r=2$.
- (2) $a=1$; $r=3$.
- (3) $a=256$; $r=\frac{1}{4}$

Problem 0.2. Find the future value of each annuity, if payments are made and interest is compounded as given. Then determine how much of this value is from contributions and how much are from interest.

- (1) $R=800$, 6.5% interest compounded semiannually for 12 years.
- (2) $R = 42000$ at 10.05% interest compounded semiannually for 12 years.

Problem 0.3. Find the future value of each ordinary annuity. Interest is compounded annually:

- (1) $R=100$ $i=0.06$ $n=4$
- (2) $R=1000$ $i=0.06$ $n=5$

Problem 0.4. Find the periodic payment that will amount to each given sum under the given conditions:

- (1) \$10000 with interest of 5% compounded annually. Payments are made at the end of each year for 12 years.
- (2) \$150000 with interest of 6%. Payments are made at the end of each semi-annual period or 11 years.

Problem 0.5. Find the amount of each payment to be made into a sinking fund so that enough will be resented to accumulate the following amounts. Payments are made at the end of each period.

- (1) \$ 7500. Money earns 6% compounded semiannually for $4\frac{1}{2}$ years.
- (2) \$ 9000. Money earns 4.8% compounded monthly for $2\frac{1}{2}$ years.

Problem 0.6. We want to buy something. At the end of each month we put in \$ 100 into a savings account that pays 2.25% interest compounded monthly.

- (1) How much is in the account after 2 years?
- (2) How much did we deposit?
- (3) How much interest did we earn?

Date: September 16th, 2015.

Problem 0.7. A further opened a savings account for his daughter on the day she was born, depositing \$ 1000. Each year on her birthday he deposits another \$ 1000, making the last deposit on her 21'st birthday. If the account pays 5.25% interest compounded annually, how much is in the account at the end of the day of her 21'st birthday? How much interest has been earned?

Problem 0.8. We put \$10000 into an account at the beginning of each year. The account pays 5% compounded annually. We then put the total amount of deposit into another account paying 6% compounded semiannually for another 9 years. Find the total amount of deposit after the entire 21-year period.

Problem 0.9. A typical pack-a-day smoker spends about \$136.50 a month on cigarettes. Suppose a smoker decides to invest that money instead. Each month the smoker deposits \$136.50 into a savings account at 4.8% interest compounded monthly. What would the account be worth after 40 years?

Problem 0.10. A conventional loan, such as a loan for a car or a house, is similar to an annuity, but usually includes a down payment. Show that if a down payment of D dollars is made at the beginning of the loan period, the future value, including the down payment, is:

$$S = D(1 + i)^n + R \left[\frac{(1 + i)^n - 1}{i} \right]$$