Honors Advanced Algebra Name: _____

Exponential growth and decay, half-life, compound interest.

Growth and Decay Function

$A = P\left(1 \pm \frac{r}{n}\right)^{nt}$

$A = P(1 \pm r)^t$

Half-life

$N = N_0(0.5)^{t/h}$

Interest Compounded Continually

$A = Pe^{rt}$

1. A coin had a value of $1.17 in 1995. Its value has been increasing at 9% per year. What is the total value after 5 years?

2. Gina deposited $1500 in an account that pays 4% interest compounded quarterly. What will the balance be in 2 years?

3. The Garcias have $12,000 in a savings account. The bank pays 3.5% interest on savings account, compounded monthly. Find the total balance after three years.

4. Determine the amount of interest earned on a $2500 investment if it is invested at 5.25% annual interest compounded monthly for four years.

5. Determine the amount of interest earned on a $100,000 investment if it is invested at 5.2% annual interest compounded quarterly for 12 years.

6. The Fresh and Green Company has a savings plan for employees. If an employee makes an initial deposit of $1000, the company pays 8% interest compounded bimonthly. If an employee withdraws the money after five years, how much is withdrawn?

7. Using the information from number 6, find the interest earned if the money is withdrawn after 35 years.

8. Mr. and Mrs. Boyce bought a house for $125,000 in 1995. Real estate values in their area decreased approximately 4% each year until the year 2012. What was the value of the house in 2012?

9. The Greens bought a condo for $110,000 in 2005. If its value appreciates at 6% per year, what will the value be in 2012?

10. An isotope of cesium (cesium-137) has a half-life of 30 years. If 1.0 g of cesium-137 disintegrates over a period of 90 years, how many g of cesium-137 would remain?

11. Actinium-226 has a half-life of 29 hours. If 100 mg of actinium-226 disintegrates over a period of 123 hours, how many mg of actinium-226 will remain?

12. The half-life of radon-222 is 3.8 days. How much of a 100 g sample is left after 15.2 days?

13. In 1985, there were 285 cell phone subscribers in the small town of Centerville. The number of subscribers increased by 75% per year after 1985. How many cell phone subscribers were in Centerville in 1994?

14. Bacteria can multiply at an alarming rate when each bacteria splits into two new cells, thus doubling. If we start with only one bacteria which can double every hour, how many bacteria will we have by the end of one day?

15. Each year the local country club sponsors a tennis tournament. Play starts with 128 participants. During each round, half of the players are eliminated. How many players remain after 5 rounds?

16. You have inherited land that was purchased for $30,000 in 1960. The value of the land increased by approximately 5% per year. What is the approximate value of the land in the year 2011?

17. An adult takes 400 mg of ibuprofen. Each hour, the amount of ibuprofen in the person's system decreases by about 29%. How much ibuprofen is left after 6 hours?

18. Use information from question 17. It is safe to take ibuprofen again once there is only 30 mgs of ibuprofen left in a person's system. Six hours after taking 400 mg of ibuprofen, would it be safe to take more ibuprofen?

19. When you were born your grandmother deposited $50.00 in a savings account that pays 3% and compounded continuously. After 25 years how much will be in the account?

20. You want to start saving for your retirement. You are not sure which type of account to use. If you deposit $1000.00 at 3% interest which account will pay the highest return after 35 years?
    a. Compounded monthly

    b. Compounded quarterly

    c. Compounded yearly

    d. Compounded continuously