

Section 4C: Homework Solutions

9. I make only the minimum required payments on my credit card balance each month, because that way I will have more of my own money to keep.

Solution:

This statement does not make sense. Your bill will increase over time, and eventually your creditors will eventually want their money, leaving you with none.

□

13. You borrowed \$40,000 at an APR of 7%, which you are paying off with monthly payments of \$310 for 20 years.

Solution:

a) For this loan, the starting principal is \$40,000, the APR is 7%, the number of payments per year is 12, the loan term is 20 years, and the payment amount is \$310.

b) Overall, you will make $12 \cdot 20 = 240$ payments, and the total payment will be $310 \cdot 240 = 74,400$.

c) \$40,000 of the payments pay off the principal, and the remaining \$34,400 is interest.

□

18. A home mortgage of \$150,000 with a fixed APR of 7.5% for 15 years.

a) Calculating the monthly payments we find

$$\frac{150,000 \cdot \frac{0.075}{12}}{1 - (1 + \frac{0.075}{12})^{-12 \cdot 15}} = \$1390.52$$

b) The total payments over the term of the mortgage will be $\$1390.52 \cdot 12 \cdot 15 = \$250,293.60$.

c) \$150,000 of the payments pays off the principal, and the remaining \$100,293.60 is all interest.

□

23. You borrow \$50,000 over a period of 15 years at a fixed APR of 8%

Solution:

a) A 15-year loan of \$50,000 at an APR of 8% requires monthly payments of

$$\frac{\$50,000 \cdot \frac{0.08}{12}}{1 - (1 + \frac{0.08}{12})^{-12 \cdot 15}} = \$477.83$$

b) The total payments over the term of the loan will be

$$\$477.83 \cdot 12 \cdot 15 = \$86,009.40.$$

c) \$50,000 of the payments pays off the principal, and the remaining \$36,009.40 is all interest.

□

27 You need to borrow \$10,000 to buy a car and you determine that you can afford monthly payments of \$220. The bank offers three choices; a 3-year loan at 7% APR, a 4-year loan at 7.5% APR, or a 5-year loan at 8% APR. Which loan best meets your needs? Explain.

Solution:

A 3 year loan of \$10,000 at an APR of 7% requires monthly payments of

$$\frac{10000 \cdot \frac{0.07}{12}}{1 - (1 + \frac{0.07}{12})^{-12 \cdot 3}} = \$308.77$$

which you cannot afford.

Borrowing the same amount of money for 4 years at 7.5% requires monthly payments of

$$\frac{\$10,000 \cdot \frac{0.075}{12}}{1 - (1 + \frac{0.075}{12})^{-12 \cdot 4}} = \$241.79$$

□

29. The credit card APR is 18% and you want to pay off the balance in 1 year.

Solution:

If you pay off a credit card debt of \$2500 in 1 year at an APR of 18%, your monthly payments will be

$$\frac{2500 \cdot \frac{0.18}{12}}{1 - (1 + \frac{0.18}{12})^{-12}} = \$229.20$$

and the total payments will be $12 \cdot 229.20 = \$2750.40$.

□

30. The credit card APR is 20% and you want to pay off the balance in 2 years.

Solution:

If you pay off a credit card debt of \$2500 in 2 years at an APR of 20%, your monthly payments will be

$$\frac{2500 \cdot \frac{0.20}{12}}{1 - (1 + \frac{0.20}{12})^{-12 \cdot 2}} = \$127.24$$

and the total payments will be $24 \cdot 127.24 = \$3053.76$.

□

41. Choice 1: 30-year fixed rate at 8% with closing costs of \$1200 and no points. Choice 2: 30-year fixed rate at 7.5% with closing costs of \$1200 and 2 points.

Solution:

With the first option, the monthly payments will be

$$\frac{80000 \cdot \frac{0.08}{12}}{1 - (1 + \frac{0.08}{12})^{-12 \cdot 30}} = \$587.01$$

and the closing costs will be \$1200.

With the second option, the monthly payments will be

$$\frac{80,000 \cdot \frac{0.075}{12}}{1 - (1 + \frac{0.075}{12})^{-12 \cdot 30}} = \$559.37$$

with closing costs of \$1200, and 2% of the principal. So total extra costs are \$2800. The total payment for the first option is \$212,523.60. The total payment for the second option is \$204,173.20. The second loan is better despite the points.

□

50. You can afford monthly payments of \$1200. If current mortgage rates are 7.5% for a 30-year fixed rate loan, what loan principal can you afford? If you are required to make a 20% down payment and you have the cash on hand to do it, what price home can you afford?

Solution:

Since we can make monthly payments of \$1200 on a 30-year loan at 7.5%, we can afford a loan principal of

$$P = 1200 \cdot \frac{1 - (1 + \frac{0.075}{12})^{-12 \cdot 30}}{\frac{0.075}{12}}$$

or about \$170,000.

Now suppose we have the cash on hand to make a 20% down payment, this means that we must borrow the remaining 80%. Since we can afford to borrow \$170,000, we can afford to buy a house for which \$170,000 represents 80% of the cost. As can easily be checked, such a house costs \$212,500.

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