# DigitLit
math instruction

## Lesson 2.06 Compound Interest

Students will be able to:

- Content Objective: Define & evaluate exponential equations that represent compound interest.

- Language Objective: Write compound interest formulas to represent real world situations.

### Warm Up

The expression $\left(a\sqrt{4b^4}\right)\left(\sqrt{3ab^2}\right)$ is equivalent to

(1) $2a^{\frac{3}{2}}b^3\sqrt{3}$

(2) $a^{\frac{1}{2}}b^2\sqrt[4]{3}$

(3) $2ab^2$

(4) $12a^2b^3\sqrt{3}$

### Graphic Organizer

**Compound Interest:** Where interest is calculated on the amount borrowed plus previous interest. Usually calculated one or more times per year.

| Compound Interest Formula |
|---|
| $$A(t) = P\left(1 + \frac{r}{n}\right)^{nt}$$ |

| A | P | r | n | t |
|---|---|---|---|---|
|   |   |   |   |   |

### Vocabulary Review

a. Compounded Daily          $n =$

b. Compounded Monthly        $n =$

c. Compounded Quarterly      $n =$

d. Compounded Semi-annually  $n =$

e. Compounded Annually       $n =$

### Write It Out

Write out the equation for each and determine the amount of the investment with the parameters below. Round to the nearest cent.

Principal: **$3000**
Rate: **2**%
Compounded: **Quarterly**
Time: **4 years**

Principal: **$1800**
Rate: **4.2**%
Compounded: **Semi-annually**
Time: **5 years**

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### Skill 1: n Compounds

A bank offers 4% interest on saving accounts. Assuming you open a savings account with an initial deposit of $2000, about how long will it take for your account to grow to $3500 if it is compounded:

Yearly:

Quarterly:

### Exercise 1: n Compounds

If you open an account with $36,500 at 7.25% interest per year, how much will be in the account after 12 years if the account was compounded:

Monthly:

Semi-Annually:

### Check Point

Sophie decides to put $200 in a savings account. The account pays 2% annual interest, compounded monthly. Which of the following Equations represents the amount of money, $S$, Sophie will have after one year if she makes no deposits or withdrawals?

(1) $S = 200(1.02)^{12}$

(2) $S = \dfrac{200 - 200(1.02)^{12}}{1 - 1.02}$

(3) $S = 200(1.002)^{12}$

(4) $S = 200(0.98)^{12}$

**2.06- Problem Set**

Name: _____

1. If an investment's value can be modeled with
   $A = 600\left(1 + \frac{.045}{4}\right)^{4t}$ then which of the following describes the investment?

   (1) The investment has a nominal rate of 45% compounded every 4 years.

   (2) The investment has a nominal rate of 4.5% compounded every 4 years.

   (3) The investment has a nominal rate of 45% compounded quarterly.

   (4) The investment has a nominal rate of 4.5% compounded quarterly.

2. How much money will you have in an account if you invest $650 and you receive 4.05% compounded **monthly** for 10 years?

3. Fill in the table below:

| Compounding period (n) | Principal (P) | Interest rate (r) | Years (t) | Show work here | Final Amount (A) |
|---|---|---|---|---|---|
| Annually | $1,000 | 2.5% | 5 *years* | | |
| Semi-Annually | $1,000 | 2.5% | 5 *years* | | |
| Monthly | $1,000 | 2.5% | 5 *years* | | |

What do you notice based on the table above?