

# What Parameters Say

Read each number as part of the story.

**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 \_\_\_\_\_

## THE BIG IDEA

In a linear function such as  $y = b + mx$ ,  $b$  is the starting amount and  $m$  is the change for each unit of  $x$ . In an exponential function such as  $y = a(r)^x$ ,  $a$  is the starting amount and  $r$  is the factor multiplied each time  $x$  increases by 1.

## WORKED EXAMPLE

A music club's fund is modeled by  $F(w) = 17 + 13w$ , where  $w$  is the number of weeks. Interpret 17 and 13.

1. Set  $w = 0$  to find the starting fund:  $F(0) = 17 + 13(0) = 17$ .
2. The constant 17 is the amount in the fund at the start.
3. The coefficient 13 means the fund increases by \$13 each week.

**Answer: The fund starts with \$17 and increases by \$13 per week.**

## PRACTICE 6 problems

- 1** A craft shop models its cost with  $C(n) = 7n + 12$ , where  $n$  is the number of bracelets made. Interpret 7 and 12.

**ANSWER** \_\_\_\_\_

- 2** A game server has  $G(t) = 45(1/3)^t$  active players, where  $t$  is measured in hours. Interpret 45 and  $1/3$ .

**ANSWER** \_\_\_\_\_

- 3** A savings account is modeled by  $S(m) = 160(5/4)^m$ , where  $m$  is the number of months. Interpret 160 and  $5/4$ .

**ANSWER** \_\_\_\_\_

- 4** A candle's height is  $h(d) = 90 - 6d$  centimeters, where  $d$  is the number of days it burns. Interpret 90 and  $-6$ .

**ANSWER** \_\_\_\_\_

- 5** The money left on a data card is  $M(g) = 26 - 5g$ , where  $g$  is the number of gigabytes used. Interpret 26 and  $-5$ .

**ANSWER** \_\_\_\_\_

- 6** A small plant population is modeled by  $P(y) = 72(3/2)^y$ , where  $y$  is the number of years. Interpret 72 and  $3/2$ .

**ANSWER** \_\_\_\_\_

## APPLY IT Show your work

- 1** A student opens an online art shop. Its follower count is modeled by  $F(d) = 240 + 15d$ , where  $d$  is the number of days since the shop opened. What do 240 and 15 mean in this situation?

WORK SPACE

ANSWER \_\_\_\_\_

- 2** A phone battery is modeled by  $B(h) = 96(3/4)^h$ , where  $h$  is the number of hours after it is fully charged. What do 96 and  $3/4$  mean in this situation?

WORK SPACE

ANSWER \_\_\_\_\_

## CHALLENGE One step up

### CHALLENGE

Two streaming creators track their followers after  $t$  weeks. Creator A uses  $A(t) = 120 + 18t$ , and Creator B uses  $B(t) = 48(3/2)^t$ . In 2 sentences, interpret the starting amount and growth parameter for each model, then explain which creator has more followers after 2 weeks.

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## PART 1 • PRACTICE

| # | PROBLEM                                                                                                                | ANSWER                                                                                                       |
|---|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 1 | A craft shop models its cost with $C(n) = 7n + 12$ , where $n$ is the number of bracelets made. Interpret 7 and 12.    | The cost increases by \$7 for each bracelet, and the shop has a starting cost of \$12.                       |
| 2 | A game server has $G(t) = 45(1/3)^t$ active players, where $t$ is measured in hours. Interpret 45 and $1/3$ .          | The server starts with 45 active players, and the number of active players is multiplied by $1/3$ each hour. |
| 3 | A savings account is modeled by $S(m) = 160(5/4)^m$ , where $m$ is the number of months. Interpret 160 and $5/4$ .     | The account starts with \$160 and is multiplied by $5/4$ each month, which is a 25% increase each month.     |
| 4 | A candle's height is $h(d) = 90 - 6d$ centimeters, where $d$ is the number of days it burns. Interpret 90 and $-6$ .   | The candle starts at 90 centimeters tall and loses 6 centimeters of height each day.                         |
| 5 | The money left on a data card is $M(g) = 26 - 5g$ , where $g$ is the number of gigabytes used. Interpret 26 and $-5$ . | The card starts with \$26, and \$5 is used for each gigabyte.                                                |
| 6 | A small plant population is modeled by $P(y) = 72(3/2)^y$ , where $y$ is the number of years. Interpret 72 and $3/2$ . | The population starts at 72 plants and is multiplied by $3/2$ each year, which is a 50% increase each year.  |

## PART 2 • APPLY IT

1. **The art shop starts with 240 followers and gains 15 followers per day.** In a linear model, the constant is the starting value. The coefficient of  $d$  is the daily change.
2. **The battery starts at 96% charge and keeps  $3/4$  of its previous charge each hour, so it decreases by 25% each hour.** In an exponential model, the number in front is the initial amount. The base  $3/4$  is the hourly multiplier.

## CHALLENGE

**Creator A starts with 120 followers and gains 18 followers per week, while Creator B starts with 48 followers and multiplies the follower count by  $3/2$  each week. After 2 weeks,  $A(2) = 156$  and  $B(2) = 108$ , so Creator A has more followers.**

Accept equivalent context language such as initial value, starting amount, rate of change, or growth factor. For exponential models, accept a correct equivalent percent interpretation when applicable.