LESSON MAKER PRO

Model Meaning Match

Read each parameter as a quantity in its situation.

HIGH SCHOOL · HSF-LE.B.5

CCSS.Math.Content.HSF-LE.B.5 "Interpret the parameters in a linear or exponential function in terms of a context."

NAME _____ DATE _____

PARAMETERS TELL THE STORY

In a linear model mx + b, b is the amount when x = 0, and m tells how the amount changes for each increase of 1 in x. In an exponential model $a(b)^x$, a is the initial amount and b is the factor multiplied each time x increases by 1.

WORKED EXAMPLE

A gaming channel's follower count is modeled by $72(4)^x$, where x is the number of weeks since the channel started. Interpret the parameters 72 and 4.

1. At x = 0, $4^0 = 1$.
2. $72(4)^0 = 72$, so the channel starts with 72 followers.
3. Each new week multiplies the follower count by 4.

Answer: 72 is the initial number of followers. 4 is the weekly growth factor, so the follower count quadruples each week.

PRACTICE 6 problems

1 A bike-share plan costs 19x + 60 dollars, where x is the number of hours rented. What do 19 and 60 mean?

ANSWER _____

2 A video's view count is modeled by $81(6)^x$, where x is the number of days after posting. What do 81 and 6 mean?

ANSWER _____

3 The volume of water in a tank, in gallons, is modeled by 250 - 7x, where x is the number of minutes after draining begins. What do -7 and 250 mean?

ANSWER _____

4 The amount of a medicine in a body is modeled by $360(1/3)^x$, where x is the number of hours after a dose. What do 360 and 1/3 mean?

ANSWER _____

5 A car wash earns 16x dollars after washing x cars. What does 16 mean?

ANSWER _____

6 A musician's merch fund is modeled by $900(1.08)^x$, where x is the number of months. What do 900 and 1.08 mean?

ANSWER _____

APPLY IT Show your work

1 An artist tracks followers after posting a new song. The model 180 + 24x gives the follower count, where x is the number of weeks since the post. Interpret 180 and 24. Then find the predicted follower count after 3 weeks.

2 A mobile game models a player's bonus-point balance by $500(3/2)^x$, where x is the number of days after beginning a streak. Interpret 500 and 3/2. What percent does the balance increase each day, and what is the balance after 2 days?

CHALLENGE One step up

Two student creators track their earnings in dollars. Creator A uses the model 30 + 18x, and Creator B uses the model $6(3)^x$, where x is the number of weeks. At x = 3, which creator has greater earnings? Explain how the parameters show each creator's starting amount and weekly change.

ANSWER KEY

Model Meaning Match

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A bike-share plan costs 19x + 60 dollars, where x is the number of hours rented. What do 19 and 60 mean?	**19 means the cost increases by $19 per hour. 60 means the starting fee is $60.**
2	A video's view count is modeled by $81(6)^x$, where x is the number of days after posting. What do 81 and 6 mean?	**81 is the number of views at the start. 6 is the daily growth factor, so views are multiplied by 6 each day.**
3	The volume of water in a tank, in gallons, is modeled by 250 - 7x, where x is the number of minutes after draining begins. What do -7 and 250 mean?	**-7 means the tank loses 7 gallons per minute. 250 means the tank contains 250 gallons when draining begins.**
4	The amount of a medicine in a body is modeled by $360(1/3)^x$, where x is the number of hours after a dose. What do 360 and 1/3 mean?	**360 is the initial amount of medicine. 1/3 means the amount is multiplied by 1/3 each hour.**
5	A car wash earns 16x dollars after washing x cars. What does 16 mean?	**16 means the car wash earns $16 for each car washed.**
6	A musician's merch fund is modeled by $900(1.08)^x$, where x is the number of months. What do 900 and 1.08 mean?	**900 means the fund starts at $900. 1.08 means the fund is multiplied by 1.08 each month, an 8% monthly increase.**

PART 2 · APPLY IT

1. **180 is the starting follower count, and 24 means the artist gains 24 followers per week. After 3 weeks, the predicted count is 252 followers.** Substitute x = 3: 180 + 24(3) = 252. The constant is the starting amount, and the coefficient of x is the weekly change.
2. **500 is the starting bonus-point balance. 3/2 is the daily growth factor, which is a 50% increase each day. After 2 days, the balance is 1,125 points.** The factor 3/2 equals 1.5, so it represents a 50% increase. Compute $500(3/2)^2 = 500(9/4) = 1{,}125$.

CHALLENGE

Creator B has greater earnings at x = 3. Creator A earns 30 + 18(3) = $84, while Creator B earns $6(3)^3 = $162. Creator A starts at $30 and adds $18 each week. Creator B starts at $6 and triples each week.

Accept equivalent wording such as "initial value" for starting amount and "multiplied by" for growth factor. For exponential rates, accept 1.08 as a factor and 8% as the equivalent monthly percent increase.