

What's Going On?

Checking In

Minds on

Simple

Action!

Compound

Consolidation

Minding Your i's and n's

Learning Goal - I will be able to solve problems involving investments earning simple and compound interest.

Minds on

Simple Interest

Simple Interest

Interest earned or paid on the original sum of money invested or borrowed.

Principal

A sum of money that is borrowed or invested.

Interest

The money earned from an investment or the cost of borrowing money.

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Simple Interest

How much interest would be earned on a principal of \$5000 invested at 4.5% simple interest over a period of 15 years?

\$3,375

$$\frac{4.5}{100} = 0.045$$

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Simple Interest

How much interest ^I would be earned on a principal of \$P invested at r% simple interest over a period of t years?

$$I = P \times \left(\frac{r}{100}\right) \times t$$

$$I = \left(\frac{r}{100}\right) P t$$

~~$$I = P \times r\% \times t$$~~

$$I = \left(P \times \frac{r}{100}\right) \times t$$

~~$$I = t(P \times r)$$~~
~~$$I = P \times r \times t$$~~

$$I = P \times \left(\frac{r}{100} \times t\right)$$

$$I = Prt$$

I is interest earned
 P is the initial investment
 r is interest rate, as a decimal
 t is the time passed, in years

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Simple Interest

Amount

The total value of an investment or loan.

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Simple Interest

What would be the total value of a \$10,000 initial investment that earned 3.25% **simple** interest for 5 years?

\$11,625

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Simple Interest

What would be the total value of a \$P initial investment that earned r% simple interest for t years?

$$A = P + I$$
$$A = P + Prt$$

$$A = P(1 + rt)$$

A is the final amount or value of the investment.

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Simple Interest

$$I = Prt$$

$$A = P(1 + rt)$$

I is the total interest earned.

P is the initial investment / principal

r is the interest rate as a percent

t is the time of the investment in years

Action!

Compound Interest

A Simple Interest Investment only earns interest on the Principal; that's bad!

A Compound Interest Investment pays interest on the total value of the investment (including interest earned); that's good!

Action!

Compound Interest

Compound Interest

Interest that is added to the principal *before* new interest earned is calculated. So interest is calculated on the principal *and* on interest already earned. Interest is paid at regular time intervals called the **compounding period**.

Compounding Period

The intervals at which interest is calculated; for example,

- annually - 1 time per year
- semi-annually - 2 times per year
- quarterly - 4 times per year
- monthly - 12 times per year

Action!

Compound Interest

What would be the total value of a \$10,000 initial investment that earned 3.25% **compound** interest for 5 years?

Hint: You may have to perform several calculations...

Year 1

$$A_1 = 10000 \times 1.0325^1$$

Year 2

$$A_2 = (10,000 \times 1.0325^2) \times 1.0325$$

Year 3

$$A_3 = (10,000 \times 1.0325^3) \times 1.0325$$

$$A_5 = 10,000 \times 1.0325^5$$

$$A_n = 10,000 \times 1.0325^n$$

Action!

Compound Interest

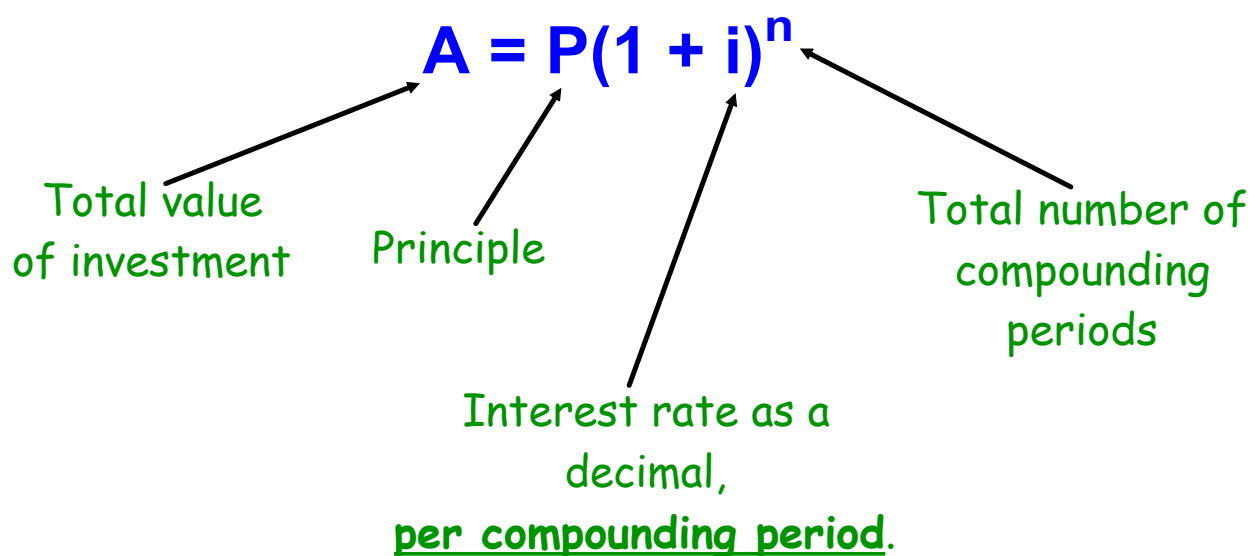
What would be the total value of a \$P initial investment that earned $i\%$ compound interest for n years?

Hint: You may have to perform several calculations...

$$A_n = P(1+i)^n$$

Action!

The Compound Interest Formula



Consolidation

Minding Your i's and n's

$$i = \frac{r}{n}$$

To determine the value of i :

**divide the interest rate by the
number of compounding periods in a year**

Example: If you invested \$2,500 at 3% interest compounded weekly for 3 years.

earned annually

$$i = .03/52$$

Interest Rate
as a decimal

Number of times interest is
compounded per year. 52

$$A = 2500 \left(1 + \frac{0.03}{52} \right)^{52}$$

Consolidation

Minding Your i's and n's

To determine the value of n :

multiply the number of compounding periods in a year by the number of years the money is invested

Example: If you invested \$2,500 at 3% interest compounded weekly for 3 years.

$$n = 52 \times 3$$

Number of times interest is compounded per year.

Number of years money will be invested

Consolidation

Exit Question

You decide to invest \$5,000 for 3.5 years at 2.5% interest compounded monthly.

What is the total final value of your investment?

$$A = P(1+i)^n$$

$$P = 5000$$

$$i = \frac{0.025}{12}$$

$$n = 12 \times 3.5$$

$$A = 5000 \times \left(1 + \frac{0.025}{12}\right)^{42}$$

$$A = \$5456.71$$

Consolidation

Simple Homework

Pg. 481

1a, 3, 4, 11

Compound Homework

Pg. 490

1, 4, 15, 17