

### Math 312 - Practice Quiz # 1

1. (1 point each) Please circle either T (true) or F (false) for each of the below statements.
  - A) T F For an annual effective interest rate  $i$ , the annual discount factor  $\nu$  represents the present value of 1, one year from now.
  - B) T F If  $i^{(12)} = 24\%$ , then the value of 100 twelve years in the future is  $100(1.24)^{12}$ .
  - C) T F A nominal annual interest rate of 6%, convertible quarterly, is the same as an effective quarterly rate of 1.5%.
  - D) T F If  $A(t) = e^{t^2-t}$ , then the force of interest is  $\delta(t) = 2t - 1$ .
  
2. (8 total points) At time  $t = 0$  you and your friend both invest 1000€. Your account earns simple interest at a rate of 10%.
  - A) (4 points) If your friend's account earns a nominal annual rate of 9%, compounded monthly, find the accumulated value in *both* accounts after 18 months.
  - B) (4 points) If your account still earns simple interest at a rate of 10%, what is the continuously compounded annual interest rate  $r$  earned by your friend's account if the two accounts have equal value after 18 months?
  
3. (4 points) Sam deposits \$1000 into her account on 01/01/2024. Brandon deposits \$500 into a different account on 01/01/2025, and another \$600 into his same account on 01/01/2026. On 01/01/2028 both Sam and Brandon have the same amount in their accounts. The accounts earn the same annual effective interest  $j$ . Assuming that  $j > -1$ , find  $j$ .
  - I) 6.2%
  - II) 6.4%
  - III) 6.6%
  - IV) 6.8%
  - V) 7.0%
  
4. (4 points) The force of interest in an account is  $\delta_t = .002t + .05$ . If  $A(4) = 1000$ , find  $A(10)$ .