

Opportunity Costs Exercises (Answer Key)

When we choose between two things, the thing we give up, or the thing we don't choose is our opportunity cost.

Below are some choices you might face when making every day decisions.

Circle your two favorite choices. Then put an X through the choice you would give up between your two options. The item you cross out is your opportunity cost.

There are no right answers. Choices students make are subjective.

1. Choose a Candy Bar:

Peanut Butter Cups Milky Way Snickers Hershey Bar PayDay

2. Select a Movie to Watch:

Avatar Inception The Roommate The Blind Side The Dilemma

3. Choose a Show to Watch on TV:

Local News Biggest Loser Simpsons The Office Sporting Event

4. Pick a Genre of Music You Like:

Rock Jazz Rap Hip Hop Country

5. Select Restaurant Food:

Italian Mexican French Chinese American

The formula for determining the future value of an investment, given an initial principal amount (P), an interest rate (r), a term in years (t) and the number of times the investment compounds per year (n) is:

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

Example: How much will an \$8,000 investment be worth in one year if I invest it in a 2% certificate of deposit (CD) that compounds quarterly?

Principal = \$8,000

APR = 2% or .02

n = 4 (quarterly)

t = 1 year

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$A = \$8,000\left(1 + \frac{.02}{4}\right)^{4(1)}$$

$$A = \$8,000(1.005)^4$$

$$A = \$8,000(1.02015)$$

$$A = \$8161.20$$

Answer: This \$8,000 investment will be worth \$8,161.20 in one year.

Your turn:

How much will a \$5,000 investment be worth in four years if I invest it in a 3.5% certificate of deposit that compounds monthly?

\$5,750.19

How much will a \$3,500 investment be worth in three years if I invest it in a 4% certificate of deposit that compounds monthly?

\$3,945.45

How much will a \$6,000 investment be worth in 60 months if I invest it in a 7% certificate of deposit that compounds quarterly?

\$8,488.67

How much interest will a \$5,000 investment accumulate in six years if I invest it in a 5.25% certificate of deposit that compounds monthly?

\$6,846.59 – \$5,000 = \$1,846.59

One vital piece of information you'll need when deciding if you can afford something that you are going to finance is, what the monthly payment will be. This will tell you if you can indeed afford the purchase.

The formula to calculate the monthly payment on an original **Principal Loan Amount (P)**, at an annual **Interest Rate (I)**, that will be necessary to pay the entire loan off in **N** months is:

$$\text{MonthlyPayment} = \frac{(P \times (I \div 12))}{(1 - (1 + (I \div 12))^{-N})}$$

P = Principal Amount of the loan

I = Interest Rate of the loan

N = Number of months to pay off the loan

(Remember: $\frac{\quad}{\quad} = \frac{\quad}{\quad}$)

Let's try it out:

A buyer wants to purchase a \$25,000 automobile at 6% interest and pay the loan off entirely in 3 years.

P = \$25,000

I = 6% = .06

N = 3 years = 36 months

Now, let's use the formula:

$$\begin{aligned} \text{MonthlyPayment} &= \frac{(P \times (I \div 12))}{(1 - (1 + (I \div 12))^{-N})} = \frac{(25,000 \times (.06 \div 12))}{(1 - (1 + (.06 \div 12))^{-36})} \\ &= \frac{(25,000 \times .005)}{(1 - (1 + .005)^{-36})} \\ &= \frac{(125)}{((1 - (1.005)^{-36})} \\ &= \frac{(125)}{(1 - .83564)} \\ &= \frac{(125)}{.16436} = \$760.53 \end{aligned}$$

Your turn:

How much will the monthly payment be on a \$5,000 loan with an 11.9% interest rate for 60 months?

\$110.97

How much will the monthly payment be on a \$3,500 loan with a 13.9% interest rate for 72 months?

\$71.93

How much will the monthly payment be on a \$7,500 loan with a 9.9%% interest rate for 48 months?

\$189.86

How much will the monthly payment be on a \$1,750 loan with a 19.9% interest rate for one year?

\$162.03

Let's try some analysis:

How much will the monthly payment be on a \$4,000 loan with a 12% interest rate for 48 months?

\$105.34

Name the 2 top things you can think of that would be worth that much per month to you:

Given a choice, which of these would you choose?

How much will the total amount of monthly payments add up to in the 48 months?

\$5,056.32

If, instead of paying this loan, you saved this monthly payment for the 48 months, the amount of money you will have accumulated is the same as the answer to the previous question.

If you had saved that amount instead of paying off the loan and the interest rate on a typical certificate of deposit 4 years from now was 7.1% compounding monthly, what would that amount of money be worth if you invested it in a CD for:

- 1 year ***\$5,427.23***
- 3 years ***\$6,252.69***
- 5 years ***\$7,203.69***