

Extra Credit Homework #1

Interest Rates

Key Formulas:

| Formula Name | Formula | Variable Definitions |
|--|--|--|
| Compounding Interest | $P \times (1 + R/100)^Y = B$ | P: Principle R: Interest Rate Y: # of Years invested B: Balance after Y years |
| Income from Interest | $\frac{P \times R}{100} = I$ | P: Principle R: Interest Rate I: Income |
| Present Discounted Value | $PDV = \frac{V}{(1 + R/100)^Y}$ | PDV: Present discounted value V: Value in Y years R: Interest Rate Y: # of Years |
| Savings with Interest and Yearly Contributions | $\frac{C}{R/100} \times [(1 + R/100)^{Y+1} - 1] = B$ | C: Yearly Contribution R: Interest Rate Y: # of Years Invested B: Balance after Y years |

1. You inherit \$2,000:

a. If you put it in 3-month treasury bonds with yearly 3.5% interest, how much will it be worth in 30 years?

b. If you invest it in the stock market, where it earns 7% interest, how much will it be worth in 30 years?

c. A 7% interest rate is twice a 3.5% interest rate. Why is the answer to part (b) *not* twice the answer to part (a)?

7. There are no guarantees in life. Suppose you want to be a millionaire at age 65, and you expect the interest rate to be 7%. Much to your disappointment, suppose the interest rate on stocks only averages 4%. Using your answers to question 6 as the yearly contribution, how much will have at age 65 if the interest rate is only 4% and you start saving at age:
- a. 15:

 - b. 25:

 - c. 35:

 - d. 45:

 - e. 55: