2-9
The Term of a Single Deposit Account
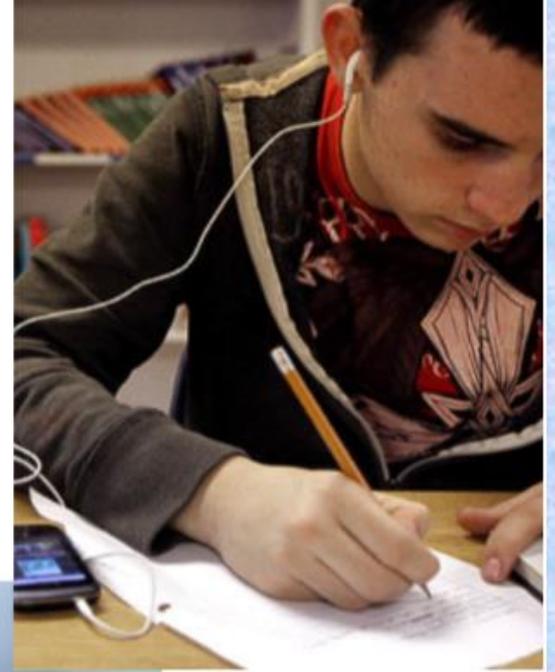
OBJECTIVES

You will need:
- Student Papers
- Calculator
- Textbook
- Notebook Paper
- Pen or Pencil

Construct an exponential model of a situation.

Calculate time it will take to reach a financial goal.

No Ear Buds!!!!

Cell Phones: Down & Dark

How long does it take to reach a financial goal?

- You received a lump-sum inheritance from a distant aunt. (YEA!)

- It is not enough for the down payment on the home that you have your heart set on.

- You want to know how long it will take for the money to grow big enough for the down payment on that home.

- Today we will focus on the time part of the Time Value of Money Formula.

Example 1

You have $1000.00 in your savings account. It earns 2% interest and compounds semi-annually. You need exactly $1,061.52 to pay for one summer session's tuition. How long will it take for this account to reach your goal?

Remember the Compound Interest Formula:

B = ending balance

p = principal or original balance

r = interest rate (converted)

n = number of compounds annually

t = number of years

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

Example 1

You have $1000.00 in your savings account. It earns 2% interest and compounds semi-annually. You need exactly $1,061.52 to pay for one summer session's tuition. How long will it take for this account to reach your goal?

Determine the variables:

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

B = ending balance <u>1,061.52</u>

p = principal or original balance <u>1,000.00</u>

r = interest rate (converted) <u>.02</u>

n = number of compounds annually <u>2</u>

t = number of years <u>t</u>

Example 1

You have $1000.00 in your savings account. It earns 2% interest and compounds semi-annually. You need exactly $1,061.52 to pay for one summer session's tuition. How long will it take for this account to reach your goal?

Determine the variables:

$$1061.52 = 1000\left(1 + \frac{.02}{2}\right)^{2t}$$

B = ending balance $\underline{1,061.52}$

p = principal or original balance $\underline{1,000.00}$

r = interest rate (converted) $\underline{.02}$

n = number of compounds annually $\underline{\quad 2 \quad}$

t = number of years $\underline{\quad t \quad}$

Example 1

You have $1000.00 in your savings account. It earns 2% interest and compounds semi-annually. You need exactly $1,061.52 to pay for one summer session's tuition. How long will it take for this account to reach your goal?

$$1061.52 = 1000\left(1 + \frac{.02}{2}\right)^{2t}$$

Use menu, 3, 1
to solve for t.

t = 3

It will take 3 years to reach this goal.

Example 4 – You try it

Nancy and Bob want to renovate their kitchen sometime in the future. They have deposited $16,000 into an account that compounds interest monthly at a rate of 2.4%. How long will it take until that account reaches $20,000?

Determine the variables:

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

B = ending balance 20,000.00

p = principal or original balance 16,000.00

r = interest rate (converted) .024

n = number of compounds annually 12

t = number of years t

Example 4 – You try it

Nancy and Bob want to renovate their kitchen sometime in the future. They have deposited $16,000 into an account that compounds interest monthly at a rate of 2.4%. How long will it take until that account reaches $20,000?

$$20000 = 16000\left(1 + \frac{.024}{12}\right)^{12t}$$

Determine the variables:

B = ending balance <u>20,000.00</u>

p = principal or original balance <u>16,000.00</u>

r = interest rate (converted) <u>.024</u>

n = number of compounds annually <u>12</u>

t = number of years <u>t</u>

Example 4 – You try it

Nancy and Bob want to renovate their kitchen sometime in the future. They have deposited $16,000 into an account that compounds interest monthly at a rate of 2.4%. How long will it take until that account reaches $20,000?

$$20000 = 16000\left(1 + \frac{.024}{12}\right)^{12t}$$

Use menu, 3, 1
to solve for t.

$t = 9.3$

It will take 9.3 years to reach this goal.

Example 4 - You try it #2!

Rudy deposited $500 in an account with 1.2% interest compounded quarterly. How long will it take for that amount to double?

Determine the variables:

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

B = ending balance __1,000__

p = principal or original balance __500.00__

r = interest rate (converted) __.012__

n = number of compounds annually __4__

t = number of years __t__

Example 4 - **You try it #2!**

Rudy deposited $500 in an account with 1.2% interest compounded quarterly. How long will it take for that amount to double?

$$1000 = 500\left(1 + \frac{.012}{4}\right)^{4t}$$

Determine the variables:

B = ending balance __1,000__

p = principal or original balance __500.00__

r = interest rate (converted) __.012__

n = number of compounds annually __4__

t = number of years __t__

Example 4 - You try it #2!

Rudy deposited $500 in an account with 1.2% interest compounded quarterly. How long will it take for that amount to double?

$$1000 = 500\left(1 + \frac{.012}{4}\right)^{4t}$$

Use menu, 3, 1 to solve for t.

$t = 57.8$

It will take 57.8 years to reach this goal.

Example 5

Sheri deposited $8,000 into an account that compounds continuously at a rate of 3.7%. How long will it take for his money to grow to $10,000?

Remember the Continuous Compounding Formula

$$A = Pe^{rt}$$

A = ending balance

p = principal or original balance

r = interest rate (converted)

t = number of years

Example 5

Sheri deposited $8,000 into an account that compounds continuously at a rate of 3.7%. How long will it take for his money to grow to $10,000?

Determine the variables:

$$A = Pe^{rt}$$

A = ending balance 10,000

p = principal or original balance
        8,000

$$10000 = 8000e^{.037 \cdot t}$$

r = interest rate (converted) .037

Menu, 3, 1

t = number of years __t__

6 years

Slide 15

Read Pg: 120 to 126

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