LESSON MAKER PRO

# Function Story Decoder

*Read each number as part of the situation.*

**HIGH SCHOOL · AII-F.LE.5**

**AII-F.LE.5** "Interpret the parameters in a linear or exponential function in terms of a context."

NAME _____ DATE _____

## PARAMETERS TELL THE STORY

In a linear function y=mx+b, b is the starting amount when x=0, and m is the amount added or removed for each 1 increase in x. In an exponential function $y=a(b)^x$, a is the starting amount and b is the factor multiplied each time x increases by 1. A factor greater than 1 shows growth, while a factor between 0 and 1 shows decay.

## WORKED EXAMPLE

A museum membership fund is modeled by y=12x+140, where x is the number of weeks. Interpret the parameters 12 and 140.

1. Set x=0: y=12(0)+140.
2. The fund starts with 140 dollars.
3. The coefficient 12 means the fund increases by 12 dollars each week.

**Answer: 140 is the starting amount, and 12 is the number of dollars added each week.**

## PRACTICE 6 problems

**1** A car wash fundraiser is modeled by y=7x+45, where x is the number of cars washed. Interpret 7 and 45.

**ANSWER** _____

**2** A plant's height is modeled by $y=32(1.25)^x$, where x is the number of weeks. Interpret 32 and 1.25.

**ANSWER** _____

**3** A phone's trade-in value is modeled by y=86-4x, where x is the number of months after today. Interpret -4 and 86.

**ANSWER** _____

**4** A hypothetical amount of caffeine, in milligrams, is modeled by $y=75(0.8)^x$, where x is the number of hours after drinking it. Interpret 75 and 0.8.

**ANSWER** _____

**5** A campus newspaper has 63 subscribers and gains 9 subscribers each month. Write a linear function for the number of subscribers y after x months.

**ANSWER** _____

**6** A game account has 48 coins at level 0, and the number of coins triples at each new level. Which function fits the situation: $y=48+3x$ or $y=48(3)^x$? State what the 3 means.

**ANSWER** _____

## APPLY IT Show your work

**1** A student is selling custom stickers to pay for a concert ticket. They already have 27 dollars and earn 6 dollars for each sheet of stickers sold. The amount of money is modeled by $y=6x+27$. Interpret both parameters, then find y when $x=11$.

**2** A student posts art videos online. The views on a video are modeled by $y=160(3/2)^x$, where x is the number of weeks after the first week. Interpret 160 and 3/2, then find y when $x=3$.

## CHALLENGE One step up

Two savings plans begin with 80 dollars. Plan A is modeled by $y=20x+80$. Plan B is modeled by $y=80(3/2)^x$, where x is the number of months. Find the value of each plan when $x=2$. Then explain how the parameters show why the plans change differently.

**ANSWER KEY**

# Function Story Decoder

**HIGH SCHOOL · AII-F.LE.5**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | A car wash fundraiser is modeled by y=7x+45, where x is the number of cars washed. Interpret 7 and 45. | **45 dollars is the amount already collected before any cars are washed. The fundraiser earns 7 dollars for each car washed.** |
| 2 | A plant's height is modeled by $y=32(1.25)^x$, where x is the number of weeks. Interpret 32 and 1.25. | **32 is the plant's starting height. The height is multiplied by 1.25 each week, so it increases by 25% each week.** |
| 3 | A phone's trade-in value is modeled by y=86-4x, where x is the number of months after today. Interpret -4 and 86. | **86 dollars is the phone's value today. The value decreases by 4 dollars each month.** |
| 4 | A hypothetical amount of caffeine, in milligrams, is modeled by $y=75(0.8)^x$, where x is the number of hours after drinking it. Interpret 75 and 0.8. | **75 milligrams is the starting amount of caffeine. Each hour, 80% of the previous amount remains, so the amount decreases by 20% each hour.** |
| 5 | A campus newspaper has 63 subscribers and gains 9 subscribers each month. Write a linear function for the number of subscribers y after x months. | **y=9x+63** |
| 6 | A game account has 48 coins at level 0, and the number of coins triples at each new level. Which function fits the situation: y=48+3x or $y=48(3)^x$? State what the 3 means. | **$y=48(3)^x$; 3 means the number of coins is multiplied by 3 at each level.** |

## PART 2 · APPLY IT

1. **27 dollars is the starting amount, and 6 dollars is earned per sheet sold. When x=11, y=93, so the student has 93 dollars.** The constant 27 is the amount at x=0, and 6 is the amount added for each sheet. Compute 6(11)+27=93.
2. **160 is the number of views in the first week. The factor 3/2 means the views increase by 50% each week. When x=3, y=540 views.** The initial value is 160, and multiplying by 3/2 each week represents 50% growth. Compute 160(3/2)(3/2)(3/2)=540.

## CHALLENGE

**At x=2, Plan A has 120 dollars and Plan B has 180 dollars. Both plans start with 80 dollars. Plan A adds 20 dollars each month, while Plan B multiplies the balance by 3/2 each month, which is a 50% increase.**

Accept equivalent wording for starting amount, rate of change, growth factor, and decay factor. For exponential interpretations, accept either "multiplies by 3/2" or "increases by 50%," and either "multiplies by 0.8" or "decreases by 20%."