

Day 5: Applications of Exponentials

Name: _____

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/Decay Factor: 1.35Growth/Decay Rate: .35 or 35%

How much am I over or under 1?

2) $y = 742(0.60)^x < 1$ _____

Growth/Decay Factor: 0.60Growth/Decay Rate: .40 or 40% $1 - .60 = ?$

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

Growth/Decay Factor: 1.04Growth/Decay Rate: .04 or 4%

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

Growth/Decay Factor: 0.42Growth/Decay Rate: .58 or 58% $1 - .42 = ?$

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

Growth/Decay Factor: 1.23Growth/Decay Rate: .23 or 23%

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

Growth/Decay Factor: 0.925Growth/Decay Rate: .075 or 7.5% $1 - .925 = ?$

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

7) A new SUV depreciates 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: $30000(1 - .23)^t$

$$30000(1 - .23)^4$$

\$ 10,545.91

Exponential Growth

$$\text{Growth: } P \left(1 + \frac{r}{n} \right)^{nt}$$

- 1) Given the equation $y = 15(1.75)^x$
- Does this equation represent growth or decay?
 - What is the rate of growth or decay?
 - What is the initial value?
 - Evaluate for $x = 4$

$$\begin{array}{r} G \\ \hline .75 \text{ or } 75\% \\ \hline 15 \\ \hline 140.68 \end{array}$$

- 2) Given the equation $y = 25(1.23)^x$
- Does this equation represent growth or decay?
 - What is the rate of growth or decay?
 - What is the initial value?
 - Evaluate for $x = 2$

$$\begin{array}{r} G \\ \hline .23 \text{ or } 23\% \\ \hline 25 \\ \hline 37.82 \end{array}$$

- 3) Given the equation $y = 154(1.06)^x$
- Does this equation represent growth or decay?
 - What is the rate of growth or decay?
 - What is the initial value?
 - Evaluate for $x = 7$

$$\begin{array}{r} G \\ \hline .06 \text{ or } 6\% \\ \hline 154 \\ \hline 231.50 \end{array}$$

- 4) The tuition at a private college was $\$15,000$. The tuition has about a 7.2% increase.

a) Write an exponential equation describing this situation.

$$15000(1 + .072)^x$$

b) How much will the tuition be 5 years from now?

$$\$21,235.63$$

- 5) A vintage radio was purchased by Grandma Schmidt in 1945 for \$16. You radio know what it's worth. Each year the radio's value increased 1.4%.

a) Write an exponential equation describing this situation.

$$16(1 + .014)^x$$

b) What will the radio be worth in 2020? 75 yrs

$$\$45.39$$

- 6) Ben made \$2,000 last summer mowing lawns. He wants to continue this for following years. He hopes that his profit will increase 10%.

a) Write an exponential equation describing the situation.

b) What will he make in 7 years?

Compounded: Annually $n=1$
 Semi-annually $n=2$
 Quarterly $n=4$
 Monthly $n=12$

Grow

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

Starting amt \rightarrow P
 compounded rate \rightarrow r
 time \rightarrow n
 time years passed \rightarrow nt
 Need a decimal

r
 .072
 P
 .014