

Multiplying Polynomials

Algebra 1 • Section 7.3

Name: _____

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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. Multiply $3x(x + 5)$. _____

6. Multiply $(x + 2)(x^2 - 3x + 1)$. _____

2. Multiply $(x + 4)(x + 2)$. _____

7. Multiply $-2m(4m^2 - m + 3)$. _____

3. Multiply $(x - 3)(x + 7)$. _____

8. Multiply $(x - 5)(x - 5)$. _____

4. Multiply $(2x + 1)(x + 5)$. _____

9. Find the product $(2p - 3)(p - 6)$. _____

5. Multiply $(3a - 2)(2a + 4)$. _____

10. Multiply $(y + 8)(y - 1)$. _____

◆ Word Problems

11. A rectangle has length $x + 9$ and width $x + 2$. Write its area. _____

12. A patio has dimensions $2x + 3$ by $x + 4$. Write the area. _____



Answer Keys

1. $3x^2 + 15x$

2. $x^2 + 6x + 8$

3. $x^2 + 4x - 21$

4. $2x^2 + 11x + 5$

5. $6a^2 + 8a - 8$

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

7. $-8m^3 + 2m^2 - 6m$

8. $x^2 - 10x + 25$

9. $2p^2 - 15p + 18$

10. $y^2 + 7y - 8$

11. $x^2 + 11x + 18$

12. $2x^2 + 11x + 12$

Step-by-Step Explanations

1. Hand $3x$ to each term in the parentheses — that's the distributive property at work.
2. FOIL it out; the outer and inner products, $2x$ and $4x$, team up into $6x$.
3. After multiplying every pair, the middles $7x$ and $-3x$ blend into $4x$.
4. Every term in the first binomial shakes hands with every term in the second.
5. You get $6a^2$, $12a$, $-4a$, -8 ; the two middle terms collapse to $8a$.
6. Send x through the trinomial, then 2, and tidy up the like terms.

7. Distribute $-2m$ to all three terms, watching how the negative flips each sign.
8. Multiplying a binomial by itself is squaring it; FOIL still gets you there safely.
9. The inner and outer terms, $-12p$ and $-3p$, combine into the middle $-15p$.
10. Cross-multiply the pairs; $-y$ and $8y$ merge to give the $7y$ in the center.
11. Area means length times width, so multiply those two binomials out.
12. Multiply side by side: $2x^2 + 8x + 3x + 12$, then gather the middle terms.



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