Name: Date: Period:

Refresher Example 1: The population of Coleman, Texas grows at a 2% rate annually. If the population in 2000 was 5,981, what was the population is 2010? Round <u>up</u> to the nearest person.

First, determine appreciation or depreciation:

Use: $y = p(1 + r)^t$

P = 5,981
r = 0.02
t = 10

$y = p(1 + r)^t$
$y = 5,981(1+0.02)^{10}$
$y = 5,981(1.02)^{10}$
7,291 people

Refresher Example 2: You deposit $1000 into a savings account that pays 2.5% annual interest. Find the balance after 3 years if the interest rate is compounded a) annually, b) monthly**, and c) daily**.

a) annually	b) monthly		c) daily
Appreciation or depreciation: $y = p(1 + r)^t$	**To determine the amount if it is compounded in amounts **other than yearly**, we need to alter the equation. For **compound interest**, the equation is $y = P(1 + \dfrac{r}{n})^{nt}$, where n is the number of times the interest is compounded within a year.		

a) annually		b) monthly		c) daily
$y = p(1 + r)^t$ P = 1000 r = 0.025 t = 3	$y = 1000(1 + .025)^3$ $y = 1000(1.025)^3$ $y = 1008.18$	P = 1000 r = 0.025 t = 3 n = 12	$y = 1000(1 + \dfrac{0.025}{12})^{(12)(3)}$ $y = 1000(1.002)^{36}$ $y = 1077.80$	P = 1000 r = 0.025 t = 3 n = 365	$y = 1000(1 + \dfrac{0.025}{365})^{(365)(3)}$ $y = 1000(1.000068)^{1095}$ $y = 1077.88$

Show all your work on a separate piece of paper. Make sure to write your formula and remember it is helpful to list out the variable values prior to substituting them into the formula.

1. Sonya's salary increases at a rate of 4% per year. Her starting salary is $45,000. What is her annual salary, to the nearest $100, after 8 years of service?

2. The value of Sam's car depreciates at a rate of 8% per year. The initial value was $22,000. What will his car be worth after 12 years to the nearest dollar?

3. Rebecca is training for a marathon. Her weekly long run is currently 5 miles. If she increases her mileage each week by 10%, will she complete a 20-mile training run within 15 weeks?

4. An investment grows at a rate of 6% per year. How much, to the nearest $100, should Noel invest if he wants to have $100,000 at the end of 20 years?

5. Tommy bought a truck 7 years ago that is now worth $12,348. If the value of his truck decreased 14% each year, how much did he buy it for? Round to the nearest dollar.

6. Charlie purchases a 7-year old used RV for $54,000. If the rate of depreciation was 13% per year during those 7 years, how much was the RV worth when it was new? Give your answer to the nearest one thousand dollars.

7. The value of homes in a neighborhood increase in value an average of 3% per year. What will a home purchased for $180,000 be worth in 25 years to the nearest one thousand dollars?

For problems 8-15, use the formula for compound interest: $y = P(1 + \dfrac{r}{n})^{nt}$

8. The Going Broke credit card company charges an Annual Percentage Rate (APR) of 21.99%, compounded monthly. If you have a balance of $2000 on the card, what would the balance be after 4 years (assuming you do not make any payments)?

9. If $12,000 is invested at 4% annual interest compounded monthly, how much will the investment be worth in 10 years? Give your answer to the nearest dollar.

10. If $8,000 is invested at 5% annual interest compounded semiannually, how much will the investment be worth in 6 years? Give your answer to the nearest dollar.

11. If $5,000 is invested at 8% annual interest compounded quarterly, how much will the investment be worth in 15 years? Give your answer to the nearest dollar.

12. If $20,000 is invested at 6% annual interested compounded quarterly, how much will the investment be worth in 12 years. Give your answer to the nearest dollar.

13. How much of an initial investment is required to insure an accumulated amount of at least $25,000 at the end of 8 years at an annual interest rate of 3.75% compounded monthly? Give your answer to the nearest one hundred dollars.

14. How much of an initial investment is required to insure an accumulated amount of at least $10,000 at the end of 5 years at an annual interest rate of 5% compounded quarterly? Give your answer to the nearest one hundred dollars.

15. Your initial investment of $20,000 doubles after 10 years. If the bank compounds interest quarterly, what is your interest rate?