

2-6

CONTINUOUS COMPOUNDING

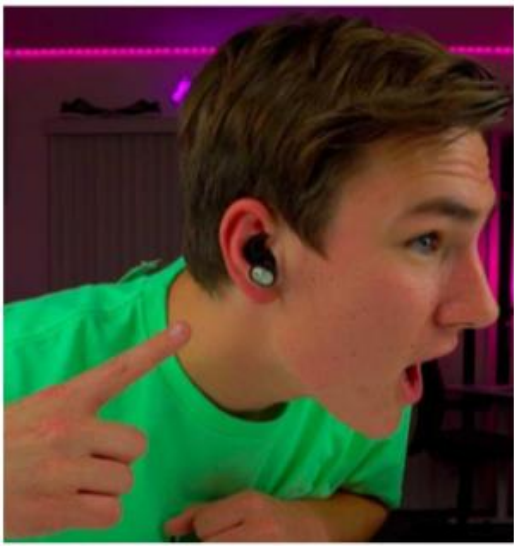
OBJECTIVES

Compute the new balance of an account that is continuously compounded.

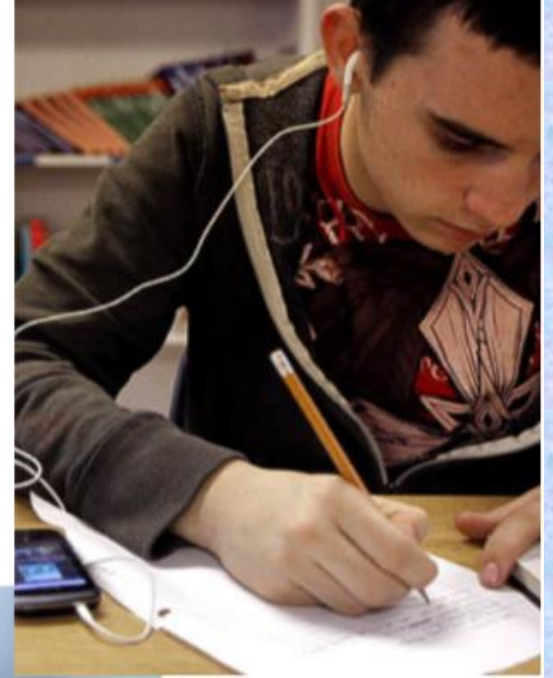
You will need:

- Student Notes
- Textbook
- Calculator
- Formula Cheat Sheet
- Notebook Paper
- Pen or Pencil

Red Items are needed during
the lecture



**No Ear
Buds!!!!**



**Cell Phones:
Down & Dark**

When you studied circles,
you studied an important
irrational number that has
a single-symbol designation
and its own key on the calculator.

What was it?

The number was π .
 $\pi = 3.141592654.$

The irrational, **exponential base “e”** is also so important in mathematics that it too has a single-letter abbreviation, **e**.

Find it on your calculator.

The “e” key is above the “(“ on the Nspire.

We use the exponential base “e”
to calculate interest income earned.

You have seen interest compounded
annually, quarterly, monthly,
weekly, and daily.

Can you compound it more often?

Can you compound it continuously?

Continuous Compound Interest Formulas

$$A = Pe^{rt}$$

$$I = Pe^{rt} - P$$

A = ending balance

I = Interest earned

p = principal or original balance

r = interest rate (converted)

t = number of years

Example 6

You deposit \$1,000 at 2.3% interest, compounded continuously for five years.

a) What is your ending balance?

Which formula on the formula cheat sheet? **3a**

Q1) One or multiple? One: Top

Q2) Which key word? Continuously: 3

Q3) What are you looking for? Ending Balance: a

Example 6

You deposit \$1,000 at 2.3% interest, compounded continuously for five years.

a) What is your ending balance?

$$A = Pe^{rt}$$

A = ending balance A

p = principal or original balance
 1,000

r = interest rate (converted) .023

t = number of years 5

$$A = 1000e^{.023 \cdot 5}$$

\$1,121.87

Example 6

You deposit \$1,000 at 2.3% interest, compounded continuously for five years.

b) How much interest did you earn?

Which formula on the formula cheat sheet? **3b**

Q1) One or multiple? One: Top

Q2) Which key word? Continuously: 3

Q3) What are you looking for? Interest: b

Example 6

You deposit \$1,000 at 2.3% interest, compounded continuously for five years.

b) How much interest did you earn?

$$I = Pe^{rt} - P$$

$$I = 1000e^{.023 \cdot 5} - 1000$$

I = interest earned 1

p = principal or original balance
 1,000

r = interest rate (converted) .023

t = number of years 5

\$121.87

Example 6 - You try it!

Craig deposits \$5,000 at 1.12% interest, compounded continuously for four years.

- a) What is his ending balance?
- b) How much interest did he earn?

Example 6 - You try it!

Craig deposits \$5,000 at 1.12% interest, compounded continuously for four years.

a) What is his ending balance?

$$A = Pe^{rt}$$

A = ending balance A

p = principal or original balance 5,000

r = interest rate (converted) .0112

t = number of years 4

$$A = 5000e^{.0112 \cdot 4}$$

\$5,229.09

Example 6 - You try it!

Craig deposits \$5,000 at 1.12% interest, compounded continuously for four years.

b) How much interest did he earn?

$$I = Pe^{rt} - P$$

$$I = 5000e^{.0112 \cdot 4} - 5000$$

I = interest earned 1

p = principal or original balance

 5,000

r = interest rate (converted) .0112

t = number of years 4

\$229.09

Example 5 - You try it!

If you deposited \$1,000 into an account that paid 100% interest:

a) What would your balance be after one year if it was a simple interest account?

b) What would your balance be after one year if it was a continuously compounded account?

Example 5 - You try it!

If you deposited \$1,000 into an account that paid 100% interest:

a) What would your balance be after one year if it was a simple interest account?

Which formula on the formula cheat sheet? **1b**

Q1) One or multiple? One: Top

Q2) Which key word? Simple: 1

Q3) What are you looking for? Ending Balance: b

b) What would your balance be after one year if it was a continuously compounded account?

Example 5 - You try it!

If you deposited \$1,000 into an account that paid 100% interest:

a) What would your balance be after one year if it was a simple interest account?

Which formula on the formula cheat sheet? **1b**

b) What would your balance be after one year if it was a continuously compounded account?

Which formula on the formula cheat sheet? **3a**

Q1) One or multiple? One: Top

Q2) Which key word? Continuous: 3

Q3) What are you looking for? Ending Balance: a

Example 5 - You try it!

If you deposited \$1,000 into an account that paid 100% interest:

a) What would your balance be after one year if it was a simple interest account?

$$I = PRT$$

$$1000 * 1 * 1 = 1000 \text{ interest}$$

$$\text{new balance} = \text{prior balance} + \text{increase} = \mathbf{\$2,000}$$

b) What would your balance be after one year if it was a continuously compounded account?

$$A = Pe^{rt}$$

$$A = 1000e^{1 \cdot 1}$$

$$\mathbf{\$2,718.28}$$

Please work on you assignment.
It is due at the end of next class.

Grade goes here	Read Pg: 102 to 106 Do Pg 107: #3-7, 9	Last First P__ A:2-6

**Please do the Daily
Question
RIGHT NOW!!!**

**If you need an to borrow my Ipad
just let me know.**