

## Loans and Loan Payments Homework Exercise (KEY)

Use the Loan Repayment Tables (Tables 3-5) to answer these questions. Feel free to use the spreadsheet to double-check your answers.

1. Ally just borrowed \$28,000 to purchase a small shed and some honey-extracting equipment. The loan is for 5 years at 6% APR with annual payments.

- a. Estimate how much interest Ally will owe in the first year.

$$\begin{aligned}\text{Annual Interest} &= \text{Annual Interest Rate} \times \text{Principal Owed} \\ &= 6.0\% \times 28,000 = \$1,680 \text{ of interest}\end{aligned}$$

- b. Calculate the annual loan payment for this car loan.

$$\text{Factor for 6\% for 5 years} = 0.2374$$

$$\text{Annual Payment} = 0.2374 \times \$28,000 = \$6,647.20 \quad (\$6,647.10 \text{ using the spreadsheet})$$

- c. Calculate how much principal Ally will be repaying in the 1<sup>st</sup> loan payment.

$$\begin{aligned}\text{Principal Due} &= \text{Annual Payment} - \text{Annual Interest Due} \\ &= \$6,647.20 - \$1,680 = \$4,967.20\end{aligned}$$

2. Bob & Jane borrowed \$135,000 to buy some farm land. The mortgage is for 25 years at 7% APR.

- a. Calculate the monthly payment on Bob & Jane's mortgage.

$$\text{Monthly Payment Factor for 7\% APR for 25 years} = 7.07$$

$$\text{Monthly Payment} = 7.07 \times \$135,000 / \$1,000 = \$954.45/\text{month}$$

- b. Estimate how much interest Bob & Jane will pay over the 25-year life of this loan.

$$(\text{Monthly Payment} \times \text{Total Number of Months}) - \text{Original Principal} = \text{Total Interest Paid}$$

$$(\$954.45/\text{month} \times 300 \text{ months}) - \$135,000 = \$151,335 \text{ of total interest paid}$$

3. Andrew really wants to buy a car for \$17,000. The car dealer has offered him 2 different loans. Loan A is a 5-year loan at 6.5% APR with monthly payments. Loan B is a 3-year loan at 5.5% APR with monthly payments.

a. Calculate the monthly loan payment for Loan A. Show your work.

**Monthly Loan Repayment Factor for 6.5% APR for 5 years = 19.57**

**Monthly Payment =  $19.57 \times \$17,000 / \$1,000 = \$332.69/\text{month}$**

b. Calculate the monthly loan payment for Loan B. Show your work.

**Monthly Loan Repayment Factor for 5.5% APR for 3 years = 30.20**

**Monthly Payment =  $30.20 \times \$17,000 / \$1,000 = \$513.40/\text{month}$**

c. Which loan would you choose if you were in Andrew's position? Briefly explain why you chose either Loan A or Loan B.

**There's not one right answer. Loan A has a smaller monthly payment that's easier to make, but you will pay more total interest over the life of the loan. Loan B has a much higher payment that is harder to pay, but you will pay a lot less interest over the life of this loan.**

4. Greta needs help with the Liabilities section of her balance sheet. She has just taken out a loan for \$45,000 to buy a new refrigerator. The loan is for 5 years at 5% APR. It has annual payments. Help Greta determine what to list on her balance sheet for this loan. Use the 3-Step Process

a. Calculate the annual loan payment for this loan.

**Annual Loan Payment =  $0.2310 \times \$45,000 = \$10,395/\text{year}$**

b. Calculate the amount of interest she is supposed to pay this year. (Step 1)

**Annual Interest = APR x Principal Owed  
=  $5\% \times \$45,000 = \$2,250$  of interest due**

c. Calculate the amount of principal due within 1 year (the current liability portion of this loan). (Step 2)

**Principal Due = Annual Loan Payment – Annual Interest Due  
=  $\$10,395 - \$2,250 = \$8,145$  principal due within 1 year (current liability)**

d. Calculate the amount of principal Greta will owe after this payment is made (the non-current liability). (Step 3)

**Principal Remaining = Principal Outstanding – Principal Due This Year  
=  $\$45,000 - \$8,145 = \$36,855$  Principal Remaining after this payment**