

Compound Interest Practice

Name _____

Date _____

Compound Interest Formula

$$y = a\left(1 + \frac{r}{n}\right)^{t \cdot n}$$

y = final amount
t = time

a = starting amount
n = # times the money will be compounded each year

r = interest rate (in decimal form)

Solve the following problems. Round appropriately. **SHOW ALL WORK!**

1. You deposit \$1000 in an account that earns 2.5% annual interest. Find the balance after 3 = t years if this interest is compounded ...

a. quarterly n = 4

b. monthly

c. daily

a

$$y = 1000\left(1 + \frac{.025}{4}\right)^{4 \cdot 3} = \boxed{1077.63}$$

2. In 1492 Columbus sailed the ocean blue. If Christopher Columbus invested \$.01 on the Native American Bank upon arriving in the New World, how much money would be in his account today if his terms were 4% interest compounded monthly?

2020
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3. In 1492 Columbus sailed the ocean blue. What if Columbus had invested his \$.01 at the Indigenous Peoples' Credit Union where they were offering 4 1/4% compounded semi-annually? How much would his account be worth today?

a

$$\frac{4.25\%}{100} = .0425$$

4. Which investment option yields the greater balance?

OPTION A: Investing \$2000 in an account that pays 9% interest compounded monthly for 15 years?

OPTION B: Investing \$2000 in an account that pays 10% interest compounded annually for 15 years?

5. You want to have \$10,000 in your account after five = t years. Find the amount your initial deposit = a should be for each of the following situations.

- a. The account pays 3.5% annual interest compounded monthly.

$$10000 = a \left(1 + \frac{.035}{12}\right)^{12 \cdot 5} = \frac{10000}{\left(1 + \frac{.035}{12}\right)^{12 \cdot 5}} = \boxed{8396.71}$$

Divide

- b. The account pays 2.75% annual interest compounded quarterly.

Compound Interest Formula

$$y = a\left(1 + \frac{r}{n}\right)^{t \cdot n}$$

Growth Formula

$$y = a(1 + r)^t$$

Decay Formula

$$y = a(1 - r)^t$$

6. Twenty grams of Carbon 15 is stored in a container. The amount C (in grams) of Carbon 15 present after t years decreases by 1.2%.
- How much Carbon 15 is present after 1500 years?
 - How long will it take for the Carbon to reach its half-life?
7. In the year 1990, kids everywhere collected Beanie Babies. There was such a demand that these critters skyrocketed in value. Katie bought a Beanie Baby for \$10.00. The stuffed animals' value increased at a rate of 7% per year.
- How much is it worth today?
 - How long did it take for Katie to double her original investment?
 - New Beanie babies were introduced each quarter, while old Beanie babies were discontinued. If the price compounded quarterly, how much would the toy be worth today?
8. A family of six vampires has just moved into Legacy Park. If the vampire population grows at a rate of 25% each day, how many vampires will there be in one week? How many vampires will there be in one year?
- ~~X~~ When the US auto industry tanked, so did the population of many towns fed by this industry. A Michigan town with a population of 345,000 in 1980 has approximately 200,000 inhabitants today. At what rate is the population decreasing?
- ~~X~~ What interest rate do you need on an account with monthly compounding if you wish to triple your investment in 20 years?
- ~~X~~ Cobb County teachers got a windfall in the summer of 2006. All teachers got an extra check that summer to change the pay period of all teachers. All of the teachers got to make the decision of what to do with this money. A group of math teachers got together to find out how to make their money for the most for them. These teachers got \$2500. How much money would the teachers have if they...
- Put it in the bank and earned 4% interest yearly for 10 years.
 - Put the money in a CD that earned 4% monthly for 10 years.
 - Put the money in a special money market account that earned 4% continuously for 10 years.
 - How long would it take the teachers to double their initial investment using the CD at 4% that earned interest monthly?