MTH 351
Exam 1
Fall 2022

When you solve an equation, show the main steps of how to solve it using algebra. Show all work in a neat and organized fashion. Clearly indicate your answers. 100 points possible.

0. (4 pts.) Four free points

1. (12 pts.) An investment is made at time zero and earns simple interest a rate of 8%. Suppose $A(4) = 2838$.

(a) Find $A(9)$.

(b) Find $a(12)$.

2. (12 pts.) At a certain rate of compound interest an investment of 5000 will grow to 8000 at the end of 10 years. Determine its value at the end of 7 years.

3. (12 pts.) Bank P offers a 5-year certificate of deposit that pays an annual effective interest rate of 6%. In addition, a bonus of 3% of the initial investment is paid at the end of the 5-year period.

Bank Q offers a 5-year certificate of deposit without any bonus.

Calculate the annual effective interest rate that Bank Q would have to offer to produce the same annual yield as the certificate from Bank P.

4. (12 pts.) An investor would like to have 20,000 at the end of 8 years. The annual simple rate of discount is 5%. How much should the investor deposit today to reach that goal?

5. (12 pts.) Calculate the accumulated value at the end of 5 years of 650 payable now assuming an interest rate equivalent to a discount rate of 9% convertible monthly.

6. (12 pts.) Frankie deposits 15 into a fund now, and twenty years later Frankie deposits 25.

Interest for the first 15 years is credited at a nominal discount rate of d compounded quarterly, and thereafter at a nominal interest rate of 7% compounded semiannually.

The accumulated balance in the fund at the end of 40 years is 300.

Calculate d.

7. (12 pts.) The force of interest depends upon time, with $\delta(t) = \dfrac{2t}{5(1+t^2)}$, $0 \leq t \leq 3$. Find the accumulated amount after three years for an initial investment of 2000 at time zero.

8. (12 pts.) Suppose that $a(t) = 0.05t^2 + 1$. The only investment made is 900 at time 4. Find the accumulated value of the investment at time 10.