LESSON MAKER PRO

Pattern Predictions

Read scatter plots and test predictions.

HIGH SCHOOL · A2.D.1.2

A2.D.1.2 "Collect data and use scatter plots to analyze patterns and describe linear, exponential, or quadratic relationships between two variables."

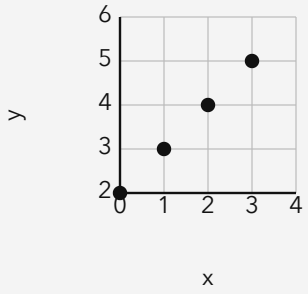
NAME _____ DATE _____

SPOT THE PATTERN

For equal steps in x, equal changes in y suggest a linear pattern, equal ratios suggest an exponential pattern, and equal second differences suggest a quadratic pattern. Predictions close to the data are usually more reliable than predictions far beyond it.

WORKED EXAMPLE

Use the scatter plot to predict y when x = 4.



1. Each step right goes 1 step up.
2. The linear rule is y = x + 2.
3. At x = 4, y = 4 + 2 = 6.

Answer: 6

PRACTICE 4 problems

1 Data: (0,2), (1,5), (2,8), (3,11). Name the pattern and predict y at x = 4.

ANSWER _____

2 Data: (0,3), (1,6), (2,12), (3,24). Name the pattern and predict y at x = 4.

ANSWER _____

3 Data: (0,1), (1,2), (2,5), (3,10). Name the pattern and predict y at x = 4.

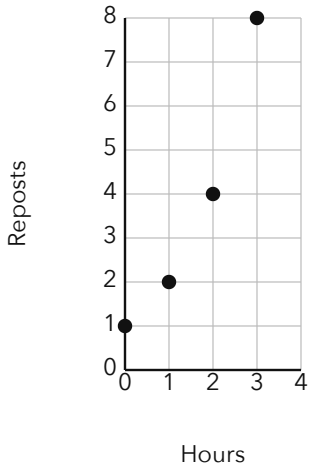
ANSWER _____

4 Data: (0,1), (1,3), (2,9), (3,27). Predict y at x = 4. Why is a prediction at x = 20 less reliable?

ANSWER _____

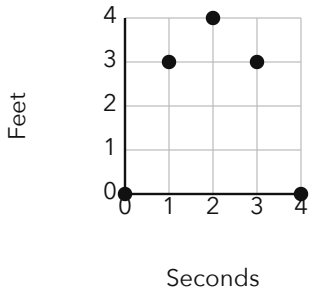
APPLY IT Show your work

1 The plot shows reposts of a gaming clip by hour. Name the pattern and predict reposts at hour 4. Why might the prediction fail?



ANSWER _____

2 The plot shows a tossed ball's height. Find a quadratic rule, then predict its height at 2.5 seconds. Is this interpolation?



ANSWER _____

CHALLENGE One step up

The points (0,2), (1,4), and (2,8) fit both a quadratic and an exponential rule. Find each rule's prediction at x = 3. What new measurement would distinguish them?

WORK SPACE AND ANSWER

ANSWER KEY

Pattern Predictions

HIGH SCHOOL · A2.D.1.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Data: (0,2), (1,5), (2,8), (3,11). Name the pattern and predict y at x = 4.	**Linear; 14**
2	Data: (0,3), (1,6), (2,12), (3,24). Name the pattern and predict y at x = 4.	**Exponential; 48**
3	Data: (0,1), (1,2), (2,5), (3,10). Name the pattern and predict y at x = 4.	**Quadratic; 17**
4	Data: (0,1), (1,3), (2,9), (3,27). Predict y at x = 4. Why is a prediction at x = 20 less reliable?	**81; x = 20 is much farther beyond the data.**

PART 2 · APPLY IT

1. **Exponential; 16 reposts. The repost rate might change.** The repost count doubles each hour, so double 8 to get 16. A real audience may not keep reposting at the same rate.
2. **$h = 4 - (t - 2)^2$; 3.75 feet. Yes, it is interpolation.** The plot peaks at (2,4) and is symmetric, giving $h = 4 - (t - 2)^2$. At $t = 2.5$, $h = 3.75$; 2.5 lies within the plotted time range.

CHALLENGE

The quadratic rule $y = x^2 + x + 2$ predicts 14. The exponential rule $y = 2(2^x)$ predicts 16. Measure y at x = 3 to distinguish the rules.

Accept equivalent forms of the quadratic rules. For the challenge, a measurement at any x where the two rules differ is valid.