LESSON MAKER PRO

Groups Act Together

See repeated expressions as one useful quantity.

HIGH SCHOOL · MA.912.AR.1.1

MA.912.AR.1.1 "Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity."

NAME _____ DATE _____

NAME THE WHOLE GROUP

When a group of terms repeats, you can treat the entire group as one quantity, such as u. Replace every matching group with u, simplify if needed, then connect u back to what it means in the situation.

WORKED EXAMPLE

A game store models the cost of 9 custom controllers by $C=9(4+p)+7$, where p is the cost of a design on one controller. Let $u=4+p$. Rewrite C using u and interpret u.

1. Let $u=4+p$.
2. Replace $4+p$ with u: $C=9u+7$.
3. u represents the cost of one customized controller before the delivery fee.

Answer: C=9u+7; u is the cost of one customized controller before the $7 delivery fee.

PRACTICE 6 problems

1 Let $u=x+3$. Rewrite $5(x+3)$ using u.

ANSWER _____

2 Let $u=3x-1$. Rewrite $12-2(3x-1)$ using u.

ANSWER _____

3 A parking pass costs $C=6d+15$ dollars, where d is the number of days. What does 6d represent? What does 15 represent?

ANSWER _____

4 A rectangle has perimeter $P=2(l+w)$. What does $l+w$ represent? What does $2(l+w)$ represent?

ANSWER _____

5 Let $u=x+5$. Rewrite $(x+5)^2-8(x+5)$ using u.

ANSWER _____

6 The equation is $3(2x+11)=30$. Let $u=2x+11$. Rewrite the equation in u. Then solve for u.

ANSWER _____

APPLY IT Show your work

1 A student orders 3 custom phone cases. Each case costs h dollars plus a $6 design charge. Delivery costs $12, so T=3(h+6)+12. What does h+6 represent? If h=14, find T.

WORK SPACE

ANSWER _____

2 For an esports fundraiser, 8 teams each collect t dollars. Each team spends $2 on supplies, and the club spends $20 on posters. Net earnings are R=8(t-2)-20. What does t-2 represent? If t=11, find R.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A school store models net income by N=6(x-2)+5(x-2)-3, where x is the dollars earned from one item before a $2 cost. Let u=x-2. Rewrite and simplify N using u. Then write an equivalent expression in x and explain what x-2 means.

WORK SPACE AND ANSWER

ANSWER KEY

Groups Act Together

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Let u=x+3. Rewrite 5(x+3) using u.	**5u**
2	Let u=3x-1. Rewrite 12-2(3x-1) using u.	**12-2u**
3	A parking pass costs C=6d+15 dollars, where d is the number of days. What does 6d represent? What does 15 represent?	**6d is the cost for d days at $6 per day; 15 is a $15 fixed fee.**
4	A rectangle has perimeter P=2(l+w). What does l+w represent? What does 2(l+w) represent?	**l+w is the sum of one length and one width; 2(l+w) is the rectangle's perimeter.**
5	Let u=x+5. Rewrite $(x+5)^2-8(x+5)$ using u.	**u^2-8u**
6	The equation is 3(2x+11)=30. Let u=2x+11. Rewrite the equation in u. Then solve for u.	**3u=30; u=10**

PART 2 · APPLY IT

1. **h+6 is the cost of one customized phone case; T=$72.** Treat h+6 as the cost of one case with its design charge. Substitute h=14: T=3(14+6)+12=72.
2. **t-2 is the net amount collected by one team after supplies; R=$52.** Treat t-2 as one team's amount after its supply cost. Substitute t=11: R=8(11-2)-20=52.

CHALLENGE

N=11u-3; N=11x-25; x-2 is the net income from one item after the $2 cost.

Accept equivalent forms such as 11(x-2)-3 for the challenge before expansion. For interpretation responses, require that students identify both the grouped quantity and its meaning in the stated context.