Looking Ahead

The skills you learned related to simplifying expressions will be very helpful when combining functions through addition, subtraction, multiplication, division, and composition. The following example shows how a combination of two functions is easier to understand once simplified.

Example Preview

Consider the following functions.

$$f(x) = x^3 + 3 \text{ and } g(x) = 4x$$

Find the formula for $(f+g)(x)$ and simplify your answer. Then find the domain for $(f+g)(x)$.

Solution

From the definitions of addition, subtraction, multiplication, and division of functions, we know that

$$\begin{aligned}(f+g)(x) &= f(x) + g(x)\\ &= (x^3 + 3) + (4x)\\ &= x^3 + 4x + 3.\end{aligned}$$

The domain of $(f+g)(x)$ is the entire set of real numbers because both $f(x)$ and $g(x)$ are defined for all real numbers.

4.R.2 Exercises

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

1. A variable that does not appear to have an exponent has an exponent of 1.

2. In the term $-9x$, nine is being subtracted from x.

3. In the term "$12a$," 12 is the constant.

4. Like terms have the same coefficients.

Practice

Identify the like terms in each list of terms.

5. $-5, 3, 7x, 8, 9x, 3y$

Simplify each expression by combining like terms.

6. $8x + 7x$

7. $3x - 5x + 12x$

8. $13x + 12x^2 + 15x - 35 - 41 - 2x^2$

Simplify each expression and then evaluate the expression for $y = 3$ and $a = -2$.

9. $5y + 4 - 2y$

10. $\frac{3a+5a}{-2} + 12a$

Applications

Solve.

11. ***Profit:*** An apartment management company owns a property with 100 units. The company has determined that the profit made per month from the property can be calculated using the equation $P = -10x^2 + 1500x - 6000$, where x is the number of units rented per month. How much profit does the company make when 80 units are rented?

12. ***Physics:*** A ball is thrown upward from an initial height of 96 feet with an initial velocity of 16 feet per second. After t seconds, the height of the ball can be described by the expression $-16t^2 + 16t + 96$. What is the height of the ball after 3 seconds?

Writing & Thinking

13. Discuss like and unlike terms and give an example of each.

14. Explain the difference between -13^2 and $(-13)^2$.