

Math 141 Week-in-Review 10 Problem Set

This Week in Review follows the financial life of Benjamin, a regular person.

1. When Benjamin is in 2nd grade, his parents open up a bank account for him that earns interest at a simple interest rate of 8.5% per year. Benjamin puts \$20 in the account to begin with. His goal is to have \$70 in his account so he can buy a Gameboy. How long will it take to have \$70 in the account?
2. Benjamin doesn't have this kind of time, so he decides to open up a different bank account with a better simple interest rate of 11%. If Benjamin wants to have \$70 in 2 years, how much should he invest in this new account?
3. Benjamin doesn't have this kind of money, so he changes accounts again. This time he starts his account with \$30 (his parents helped out) and he plans on just leaving it there for a while. In 5 years, Benjamin has \$52.50 in his account. What was the simple interest rate on this account?
4. Benjamin is now in 7th grade and is becoming smarter. He decides that simple interest rates aren't good. So he takes his \$52.50 and puts it in a savings account that earns interest at a rate of 9%/year compounded quarterly.
 - (a) How much will Benjamin have at the end of 3 years?

(b) What would the interest rate have to be if Benjamin wants to have \$75 at the end of the 3 years and interest is still compounded quarterly? (Round to 4 decimal places.)

5. After 10th grade, Benjamin gets a part time job. Every month he deposits \$125 from his paycheck into a savings account that has an interest rate of 8.65% compounded monthly. In how many months will Benjamin have \$2500 in this account?

6. When Benjamin graduates from high school, he decides to take \$1000 of his money and open a checking account. He has 2 banks which he is looking at. Second National Bank has an account which has an interest rate of 9.43%/yr compounded monthly. First American Bank has an account which has an interest rate of 9.65%/yr compounded semiannually. Which account should Benjamin choose?

7. If Benjamin had invested his \$1000 in an account which compounded interest continuously at a rate of 9.88%/yr, how much would be in the account after 4 years?

8. Now that Benjamin is starting college, he goes out and purchases a car. He provides a down payment of \$2000 and takes out a loan on the remaining balance. In order to pay off the car, he will have to pay \$250 a month for 5 years at an interest rate of 10%/yr compounded monthly.

(a) What was the cash price of the car?

(b) How much will Benjamin end up paying in interest?

9. Benjamin is planning for the near future. In 6 years, he wants to take a vacation to New York City. He knows that he will need \$7500 for this vacation.

(a) How much should he deposit each month into a sinking fund he has set up if this account earns interest at a rate of 11%/yr compounded monthly.

(b) How much of the \$7500 is from interest earned?

10. Benjamin makes a foolish purchase while in college. He buys a high definition flat screen TV using a credit card. The TV cost \$2000. The credit card has an interest rate of 17%/yr compounded monthly. After 1 month, Benjamin gets his first credit card bill. The statement suggests that he make the minimum payment of \$75.

(a) If Benjamin makes the first payment of \$75, how much of this goes toward interest?

(b) How much of the payment goes toward the principal?

(c) If he continues to make a payment of \$75 each month, how long will it take him to pay the TV off?

(d) How much total interest would he end up paying this way?

(e) If Benjamin decides he wants to pay off the TV in 18 months, how much should his monthly payment be?

11. Once Benjamin has graduated from college and wisens up, he gets a good job and opens up a retirement account to prepare for the long-term future. Every month he will put \$325 of his paycheck into a retirement account that earns interest at a rate of 5.5%/yr compounded monthly.

(a) How much money will be in the retirement account when Benjamin retires in 50 years?

(b) How much total interest has Benjamin earned?

12. Benjamin eventually gets married. He and his wife decide to buy a house. The house they want costs \$240,000. They make a 10% down payment and take out a mortgage on the remaining balance. The mortgage loan is for 30 years at an interest rate of 6.75%/yr compounded monthly.

(a) How much will their monthly mortgage payment be?

(b) Once the mortgage is paid off, how much will they have paid in interest?

13. After 8 years, Benjamin and his wife decide to refinance their home. The new loan on the remaining balance is to be paid off over 20 years and has an interest rate of 6.05%/yr compounded monthly.

(a) What is their outstanding principal after the 8 years?

(b) How much equity do they have after 8 years?

(c) What would be their new monthly mortgage payment?

(d) How much total interest will they save by refinancing?