Looking Ahead

Now that you have reviewed how to multiply polynomials, you will see how this idea can be used to perform operations with functions.

Example Preview

Find the formula for $(fg)(x)$ for the following functions.

$$f(x) = x^2 + 5 \quad \text{and} \quad g(x) = x^3 - 2$$

Solution

$$\begin{aligned}(fg)(x) &= f(x) \cdot g(x) \\ &= (x^2 + 5)(x^3 - 2) \\ &= x^6 - 2x^2 + 5x^3 - 10 \\ &= x^6 + 5x^3 - 2x^2 - 10\end{aligned}$$

4.R.3 Exercises

Concept Check

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. The distributive property can only be used to multiply a monomial and a polynomial.

2. The product of $(a + b)$ and $(c + d)$ is $ac + bd$.

3. The FOIL method is a way to remember one specific order that the distributive property can be applied.

Practice

Multiply and simplify, if necessary.

4. $-3x^2\left(2x^3+5x\right)$

5. $-4x^3\left(x^5-2x^4+3x\right)$

6. $(x+4)(x-3)$

7. $(y+3)\left(y^2-y+4\right)$

Applications

Solve.

8. ***Advertising:*** A graphic artist is designing a poster to advertise an upcoming event. The only restrictions regarding the poster size is that it must have a length of $3x$ inches and a width of $2x + 5$ inches. Find a simplified expression for the area of the poster.

9. ***Shipping:*** Armon works for a company that ships artwork worldwide. The size of each item varies, but all of the art is on square canvases. Armon's job is to make the wooden shipping crates for each piece of art. In order to protect the artwork, each crate must be 10 inches deep. The crate must also be 10 inches wider and 12 inches taller than the artwork. Letting x represent the length of one side of the artwork, find the volume of the rectangular shipping crate.

Writing & Thinking

10. We have seen how the distributive property is used to multiply polynomials.

Show how the distributive property can be used to find the product

$$\begin{array}{r} 75 \\ \times\, 93 \\ \hline \end{array}$$

(**Hint:** $75 = 70 + 5$ and $93 = 90 + 3$)