

\$\$\$ Questions...great website for answers!!!

The screenshot shows the homepage of GetSmarterAboutMoney.ca. At the top, there are navigation links for 'GetSmarter AboutMoney.ca', 'Inspire FinancialLearning.ca', and 'GetSmarter WithFunnyMoney.ca'. The main header features the 'INVESTOR EDUCATION FUND' logo, the 'OSC' logo, and the text 'An Ontario Securities Commission initiative'. Below this is the site's name 'GetSmarterAboutMoney.ca' with the tagline 'Answers to your money questions.' and a search bar. A navigation menu includes 'Home', 'Investing', 'Planning', 'Life events', 'Tools & Calculators', 'Research', and 'About IEF'. The main content area has a dark background with a cartoon character pointing to the text 'help your teen put mind over money.' and 'Play the NEW DOLLAR DECISIONS\$'. A sidebar on the right lists topics like 'Money and families', 'A real estate reality check', 'Calculate it: RESPs', 'Freshman finances', and 'Dollar Decision\$ for teens'. A blue button in the top right corner says 'Improve the site - take our survey.'

8.3

Compound Interest: Future Value

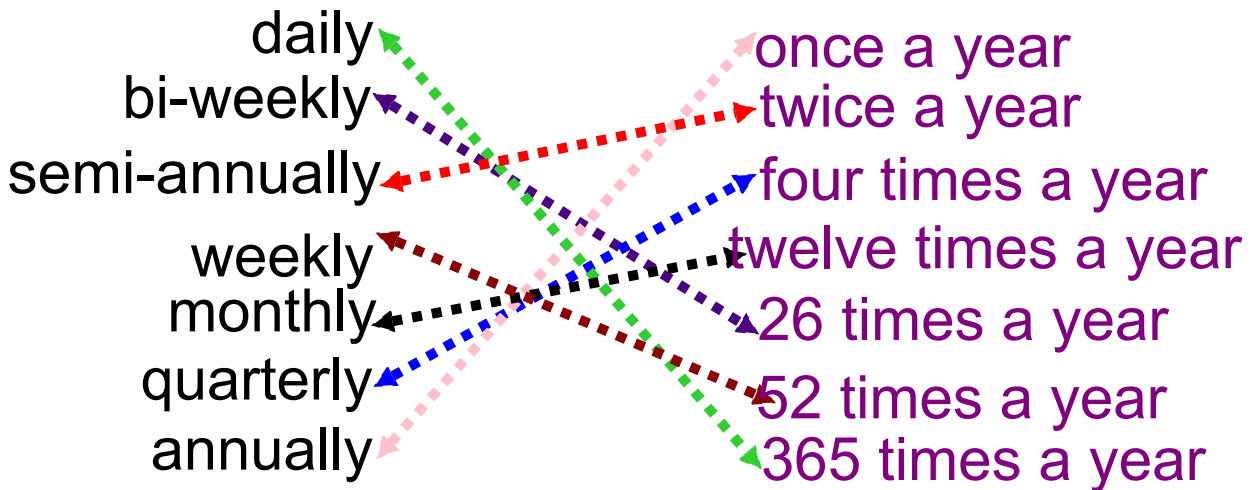
$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

GOAL

Determine the future value of an investment that earns compound interest.

Terminology Tango

Click on the picture to verify the match.



COMPOUND Interest

Interest is added to the principal periodically throughout the year. New interest may be paid on the principal plus the interest. The interest rate is stated per annum and is divided by the number of **compounding periods**.

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

$$I = A - P$$

A = final value of the investment ...(principal + interest)

P = principal

r = annual interest rate

n = number of compounding periods in a year

t = term of the investment or loan in number of years

EXAMPLE #1: If \$1000 is invested at 8 %/a compounded semi-annually for 2 years, how much will the investment be worth?

Using the simple interest formula...

$$I = 1000(0.08)(6/12)$$

$$= \$40 \text{ (after 1st interest period)}$$

$$\text{New principal} = 1000 + 40$$

$$= \$1040$$

$$I = 1040(0.08)(6/12)$$

$$= \$41.60 \text{ (after 2nd interest period)}$$

$$\text{New Principal} = 1040 + 41.60$$

$$= \$1081.60$$

$$I = 1081.60(0.08)(6/12)$$

$$= \$43.26 \text{ (after 3rd interest period)}$$

$$\text{New Principal} = 1081.60 + 43.26$$

$$= \$1124.86$$

$$I = 1124.86(0.08)(6/12)$$

$$= \$44.99 \text{ (after 4th interest period)}$$

$$\text{New Principal} = 1124.86 + 44.99$$

$$= \$1169.85$$

Compound Interest

$1000(1+0.08/2)^4$ 1169.85856

Compound Interest Formula...

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

**SAME
ANSWER?**

EXAMPLE #2:

Calculate the final value of an initial investment of \$6000.00. Interest is paid at 4% per annum, compounded semi-annually, for three years.

A = final value of the investment ...(principal + interest)
P = principal
r = annual interest rate
n = number of compounding periods in a year
t = term of the investment or loan in number of years

$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$
$$A = 6000 \left(1 + \frac{0.04}{2}\right)^{(2)(3)}$$

A = $6000 \left(1 + \frac{0.04}{2}\right)^6$
6756.974516

A = \$6756.97

EX #3: Maggie invests \$59 000 at 4.5% /a compounded quarterly for 30 years. Determine...

- a) How much will this investment be worth?
- b) How much interest did you earn?

a)
$$59000(1+0.045/4)^{120}$$

$$= 225879.1611$$

$$\$ 225879.16$$

b)
$$225879.16$$

$$- 59000$$

$$\$ 166879.16$$

EXAMPLE #4...

A keen MVHS student wants to save some money from their summer employment. They decide to take out a Canada Savings Bond which pays 2.5 % interest per year compounded monthly. If the student invests \$850 into the bond, how much interest will they earn if they don't touch the money for 3 years?

$$A = 850(1 + 0.025/12)^{36}$$

916.1300521
Ans-850
66.13005205

$$I =$$

HOMEWORK...

p. 457: #1, 2

p. 468: #2, 6, 7

Simple

$$I = Prt$$

&

$$A = P + I$$

$$A = P + Prt$$


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


Compound

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

$$I = A - P$$

Practice With Compound Interest...

 Worksheet - Introduction to Compound Interest.doc

 Worksheet Solutions - Compound Interest.pdf

Attachments

Worksheet - Introduction to Compound Interest.doc

Worksheet Solutions - Compound Interest.pdf