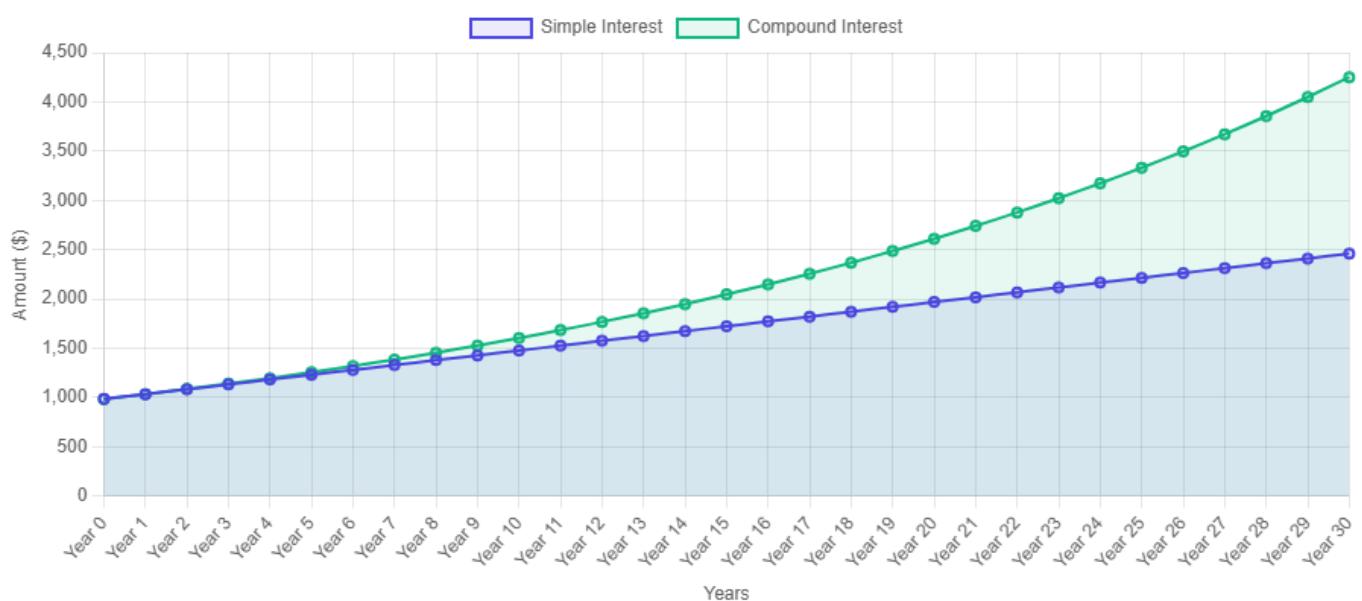


# Simple vs. Compound Interest Comparison

Chapter 5.2: Understanding the Power of Compound Interest and the Rule of 72

This interactive tool compares simple and compound interest growth over time. You can see how dramatically compound interest outperforms simple interest, especially over longer time periods. Use the controls to adjust the investment amount, interest rate, and time period to explore different scenarios.

Initial Investment (\$):      Annual Interest Rate (%):      Time Period (Years):

Update Graph

## Formulas Used:

**Simple Interest:**  $A = P \times (1 + r \times t)$

Where A is the final amount, P is the principal, r is the interest rate (as a decimal), and t is the time in years.

**Compound Interest:**  $A = P \times (1 + r)^t$

Where A is the final amount, P is the principal, r is the interest rate (as a decimal), and t is the time in years.

## Growth Comparison Table

This table shows the growth of \$1,000 at 5% interest over 30 years.

Year	Simple Interest (\$)	Compound Interest (\$)	Difference (\$)
0	\$1,000.00	\$1,000.00	\$0.00
5	\$1,250.00	\$1,276.28	\$26.28
10	\$1,500.00	\$1,628.89	\$128.89
15	\$1,750.00	\$2,078.93	\$328.93
20	\$2,000.00	\$2,653.30	\$653.30
25	\$2,250.00	\$3,386.35	\$1,136.35
30	\$2,500.00	\$4,321.94	\$1,821.94

### Key Insights:

- With simple interest, growth is linear. The interest earned each year is the same.
- With compound interest, growth is exponential. The interest earned increases each year.
- The difference between simple and compound interest becomes more dramatic over longer time periods.
- Higher interest rates amplify the difference between simple and compound interest.
- The Rule of 72 can help you estimate how long it will take for your money to double with compound interest.

#### Simple Interest

**Definition:** Interest calculated only on the initial principal.

**Key Characteristic:** Linear growth. The interest earned is the same each year.

**After 30 years:** \$2,500.00

**Total Interest Earned:** \$1,500.00

#### Compound Interest

**Definition:** Interest calculated on both the initial principal and accumulated interest.

**Key Characteristic:** Exponential growth. The interest earned increases each year.

**After 30 years:** \$4,321.94

**Total Interest Earned:** \$3,321.94

### Rule of 72 Application

The Rule of 72 provides a quick way to estimate how long it will take for your investment to double.

**Formula:** Years to double =  $72 \div \text{Interest Rate (\%)}$

For a 5% interest rate, your money would double in approximately 14.4 years.

This means a \$1,000 investment would become \$2,000 in about 14.4 years, \$4,000 in about 28.8 years, and \$8,000 in about 43.2 years.

