Name: Guide Date: _____

Exponential Growth and Decay Practice

$$Growth: y = P(1+r)^t \qquad Decay: y = P(1-r)^t$$

$$\text{Compound Interest}: A = P\left(1+\frac{r}{n}\right)^{nt}$$

1. You deposit $1500 in an account that pays 5% interest compounded yearly. Find the balance after 6 years.

$A = 1500\left(1+\frac{.05}{1}\right)^{1(6)} = \$2,010.14$

2. The mice population is 25,000 and is decreasing by 20% each year. Write a model for this situation. What will be the mice population after 3 years?

3. The number of mosquitoes at the beach has tripled every year since 1999. In 1999, there were 2,500 mosquitoes. Write a model for this situation. How many mosquitoes would you predict were at the beach in 2005?

$A = 2500(1+2)^t$ $\qquad A = 2500(1+2)^6 = 1,822,500$

↑ equals 3 for tripling

4. Corey invested $1500 when he was a freshman in order to save for college. If he chooses to invest it in an account that earns 3.5% interest and is compounded annually, how much money will he have after 4 years?

5) Given the equation $y = 35(0.57)^x$

a) Does this equation represent growth or decay? Decay

b) What is the rate of growth or decay? 0.43

c) What is the initial value? 35

d) Evaluate for x = 5 2.11

$1 - r = 0.57$
$-1 \quad -1$
$-r = -0.43$
$r = 0.43$

6) Given the equation $y = 225(1.23)^x$

a) Does this equation represent growth or decay? _____

b) What is the rate of growth or decay? _____

c) What is the initial value? _____

d) Evaluate for x = 2 _____

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7) A used car was purchased for $12,329 this year. Each year the car's value decreases 8.5%.

a) Write an exponential equation describing this situation.

$A = 12,329(1 - 0.085)^t$

b) What will the car be worth in 2025?

(in 2021) $A = 12,329(1 - 0.085)^4 = \$8,641.96$

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8) You have invested $2,500 in stocks. The stock increases at a rate of 5% and is compounded monthly.

a) Write a compound interest function to model the situation.

b) How much will the stocks be worth in 3 years?

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9) A doctor prescribes 300 milligrams of medicine to treat an infection. Each hour following the initial dose, 70% of the concentration remains in the body from the preceding hour.

a) Write an exponential equation describing the situation.

$A = 300(1 - .30)^t$

b) How much will be remaining in the body at the end of 6 hours?

$A = 300(1 - .30)^6 = 35.29 \text{ mg}$
