

Understanding Time Value of Money



Objective

In this lesson, you will

Future Value and Present Value

_____ value = the value of the money you have (and save) at a specified date in future

_____ value = the current value of a future sum of money

Example 1:

Josie's mom put \$20,000 in savings.

The money earns interest of 10 percent per year, so after 10 years Josie will have \$51,874.85.

\$ _____ is the future value of \$ _____

\$ _____ is the present value of \$ _____

Example 2:

Darren borrows \$200 from his mom and agrees to pay 5 percent interest per year.

Three years later, he repays his mom \$231.52.

The future present value of \$231.52 is \$200.

The future present value of \$200 is \$231.52.

Calculating Future and Present Value

$$\text{future value} = P \times (1 + i)^t$$

In these formulas:

P = _____, or the original amount of money

i = _____

t = _____, or the number of years for which interest is paid

$$\text{present value} = \frac{P}{(1 + i)^t}$$

When calculating _____ value, you _____ instead of multiply.

Example: Suppose you want to have \$10,000 in the bank five years from now. You know you can invest it at a 4 percent interest rate. What you need to know is how much to put into savings now to reach that goal.

Calculate the _____ value of \$30,000 after 10 years, with an interest rate of 8 percent.

- 1) Convert the interest rate from a percent to a _____: $8\% =$ _____
- 2) Add 1 to i , to get _____.
- 3) On a calculator, enter _____ and press the exponential key, followed by _____ (for the 10 years).
- 4) Write down the result from step 3 (_____) and clear the calculator.
- 5) On the calculator, enter _____, press the _____ key, and enter _____.
Press the equal sign.

The _____ value of \$30,000 is \$_____.



You want to deposit \$4,000 in a bank where you earn an interest rate of 6 percent per year. What will its future value be after five years?

$$P = \underline{\hspace{2cm}}$$

$$i = \underline{\hspace{1cm}}\% = \underline{\hspace{2cm}}$$

$$t = \underline{\hspace{2cm}}$$

$$\text{future value} = P \times (1 + i)^t$$

$$= 4,000 \times (1 + 0.06)^5$$

$$= \underline{\hspace{2cm}}$$

The future value of \$4,000 after five years is \$_____.

Summary

How are the formulas for future and present value related?