LESSON MAKER PRO

Growth Pattern Lab

Fit exponential models and use them to predict.

HIGH SCHOOL · MA.912.DP.2.9

MA.912.DP.2.9 "Fit an exponential function to bivariate numerical data that suggests an exponential association. Use the model to solve real-world problems in terms of the context of the data."

NAME _____ DATE _____

SPOT THE MULTIPLIER

When x increases by 1, check whether each y-value is multiplied by the same number. If so, use $y = a(b^x)$, where a is the value when x = 0 and b is the repeated multiplier.

WORKED EXAMPLE

Data: (0, 7), (1, 21), (2, 63). Fit a model and find y when x = 3.

1. 21/7 = 3 and 63/21 = 3.
2. The value at x = 0 is 7, so a = 7.
3. The model is $y = 7(3^x)$.
4. $y = 7(3^3) = 189$.

Answer: $y = 7(3^x)$; when x = 3, y = 189.

PRACTICE 4 problems

1 Data: (0, 4), (1, 8), (2, 16). Write an exponential model.

ANSWER _____

2 For $y = 3(4^x)$, find y when x = 2.

ANSWER _____

3 Data: (0, 20), (1, 10), (2, 5). Write an exponential model.

ANSWER _____

4 For $y = 5(3^x)$, find x when y = 135.

ANSWER _____

APPLY IT Show your work

1 A student's video views are shown in the table. Let x be days after posting. Write a model, then predict the views on day 4.

VIDEO VIEWS

x, days	y, views
0	25
1	50
2	100
3	200

ANSWER _____

2 A school gaming club has 120 members on day 0, 180 on day 1, and 270 on day 2. Let x be days after day 0. Write a model, then predict the membership on day 3.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Data: (1, 12), (2, 36), (3, 108). Write a model in the form $y = a(b^x)$. Then find x when y = 972.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Data: (0, 4), (1, 8), (2, 16). Write an exponential model.	**$y = 4(2^x)$**
2	For $y = 3(4^x)$, find y when x = 2.	**48**
3	Data: (0, 20), (1, 10), (2, 5). Write an exponential model.	**$y = 20(1/2)^x$**
4	For $y = 5(3^x)$, find x when y = 135.	**x = 3**

PART 2 · APPLY IT

1. **$y = 25(2^x)$; 400 views on day 4.** The views double each day, and the starting value is 25. Evaluate $25(2^4)$.
2. **$y = 120(3/2)^x$; 405 members on day 3.** Each day's membership is multiplied by 3/2. Evaluate $120(3/2)^3$.

CHALLENGE

$y = 4(3^x)$; x = 5.

Accept equivalent forms such as $y = 4 \cdot 2^x$. For each model, the starting value is the y-value at x = 0, even when that point is not listed.