

# Adding and Subtracting Polynomials

## Algebra 1 • Section 7.2

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 12

### Quick Review and Helpful Hints

Polynomial work is pattern work. Keep like terms together, apply exponent rules only when the bases match, and check factoring by multiplying the factors back together.

▷ **Example:** Factor  $x^2 + 9x + 20$ .

**Work:** Look for two numbers that multiply to 20 and add to 9. The numbers are 4 and 5.

★ **Answer:**  $(x + 4)(x + 5)$

### ◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Add  $(3x^2 + 2x - 5) + (x^2 - 7x + 9)$ . \_\_\_\_\_

6. Classify  $8y^2 - 3y + 1$  by terms. \_\_\_\_\_

2. Subtract  $(5a^2 - 3a + 1) - (2a^2 + a - 8)$ . \_\_\_\_\_

7. Add  $(-2x^2 + 5x) + (9x^2 - x - 3)$ . \_\_\_\_\_

3. Add  $(7m - 4) + (2m + 11)$ . \_\_\_\_\_

8. Subtract  $(x^2 + 4x + 4) - (x^2 - 4x + 4)$ . \_\_\_\_\_

4. Subtract  $(4p^3 + p) - (p^3 - 6p + 2)$ . \_\_\_\_\_

9. Find the leading coefficient of  $-3x^5 + 2x^2 - 1$ . \_\_\_\_\_

5. Find the degree of  $6x^4 - 2x^2 + x - 9$ . \_\_\_\_\_

10. Write in standard form:  $5 - 2x^3 + x$ . \_\_\_\_\_

### ◆ Word Problems

11. A garden side is  $3x + 2$  and another is  $5x - 1$ . Add the expressions. \_\_\_\_\_

12. A company's profit model changes from  $4x^2 + 8x$  to  $x^2 - 3x + 6$  less. Find the difference. \_\_\_\_\_



## Answer Keys

1.  $4x^2 - 5x + 4$

2.  $3a^2 - 4a + 9$

3.  $9m + 7$

4.  $3p^3 + 7p - 2$

5.  $4$

6. Trinomial

7.  $7x^2 + 4x - 3$

8.  $8x$

9.  $-3$

10.  $-2x^3 + x + 5$

11.  $8x + 1$

12.  $3x^2 + 11x - 6$

### Step-by-Step Explanations

1. Group terms that share the same power and add — only matching degrees can combine.
2. That minus sign flips every term in the second group before you combine like terms.
3. Line up the  $m$ -terms together and the plain numbers together, then total each pile.
4. Flip the sign of each term being subtracted, then merge:  $p - (-6p)$  becomes  $7p$ .
5. Degree is just the biggest exponent in the bunch, and that's the 4 on  $x^4$ .
6. Count the pieces separated by plus and minus signs — three of them means trinomial.

7. Pair up matching powers and add their coefficients:  $-2 + 9$  and  $5 - 1$ .
8. The  $x^2$  and constants are identical and cancel, while  $4x - (-4x)$  leaves  $8x$ .
9. Spot the highest-degree term first; the number stuck to it,  $-3$ , is your leading coefficient.
10. Standard form just reorders the terms from biggest exponent down to smallest.
11. Stack the two lengths and combine:  $3x + 5x = 8x$ , and  $2 - 1 = 1$ .
12. Take the original and subtract the change, flipping signs:  $4x^2 - x^2$ ,  $8x - (-3x)$ , and  $-6$ .



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