

Writing Equivalent Expressions

You can use the properties of operations to write equivalent expressions. Two algebraic expressions are equivalent if they have the same value when any number is substituted for the variable.

How can you use the properties of operations to write an equivalent expression for the expression below?

$$2(5x + 7)$$

Use the Distributive Property to expand the expression. Then use Associative Property of Multiplication to regroup the first term and multiply 2×5 .

$$\begin{aligned} 2(5x + 7) &= 2(5x) + 2(7) \\ &= (2 \times 5)x + 14 \\ &= 10x + 14 \end{aligned}$$

How can you use the Distributive Property in reverse order to write an equivalent expression for the expression below?

$$9x + 3$$

Look for a common factor of both terms that is greater than 1. In this expression, the common factor is 3.

$$\begin{aligned} 9x + 3 &= 3(3x) + 3(1) \\ &= 3(3x + 1) \end{aligned}$$

Use the Distributive Property to write an equivalent expression by filling in the missing numbers.

1. $4(x - 2) = \underline{\quad}x - \underline{\quad}$

2. $15x - 5 = 5(\underline{\quad}x - \underline{\quad})$

3. $3(6x + 1) = \underline{\quad}x + \underline{\quad}$

4. $21x + 6 = 3(\underline{\quad}x + \underline{\quad})$

Find the missing number(s) so that the expressions are equivalent.

5. $2(4x + 6)$ and $\underline{\quad}x + 12$

6. $16x - 14$ and $\underline{\quad}(8x - \underline{\quad})$

7. $3(8x - 5)$ and $\underline{\quad}x - 15$

8. $10x + 25$ and $5(\underline{\quad}x + \underline{\quad})$

Use the Distributive Property to write an equivalent expression.

9. $3(2x - 1)$

10. $10x - 5$

11. $7(3x + 4)$

12. $22x - 8$

13. Reasoning Jun writes the expression $5(x + 2)$. Then he uses the Distributive Property to write the equivalent expression $5x + 10$. How can he substitute a value for the variable to check to see if expressions are equivalent?