

8-2 Reteaching

Multiplying and Factoring

You can multiply a monomial and a trinomial by solving simpler problems. You can use the Distributive Property to make three simpler multiplication problems.

Problem

What is the simplified form of $3x(2x^2 + 4x - 1)$?

Use the Distributive Property to rewrite the problem as three separate multiplication problems.

$$3x(2x^2 + 4x - 1) = (3x \cdot 2x^2) + (3x \cdot 4x) + (3x \cdot (-1))$$

Remember that when you multiply same-base terms containing exponents, you add the exponents.

Solve	$3x \cdot 2x^2 = 6x^3$	Multiply inside the first pair of parentheses.
	$3x \cdot 4x = 12x^2$	Multiply inside the second pair of parentheses.
	$3x \cdot (-1) = -3x$	Multiply inside the third pair of parentheses.
	$6x^3 + 12x^2 - 3x$	Add the products.

Check	$6x^3 \div 2x^2 = 3x$	Check your solution using division.
	$12x^2 \div 4x = 3x$	
	$-3x \div (-1) = 3x$	

Solution: $3x(2x^2 + 4x - 1) = 6x^3 + 12x^2 - 3x$

Exercises

Simplify each product.

1. $4x(2x - 7)$
 $8x^2 - 28x$

2. $3y(3y + 4)$
 $9y^2 + 12y$

3. $2z^2(2z - 3)$
 $4z^3 - 6z^2$

4. $3a(-4a - 6)$
 $-12a^2 - 18a$

5. $6b(3b^2 + 2b - 4)$
 $18b^3 + 12b^2 - 24b$

6. $3c^2(2c^2 - 4c + 3)$
 $6c^4 - 12c^3 + 9c^2$

7. $-2d(4d^2 + 3d - 2)$
 $-8d^3 - 6d^2 + 4d$

8. $5e^2(-3e^2 - 2e - 3)$
 $-15e^4 - 10e^3 - 15e^2$

9. $4f(-3f^3 + 2f^2 + 6)$
 $-12f^4 + 8f^3 + 24f$

8-2 **Reteaching** (continued)

Multiplying and Factoring

To factor a polynomial, find the greatest common factor (GCF) of the coefficients and constants and also the GCF of the variables.

Problem

What is the factored form of $8x^4 + 12x^2 - 16x$?

Solve Find the GCF of the coefficients. Use prime factorization.

$$8 = 2 \cdot 2 \cdot 2$$

$$12 = 2 \cdot 2 \cdot 3$$

$$16 = 2 \cdot 2 \cdot 2 \cdot 2$$

The GCF of the numbers is 4.

Each term has a variable. Remember, $x = x^1$.

The GCF is the least exponent.

The GCF of the variables is x .

The GCF is $4x$.

Combine the GCFs.

Factor out the GCF of each term.

$$4(2 + 3 - 4)$$

Factor the coefficients.

$$4x(2x^3 + 3x - 4)$$

Insert the variables.

Check $4x(2x^3 + 3x - 4) = 8x^4 + 12x^2 - 16x$ Check by multiplying.

Solution: The factored form of $8x^4 + 12x^2 - 16x$ is $4x(2x^3 + 3x - 4)$.

Exercises

Find the GCF of the terms of each polynomial.

10. $12x^2 - 6x$
 $6x$

11. $4y^2 + 12y + 8$
 4

12. $6z^3 + 15z^2 - 9z$
 $3z$

Factor each polynomial.

13. $8a + 10$
 $2(4a + 5)$

14. $12b^2 - 18b$
 $6b(2b - 3)$

15. $9c^3 + 12c^2$
 $3c^2(3c + 4)$

16. $5d^3 - 10d^2 + 20d$
 $5d(d^2 - 2d + 4)$

17. $6e^2 + 10e - 8$
 $2(3e^2 + 5e - 4)$

18. $8g^3 - 24g^2 + 16g$
 $8g(g^2 - 3g + 2)$