

## Finance Review Solutions

1. Alice Cohen buys a two-year-old Honda from a car dealer for \$9,000. She put \$500 down and finances the rest through the dealer at 13% add-on interest. If she agrees to make 36 monthly payments, find the size of each payment.

**Solution:**

For this problem, we use the simple interest future value formula. We start by determining  $P$ . Since Alice has to put \$500 down, she will only finance \$8500. The interest rate in decimal form is .13. The amount of time in years is 3 years (36 months).

$$FV = 8500(1 + .13 * 3) = 11815$$

Once you have the total amount to be paid, you divide it by 36 to find out how much will be paid each month.

$$\text{monthly payment} = \frac{11815}{36} = 328.19$$

2. First National Bank offers two-year CDs at 9.12% compounded daily, and Citywide Savings offers two-year CDs at 9.13% compounded quarterly. Compute the annual yield for each institution and determine which is more advantageous for the consumer.

**Solution:**

9.12% CD:

For this problem, we use the annual yield formula  $ay = (1 + i)^n - 1$ . The

periodic interest rate is  $\frac{.0912}{365}$ .

$$ay = \left(1 + \frac{.0912}{365}\right)^{365} - 1$$
$$r = .0954756014$$

The annual yield is 9.548%.

9.13% CD:

For this problem, we use the annual yield formula for more than one

year. The periodic interest rate is  $\frac{.0913}{4}$ .

$$ay = \left(1 + \frac{.0913}{4}\right)^4 - 1$$
$$r = .0944737207$$

The annual yield is 9.447%.

The CD with the 9.12% compounded daily has a better annual yield.

3. Find the present value that will give a future value of \$9,280 at  $9\frac{3}{4}\%$  compounded monthly for 2 years, 3 months.

**Solution:**

For this problem, we use the compound interest future value formula. We know that the future value is \$9280. The periodic interest rate is  $\frac{.0975}{12}$ . The total number of compounding periods (total months) is  $(2 * 12) + 3$ .

$$9280 = P \left( 1 + \frac{.0975}{12} \right)^{(2*12+3)}$$

$$P = 7458.64$$

The total amount that needs to be put in the account in order to have \$9280 after 2 years and 3 months is \$7458.64.

4. At age 25, Carrie establishes an Individual Retirement Account (IRA). If she invests \$4000 per year for 30 years in an ordinary annuity, the account earns 7.75% per year, how much will she have in the account at age 55?

**Solution:**

For this problem, we use the future value of an ordinary formula. The amount of each payment is \$4000. She is making the payments once per years. She will make a total of 30 such payments.

$$FV = 4000 \frac{\left( 1 + \frac{.0775}{1} \right)^{30} - 1}{\frac{.0775}{1}}$$

$$FV = 432867.99$$

The total amount in the account at age 55 is \$432,867.99.

5. Joe wants to have \$30,000 five years from now to use for a down payment on a house. How much should he deposit each month into an ordinary annuity that pays an annual rate of 7.7% in order to achieve his goal?

**Solution:**

For this problem, we use the future value of an ordinary annuity formula. We know that the future value needs to be \$30,000. The periodic interest rate is .077. The total numbers of payments that Joe will make is  $12 \times 5 = 60$

$$30000 = \text{pymt} \frac{\left(1 + \frac{.077}{12}\right)^{60} - 1}{\frac{.077}{12}}$$

$$\text{pymt} = 411.49$$

The monthly payments are \$411.49.

6. Shirley Trembley bought a house for \$187,600. She put 20% down and obtained a simple interest amortized loan for the balance at  $6\frac{3}{8}\%$  for 30 years.
- Find the monthly payment.
  - Find the total interest.

**Solution:**

- For this problem, we use the simple interest amortized loan formula. Since she put 20% down, the amount of the loan is  $187600 \times .80 = 150080$ . The periodic interest rate is  $\frac{.06375}{12}$ .

The total number of monthly payments is  $12 \times 30 = 360$

$$\text{pymt} \frac{\left(1 + \frac{.06375}{12}\right)^{360} - 1}{\frac{.06375}{12}} = 150080 \left(1 + \frac{.06375}{12}\right)^{360}$$

$$\text{pymt} = 936.30$$

The monthly payments are \$936.30

- To find the total interest, we first find the total amount of all the monthly payments over the whole 30 years.

$$\text{total payments} = 936.30 \times 12 \times 30 = 337068$$

Now we subtract the amount borrowed from the total of all the monthly payments to find the total interest.

$$\text{total interest} = 337068 - 150080 = 186988$$

Total interest is \$186,988