

MATH1007

Homework 3

Due Friday, September 23

When submitting homework, please remember the following:

- Show all work leading to each solution.
- *You must use a staple* (not paper clip) if your answers are longer than a single page.
- Do not submit crossed-out or sloppy work.
- Do not submit ripped or torn pages.
- Be sure to submit your own work.

1. Find a 5-term arithmetic sequence with common difference 2.1 which sums to 375.4. In other words, you need to find an arithmetic sequence  $P_0, P_1, \dots, P_4$  so that  $P_1 - P_0 = P_2 - P_1 = \dots = 2.1$ , and  $P_0 + \dots + P_4 = 375.4$

2. Find a 5-term geometric sequence with common ratio 1.1 which sums to 375.4. In other words, you need to find a geometric sequence  $P_0, P_1, \dots, P_4$  so that  $P_1/P_0 = P_2/P_1 = \dots = 1.1$ , and  $P_0 + \dots + P_4 = 375.4$ . Work to 4 decimal places.

3. Over a period of one week, the NASDAQ index went up by 2.4% on Monday, went down by 5.8% on Tuesday, went down by 17.7% on Wednesday, went down another 17.7% on Thursday, and went up 14.2% on Friday. What is the percentage increase or decrease for the week?

4. Suppose that you deposit \$2340 in the bank. How much money will you have in 7 years with an APR of 2.5% compounded

- (a) annually?                      (b) quarterly?                      (c) monthly?                      (d) continuously?

5. Find the effective annual percentage rate (the APY) if an annual percentage rate of 12.2% is compounded

- (a) quarterly.                      (b) monthly.                      (c) daily.                      (d) continuously.

Work to 4 decimal places.

6. You would like to buy a car. You have \$1900 for a down payment. The loan terms are 5.2% APR, compounded monthly, for 4 years (48 payments). You can afford a monthly payment of \$750. What is the maximum price of the car that you can afford?

7. Repeat the previous problem if the loan is available for 5 years (60 payments) rather than 4.

8. Suppose that a young person with no initial savings decides to save 100 dollars per month at an APR of 3%. Assume that the investments are made monthly and that the return is compounded monthly at the end of each month. After 30 years, 360 deposits, and 360 interest payments, how much money is in the account?

9. For this problem, assume that interest is collected monthly, and that payments are made monthly.

- (a) A 3-year car loan for \$6000 has 3% annual interest. What is the monthly payment?
- (b) A 6-year car loan for \$6000 has 3% annual interest. What is the monthly payment?  
How does your answer compare to your answer in part (a)?
- (c) A 3-year car loan for \$6000 has 6% annual interest. What is the monthly payment?  
How does your answer compare to your answer in part (a)?
- (d) A 3-year car loan for \$3000 has 3% annual interest. What is the monthly payment?  
How does your answer compare to your answer in part (a)?

10. Suppose that you deposit \$750 in a bank account which compounds interest annually. After 5 interest payments, you have \$1000. What is the annual percentage rate for the account?