Accelerated Coordinate Algebra

Name_____

Section 12.3 (Day 2)—Exponential Growth and Decay

$y = a(1+r)^t$ $y = a(1-r)^t$ $A = P\left(1+\frac{r}{n}\right)^{nt}$

1. The population of Johnson City in 2005 was 25000. Since then, the population has grown at an average rate of 3.2% each year. Write an equation to represent the population of Johnson City since 2005. What will the population of Johnson City be in 2015?

$y = 25000(1+.032)^t$

$y = 25000(1+.032)^{10}$

$y = 34256$

2. Determine the value of an investment of $2500 if it is invested at an interest rate of 5.25% compounded monthly for 4 years.

$A = 2500\left(1+\frac{.0525}{12}\right)^{48}$

$A = 3082.78$

3. Determine the value of an investment of $100000 if it is invested at an interest rate of 5.2% compounded quarterly for 12 years.

$A = 100000\left(1+\frac{.052}{4}\right)^{48}$

$A = 185888.87$

4. The population of Bulgaria has been decreasing at an annual rate of 0.89%. If the population of Bulgaria was about 7,450,349 in the year 2005, predict its population in the year 2015.

$y = 7450349(1-.0089)^{10}$

$y = 6,813,204$

$\Delta = 0.94$

5. Mr. Gossell is a machinist. He bought some new machinery for about $125,000. He wants to calculate the value of the machinery over the next 10 years for tax purposes. If the machinery depreciates at the rate of 15% each year, what is the value of the machinery (to the nearest $100) at the end of 10 years?

$y = 125000(1-.15)^{10}$

$y = \$24,600$

6. A new car costs $32,000. It is expected to depreciate 12% each year for 4 years and then depreciate 8% each year thereafter. Find the value of the car in 6 years.

$y = 32,000(1-.12)^4$

$y = 19,190.25$

$y = 19190.25(1-.08)^2$ (6−4)

$y = 16,242.63$

7. Hans opens a savings account by depositing $1200 in an account that earns 3% interest compounded weekly. How much will his investment be worth in 10 years? (Use 52 weeks in a year and round answer to the nearest hundredth.)

$A = 1200\left(1+\frac{.03}{52}\right)^{520}$

$A = \$1619.69$

8. Ken and Barbie bought a condominium in Malibu for $500,000 in 2010. If its value appreciates at an average rate of 6% each year, what will the value be in 2015?

$y = 500000(1+.06)^5$

$y = 669,112.79$

9. Kyle saved $500 from a summer job. He plans to spend 10% of his savings each week on various forms of entertainment. At this rate, how much will Kyle have left after 15 weeks?

$y = 500(1-.10)^{15}$

$y = 102.95$