CONTINOUS DISTANCE LEARNING LESSON

Lesson Title: Exponential Functions
Grade: 8th Grade

Name _____ Cohort _____

https://www.cnbc.com/2019/07/23/how-families-pay-for-college.html

There are 3 main types of colleges in America; Public, For-Profit, Non-Profit. Where does each get their funding?

Public: _____

For-Profit: _____

Non-Profit: _____

Read the article:
https://money.cnn.com/2017/10/25/pf/college/college-tuition-price-2017-2018/index.html

1. What was the **average** rate of increase for college tuition in 2017?

2. If tuition costs $23,000 now, how much would the tuition have been in 1950, assuming it grew at the same rate every year?

   a. How much would it have been in 2000?

    b. How much will it be in 2024?

Read the article:

https://bigfuture.collegeboard.org/pay-for-college/college-costs/college-costs-faqs

 What does the article state are the average costs of tuition for a...?

Public 4-year College (in-state tuition) _____

Private 4-year College _____

Do you feel these numbers are accurate? Explain why or why not.

What is the annual tuition for UIC? _____

What is the annual tuition for Northwestern? _____
*Only look at tuition costs, not including other expenses.

UIC is a public 4-year college and Northwestern is a private 4-year college, are the tuition costs close to those stated in the article?

According to the article, what are some ways you can get help paying for college?

Identify possible revenue streams to pay for college such as parents, student loans, and part-time jobs, etc. Record them below in the "Income Sources" section. Next, identify a list of basic college expenses. Costs can include items like tuition, room and board, books and supplies, cell phone, transportation, and entertainment. List them in the "Expense Categories" section below.

Income Sources:

1.

 2.

3.

4.

 5.

 6.

Expense Categories:

1.

 2.

3.

4.

5.

6.

7.

8.

9.

10.

Read then complete the different budget scenarios below. Be aware that each has a different set of expenses.

Scenario 1: The Dream: Come up with any type of college and expenses you like.

Scenario 2: Middle of the Road: Be careful with spending, but you can attend any college you like.

Scenario 3: Frugal Student: Try to spend as little money as possible.

Summary:

Scenario 1-"The Dream" ($45,000+ per year)

Scenario 2-"Middle of the Road" ($30,000-45,000 per year)

Scenario 3-"Frugal Student" (Under $30,000 per year)

Name _____ Cohort _____

Using the information from the "summary section", from Day 1, fill in the blank cells below. Some cells may not be filled in, depending on the scenario. (Try to find actual numbers for each category. You can look on college websites to estimate the cost of books and supplies and room and board. You can google transportation costs in the city where the college is located. Look up different cell phone plans, etc...)

Expenses:	Scenario 1	Scenario 2	Scenario 3
Tuition			
Books and Supplies			
Room and Board			
Transportation			
Cell Phone			
Eating Out/Entertainment			
Miscellaneous			
Total:			

Do you have any reflections so far? Is the cost of college what you thought it would be?

Do you have any new ideas about paying for college?

Did you think about the other expenses?

Saving for College

You will complete this section for all three of your scenarios above. You can either choose option 1 or option 2.

Option 1: Basic Option

You will be comparing the rates at two different banks to determine how much money you should save now, to have enough money to pay for college in five years. In this option you will put in one amount of money now and leave it in the account to grow interest for five years.

Bank 1 - At Bank 1 they offer a high interest savings account that earns 3.75% interest compounded monthly. How much money would you need to invest today to be able to afford each of your three college scenarios in 5 years?

Scenario 1	Scenario 2	Scenario 3

Bank 2 - At Bank 2 they offer a standard interest savings account that earns 1.5% interest compounded monthly. How much money would you need to invest today to be able to afford each of your three college scenarios in 5 years?

Scenario 1	Scenario 2	Scenario 3
Equation Answer		

Do you think it's a realistic option to save one amount of money right now to pay for college in 5 years?

Option 2: Challenge Option

You will be comparing the rates at two different banks to determine how much money you should save, to have enough money to pay for college in five years. In this option you will not put in one amount of money and let it grow interest; but you will also be adding money every month.

The formula for this option is: Compound Interest Formula + Future Value Formula

Compound Interest Formula: $P(1 + r/n)^{nt}$

Future Value Formula: $PMT \times \{[(1 + r/n)^{nt} - 1] / (r/n)\}$

Complete Formula:

$$P(1 + r/n)^{nt} + PMT \times \{[(1 + r/n)^{nt} - 1] / (r/n)\}$$

P - principal investment

PMT - monthly deposit amount

r = rate as a decimal

n = number of times interest is compounded in one year

t = time in years

Bank 1 - At Bank 1 they offer a high interest savings account that earns 3.75% interest compounded monthly. You start with $5,000 and deposit an additional $250 each month. How much money will you have after 5 years?

Will it be enough money to afford any of your college scenarios?

If you changed the initial deposit to $10,000 and continued to deposit an additional $250 each month, how much money would you have in 5 years?

If you start with $5,000 and deposit an additional $500 each month. How much money would you have after 5 years?

Bank 2 - At Bank 1 they offer a standard interest savings account that earns 1.5% interest compounded monthly. You start with $5,000 and deposit an additional $250 each month. How much money will you have after 5 years?

Will it be enough money to afford any of your college scenarios?

If you changed the initial deposit to $10,000 and continued to deposit an additional $250 each month, how much money would you have in 5 years?

If you start with $5,000 and deposit an additional $500 each month. How much money would you have after 5 years?

Do you think it is better to change the initial amount or the amount you deposit each month?

If you have time, try to find out how much money you would need to start with and how much you would need to add monthly to afford one of your scenarios.

If you finish early!

IXL Practice - Teacher Recommended Exercises on IXL

X. Exponential functions

1 Evaluate an exponential function

2 Match exponential functions and graphs

3 Domain and range of exponential functions: graphs

4 Domain and range of exponential functions: equations

5 Exponential growth and decay: word problems