Comparing Linear, Quadratic, and Exponential Models

Algebra 1 •Section 11.3

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. Which grows faster eventually: $5x + 20$ or 2^x?

2. Classify $y = 3x + 7$.

3. Classify $y = x^2 - 4$.

4. Classify $y = 6(1.4)^x$.

5. Which has constant second differences?

6. Which has a constant ratio in outputs?

7. Which model has constant first differences?

8. Compare at $x = 3$: $f = x^2$ and $g = 2^x$.

9. Compare at $x = 5$: $f = 3x + 1$ and $g = x^2$.

10. Which model can represent repeated percent growth?

Word Problems

11. A savings account adds $\$50$ monthly. Linear or exponential?

12. A bacteria culture doubles hourly. Linear, quadratic, or exponential?

Answer Keys

1. 2^x
2. Linear
3. Quadratic
4. Exponential
5. Quadratic
6. Exponential
7. Linear
8. $f(3) = 9$ is greater
9. g is greater
10. Exponential
11. Linear
12. Exponential

Step-by-Step Explanations

1. Exponential growth eventually outpaces linear growth.
2. The variable has power 1 and constant rate of change.
3. The highest power of x is 2.
4. The variable is in the exponent.
5. Quadratic functions have constant second differences in tables.
6. Equal input steps multiply outputs by a constant ratio.
7. Linear functions change by equal amounts over equal input intervals.
8. $2^3 = 8$, while $3^2 = 9$.
9. $f(5) = 16$ and $g(5) = 25$.
10. Percent growth multiplies by the same factor each period.
11. Adding a constant amount creates constant first differences.
12. Doubling means multiplying by the same factor over equal intervals.

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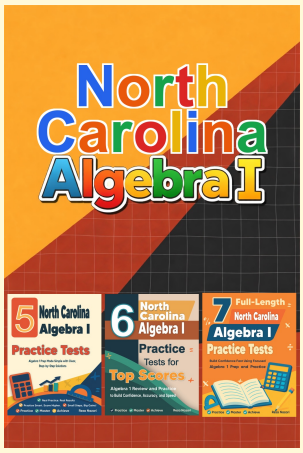

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