

Name: \_\_\_\_\_

**MATH 108**

**Spring 2023**

**HW 4: Due 02/08**

*“Don’t look for the needle in the  
haystack. Just buy the haystack!”*

*–John Bogle*

**Problem 1.** (10pt) Aaliyah is making her first big investment. She places \$24,000 with a company that promises a return equivalent to 4.5% annual interest, compounded monthly.

- (a) How much money will her investment be worth in 3 years?
- (b) How much interest has she made in her investment after 3 years?
- (c) If she had wants the investment to mature to \$29,000 in only 3 years, how much should she invest now?

**Problem 2.** (10pt) Jordan is taking out a loan for \$13,000. The agreement he negotiates with the bank is for a 5.3% annual interest rate, compounded continuously.

- (a) How much will he owe after 5 years?
- (b) How much interest will he have been charged on the loan after 5 years?
- (c) If he knows that after 5 years he will have at most \$45,000 to pay back on the loan, what is the most he can afford to borrow initially?

**Problem 3.** (10pt) An investment firm promises that if you place your money with them that you will see returns of 9.7% annual interest, compounded semiannually. You decide to place \$86,000 with this firm.

- (a) How long until your investment is worth \$100,000?
- (b) If instead they claimed the return was 9.7% annual interest, compounded continuously, how long until your investment would be worth \$100,000?
- (c) Why is your answer in (b) a shorter time period than your answer in (a)?

**Problem 4.** (10pt) A bank offers two different loan packages. One package offers a rate of 10.2% annual interest, compounded quarterly. The other package is for 10.1% annual interest, compounded continuously.

- (a) 'At face value', which appears to be the better offer?
- (b) Compute the effective interest rate for each package. Based on these interest rates, which is the better offer?
- (c) Compute the doubling time for each package. Based on these times, which is the better offer?
- (d) Explain the differences (if any) in your answers to (a), (b), and (c).