Exponential Growth and Decay

Algebra 1 •Section 11.2

Name: _____	Date: _____	Score: _____ / 12

Quick Review and Helpful Hints

Exponential models multiply by a constant factor over equal input intervals. Compare the initial value, multiplier, and long-term behavior before deciding what the model means.

Example: Evaluate $100(1.05)^2$.
Work: Square the growth factor: $1.05^2 = 1.1025$. Then multiply: $100(1.1025) = 110.25$.

Answer: 110.25

Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Write a growth model for 200 increasing by 5% each year.

2. Write a decay model for 800 decreasing by 12% each year.

3. Evaluate $500(1.1)^2$.

4. Evaluate $1000(0.9)^3$.

5. Find the growth factor for 7% growth.

6. Find the decay factor for 35% decay.

7. Does $y = 4(1.2)^x$ show growth or decay?

8. Does $y = 9(0.75)^x$ show growth or decay?

9. Find the initial value of $A = 350(1.04)^t$.

10. What is the percent change in $y = 60(1.18)^x$?

Word Problems

11. A car worth $\$20{,}000$ loses 15% yearly. Write the model.

12. A population of $1{,}500$ grows by 3% each year. Estimate after 2 years.

Answer Keys

1. $\boxed{200(1.05)^t}$
2. $\boxed{800(0.88)^t}$
3. $\boxed{605}$
4. $\boxed{729}$
5. $\boxed{1.07}$
6. $\boxed{0.65}$
7. $\boxed{\text{Growth}}$
8. $\boxed{\text{Decay}}$
9. $\boxed{350}$
10. $\boxed{18\% \text{ growth}}$
11. $\boxed{20000(0.85)^t}$
12. $\boxed{1{,}591.35}$

Step-by-Step Explanations

1. Growth by 5% means multiply by 1.05 each year.
2. Decay by 12% means keep 88%, so the factor is 0.88.
3. $1.1^2 = 1.21$, and $500(1.21) = 605$.
4. $0.9^3 = 0.729$, so the value is 729.
5. Add the growth rate to 1.
6. Keep 65% of the original amount.
7. The base 1.2 is greater than 1.
8. The base is between 0 and 1.
9. The initial value is the coefficient when $t = 0$.
10. The factor 1.18 means $1 + 0.18$.
11. The car keeps 85% of its value each year.
12. Use $1500(1.03)^2 = 1500(1.0609) = 1591.35$.

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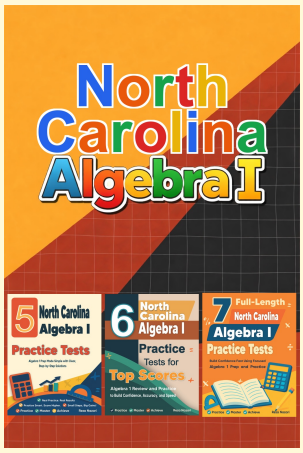

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