

Letters Name Numbers

Name: _____

Date: _____

Distinguish the statements. $4(x + 1)$ is an expression. $4(x + 1) = 4x + 4$ is an identity: it holds for every x . The equation $x + 5 = 13$ is true only for $x = 8$.

Explore and explain

1. Explain the difference between the expression $2x + 3$ and the equation $2x + 3 = 11$. Evaluate the expression when $x = 4$.

2. Expand $5(x + 2)$. Use groups or a property to explain why the new expression is equivalent.

3. A student says $2(x+4) = 2x+4$. Find a counterexample, then write a correct equivalent expression.

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Apply and transfer

4. Solve and check $x + \frac{3}{8} = \frac{7}{8}$.

5. Solve and check $\frac{3}{4}x = 6$.

6. A club has \$32 to buy identical notebooks at \$4 each. Write an equation for the number it can buy and solve. Explain the variable and units.

Think Like a Mathematician

Optional extension. Choose a strategy and justify why it works. Try a diagram, organized cases, a simpler example, or an equation.

7. Two expressions agree when $x = 1$: $3x + 4$ and $5x + 2$. Are they equivalent? Find every x that makes them equal. Explain why one successful test was insufficient.

8. Find positive whole-number pairs (a, b) such that $a + b = 12$ and $3a + 2b = 29$. Use an organized strategy or a diagram, and explain why the pair is unique.