LESSON MAKER PRO

Parts Tell Stories

Find what each part of an expression means.

GRADE 8 · 8A.AF.A.4

8A.AF.A.4 "Interpret linear, quadratic, and exponential expressions in terms of a context by viewing one or more of their parts as a single entity."

NAME _____ DATE _____

THE BIG IDEA

A part of an expression can stand for one amount in a story. Name that amount first, then find its value and use it to find the total.

WORKED EXAMPLE

A club makes 7 badges for each person, plus 5 spare badges. The total is $7(t + 3) + 5$. Use the roster to find the total. What does $t + 3$ count?

CLUB ROSTER

People	Count
Team members (t)	8
Guests	3

1. $t + 3 = 8 + 3 = 11$ people.
2. $7 \times 11 = 77$ badges for people.
3. $77 + 5 = 82$ badges in all.

Answer: t + 3 counts everyone at the club. The club makes 82 badges.

PRACTICE 4 problems

1 A rink charges $11 per skater plus $13 for a locker. The cost is $11x + 13$. If $x = 10$, what does $11x$ mean, and what is the total cost?

ANSWER _____

2 A square icon has side length $x + 1$ pixels. Its area is $(x + 1)^2$. If $x = 10$, what does $x + 1$ mean, and what is the area?

ANSWER _____

3 A clip starts with 11 views. Views double each hour: $V = 11(2)^h$. At $h = 4$, what does $(2)^4$ mean, and how many views are there?

ANSWER _____

4 A club buys 12 bottles for each of x teams and one coach's team, plus 10 extra bottles. The total is $12(x + 1) + 10$. If $x = 4$, what does $x + 1$ count, and how many bottles are bought?

ANSWER _____

APPLY IT Show your work

1 A square game icon has side length x + 2 pixels. Use the table to find its area. What does x + 2 represent?

ICON SIDE LENGTH

Part	Pixels
x	10
Added length	2

ANSWER _____

2 A video starts with 25 shares. Shares double each day: $S = 25(2)^d$. On day 4, what does $(2)^4$ tell you, and how many shares are there?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A game starts with 10 coins before its first doubling. Its coins double once right away, then once each day. After d days, it has $C = 10(2)^{d+1}$ coins. At d = 4, what does d + 1 count? Find C and explain why $10(2)^d$ gives half as many coins.

WORK SPACE AND ANSWER

ANSWER KEY

Parts Tell Stories

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A rink charges $11 per skater plus $13 for a locker. The cost is 11x + 13. If x = 10, what does 11x mean, and what is the total cost?	**11x is the cost for all 10 skaters. The total is $123.**
2	A square icon has side length x + 1 pixels. Its area is $(x + 1)^2$. If x = 10, what does x + 1 mean, and what is the area?	**x + 1 is the side length, 11 pixels. The area is 121 square pixels.**
3	A clip starts with 11 views. Views double each hour: $V = 11(2)^h$. At h = 4, what does $(2)^4$ mean, and how many views are there?	**$(2)^4$ is a growth factor of 16 after four doublings. There are 176 views.**
4	A club buys 12 bottles for each of x teams and one coach's team, plus 10 extra bottles. The total is 12(x + 1) + 10. If x = 4, what does x + 1 count, and how many bottles are bought?	**x + 1 counts all 5 teams. The club buys 70 bottles.**

PART 2 · APPLY IT

1. **x + 2 is the icon's side length, 12 pixels. Its area is 144 square pixels.** Add 10 + 2 to find the side length. Square 12 to find the area.
2. **$(2)^4$ is a growth factor of 16 after four doublings. There are 400 shares.** Compute $(2)^4 = 16$, then multiply 25 x 16 = 400.

CHALLENGE

d + 1 counts 5 doublings: the first doubling and 4 daily doublings. $C = 10(2)^5 = 320$ coins. The expression $10(2)^4$ gives 160 coins because it leaves out one doubling.

Accept equivalent wording for what each part represents. For growth factors, students should distinguish the number of doublings from the factor produced.