



- I. Model Problems.
- II. Practice
- III. Challenge Problems
- VI. Answer Key

### Web Resources

 Monomials

[www.mathwarehouse.com/algebra/polynomial/monomials/how-to-multiply-monomials.php](http://www.mathwarehouse.com/algebra/polynomial/monomials/how-to-multiply-monomials.php)

Polynomials

<http://www.mathwarehouse.com/algebra/polynomial/>

 Multiplying Polynomials

[www.mathwarehouse.com/algebra/polynomial/how-to-multiply-polynomials.php](http://www.mathwarehouse.com/algebra/polynomial/how-to-multiply-polynomials.php)

We Recommend [Meta Calculator- A Free Graphing Calculator](#)



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Graph Paper Maker (free): [www.mathworksheetsgo.com/paper/](http://www.mathworksheetsgo.com/paper/)

## I. Model Problems

A **monomial** is an expression that is a number, variable or product of a number and variables.

Examples of monomials:  $-3$ ,  $4x$ ,  $5xy$ ,  $y^2$

To multiply monomials, multiply all the coefficients and all the variables.

**Example** Simplify  $3x^2(5x^3)$ .

$$= 15x^2x^3$$

Multiply the coefficients.

$$= 15x^5$$

Multiply variables.

**The answer is  $15x^5$ .**

## II. Practice

Simplify.

1.  $2x^2(3x)$

2.  $-9x^7(8x^5)$

3.  $-4x^3(2x^7)$

4.  $10x^5(8x^8)$

5.  $9x^2(3x^3)$

6.  $-4x^2(6x^9)$

7.  $-4x^2(3x^{10})$

8.  $15x^4(3x^9)$

9.  $7x^2y^5(9x^3y)$

10.  $-8x^2y^4(3x^3y^{10})$

11.  $-9x^2y^9(-10x^3y^{10})$

12.  $9x^2y(x^3y^9)$

13.  $5x^2y^9(7x^7y^5)$

14.  $-14x^2(3x^{10}y^3)$

**15.**  $4x^2y(-x^2y)$

**16.**  $5x^2y(x^2yz)$

**17.**  $3x^2yz(2x^2yz^2)$

**18.**  $4xy^2z(3x^2y^2z^3)$

**19.**  $3x^2y^2z(7x^2yz)$

**20.**  $-2xyz(3x^2y^2z^2)$

### III. Challenge Problems

**21.** What is the area of a rectangle with length  $3xy$  inches and width  $(14x^2y)$  inches? Write your answer as an expression in terms of  $x$  and  $y$ .

**22.** Explain why the product  $(3x^{-3})(3x^3)$  is a constant.

**23.**  $3x^a y^b (5x^2 y^t z)$

#### **24. Correct the Error**

There is an error in the student work shown below:

Question: Simplify  $5x^2(3x^3y)$ .

Solution:

$$\begin{aligned} & 5x^2(3x^3y) \\ &= 15x^2x^3y \\ &= 15x^6y \end{aligned}$$

What is the error? Explain how to solve the problem.

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#### IV. Answer Key

1.  $6x^3$

2.  $-72x^{12}$

3.  $-8x^{10}$

4.  $80x^{13}$

5.  $27x^5$

6.  $-24x^{11}$

7.  $-12x^{12}$

8.  $45x^{13}$

9.  $63x^5y^6$

10.  $-24x^5y^{14}$

11.  $90x^5y^{19}$

12.  $9x^5y^{10}$

13.  $35x^9y^{14}$

14.  $-42x^{12}y^3$

15.  $-4x^4y^2$

16.  $5x^4y^2z$

17.  $6x^4y^2z^3$

18.  $12x^3y^4z^4$

19.  $21x^4y^3z^2$

20.  $-6x^3y^3z^3$

21.  $42x^3y^2 \text{ in.}^2$

22.  $(3x^{-3})(3x^3) = 9x^{-3}x^3 = 9x^{-3+3} = 9x^0 = 9 \cdot 1 = 9$ , which is a constant.

23.  $3x^a y^b (5x^2 y^t z) = 15 x^{(2+a)} y^{(b+t)} z$

24. The student incorrectly multiplied exponents instead of adding. The correct answer is  $15x^5y$ .