Algebra 1 | Unit 10: Exponential Functions | Practice

Day 5: Growth & Decay

Name: Amos

Practice Assignment

Directions: Label if the equation represents growth or decay. Then determine the growth/decay factor and growth/decay rate. Remember to write your rate as a percentage.

1) $y = 10(1.35)^x$ Growth

Growth/Decay Factor: .35

Growth/Decay Rate: 35%

2) $y = 742(0.60)^x$ Decay

Growth/Decay Factor: .40

Growth/Decay Rate: 40%

3) $y = (1.04)^x$ Growth

Growth/Decay Factor: .04

Growth/Decay Rate: 4%

4) $y = 7500(0.42)^x$ Decay

Growth/Decay Factor: .58

Growth/Decay Rate: 58%

5) $y = 50(1+.23)^x$ Growth

Growth/Decay Factor: .23

Growth/Decay Rate: 23%

6) $y = 1500(0.925)^x$ Decay

Growth/Decay Factor: .075

Growth/Decay Rate: 7.5%

Directions: Create an exponential growth/decay model and use it to solve each problem. Make sure your model problem is in simplified form (y = ab^x)

$y = a(1 \overset{+}{-} r)^t$ growth / decay

7) A new SUV depreciates (decay) at a rate of 23% per year. If the original selling price was $30,000, how much will the vehicle be worth after 4 years?

Model: $y = 30{,}000(1-.23)^4$

$= \$10545.41$

8) Two bacteria are discovered at the bottom of a shoe. If the bacteria multiply at a rate of 34% per hour, how many bacteria will be present after 48 hours?

Model: $y = 2(1+.34)^{48}$

$\boxed{2{,}523{,}831}$

9) The number of student athletes at a local high school is 300 and is increasing at a rate of 8% per year. How many students will be at the school is 5 years?

Growth

Model: $y = 300(1+.08)^5$

$\boxed{440}$ students

10) A scientist is creating a mathematical model for the breakdown of caffeine in the human body. According to her current model, caffeine is broken down at a rate of 5% each hour. If a person consumes a sample containing 150 milligrams of caffeine, then how much will remain in 7 hours?

Model: $y = 150(1-.05)^7$

Decay

$\boxed{\text{104 mg of caffeine remains}}$

decay

11) Riley owns a painting that is valued at $59,000. If the value of the artwork decreases by 5% every year, how much will it be worth in 14 years?

Model: $y = 59{,}000(1-.05)^{14}$

$28722.82 value after 14 years

12) Bacteria can multiply at an alarming rate when each bacteria splits into two new cells, thus doubling. If we start with only 1 bacteria, which can double every hour, how many bacteria will we have by the end of the day?

Model: $y = 1(2)^{24}$

$y = 16{,}777{,}216$ bacteria at the end of one day

13) 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?

Model: $y = 128(1-.50)^5$

4 players remain

Algebra 1
Day 5: Growth/Decay Percents of Change
Practice Assignment

Unit 10: Exponential Functions

Name: Amos Practice
Block: ____________

Identify the following:

Equation	Growth/Decay	Starting Value	Growth/Decay Factor	Percent of Change
$Y = 350(1 + 0.75)^t$	Growth	350	.75	75%
$Y = 240(0.75)^t$	Decay	240	.25	25%
$Y = 8(1 - 0.15)^t$	Decay	8	.85	85%
$Y = 6.72(2)^t$	Growth	6.72	200.	200%
$Y = 25(1.2)^t$	Growth	25	.20	20%
$Y = 1250(0.865)^t$	Decay	1250	.135	13.5%
$Y = 4(0.8)^t$	Decay	4	.20	20%
$Y = (1.8)^t$	Growth	1	.80	80%
$Y = 0.65(0.48)^t$	Decay	.65	.52	52%
$Y = 175(1.028)^t$	Growth	175	.028	2.8%
$Y = 700(0.995)^t$	Decay	700	.005	.5%
$Y = (\frac{7}{8})^t$	Decay	1	.125	12.5%

Front Only

Day 6: Applications of Exponential Functions **Name:** ______________________

Practice Assignment

Growth: $y = a(1+r)^t$	Decay: $y = a(1-r)^t$
Key Words: +	Key Words: −

Directions: Create an exponential model and use it to solve each problem.

Example 1: Russell's health and fitness blog is really taking off. The blog had 45,000 commenters this month and the number of commenters has consistently gone up by 10% per month. How many commenters can Russell expect to have in 5 months?

$y = 45{,}000(1+.10)^5$

$\boxed{72{,}472}$ commenters

Example 2: A pot of soup, currently at 84° C is left out to cool. If that temperature decreases by 5% per minute, what will the temperature be in 5 minutes?

$y = 84(1-.05)^5$

$\boxed{65°}$ in 5 minutes

Example 3: The population of a small town started at 233 people in 1999. If the population grows at a rate of 16% per year, how many people are now in the town in 2006?

1999 → 2006 = 7 years

$y = 233(1+.16)^7$

$\boxed{658}$ people in 2006