Multiplying monomials by polynomials

To multiply a monomial by a polynomial, multiply the monomial by each term in the polynomial using the procedure for multiplication of exponents. Think distributive property!

\[-2x(3x^2 - 4x + 5)\]

1) \[x(7x^2 + 4)\]  
2) \[-2x^2(-5 - 7x)\]

Multiplying Polynomials

To find the product of two polynomials, multiply each term in the first factor by each term in the other factor. Then combine like terms.

\[(2x - 3)(x^2 - 2x + 1)\]
You can also multiply polynomials using the **Box (also called Table) Method**.

**Ex.**

\[(7x + 2)(5x + 1)\]

\[
\begin{array}{ccc}
7x & 5x & 1 \\
7x & 7x \cdot 5x & 7x \cdot 1 \\
& 35x^2 & 7x \\
2 & 2 \cdot 5x & 2 \cdot 1 \\
& 10x & 2 \\
\end{array}
\]

\[35x^2 + 10x + 7x + 2 \]

\[35x^2 + 17x + 2 \]

**Your Turn**

3) \((7x^2 - 2)(x^2 - 5x - 1)\)

4) \((x^2 - 3x - 1)(-5x + 1)\)

5) \((3x + 4)^2\) -- use box or table

6) \((3x + 2)(3x - 2)\) -- use box or table

7) \((3x + 2)^2\)

8) \((2x^2 + 3x - 1)(5x^2 + 2x + 1)\)
When you see a binomial squared, write it out and then multiply!

9) \((y + 6)^2 = (y + 6)(y + 6)\)  
10) \((4a - 7)^2\)

We can also use the FOIL METHOD to multiply binomials.

\[
\begin{array}{c}
F \\
O \\
I \\
L \\
\end{array}
\]

\((2x + 3)(4x + 1)\) draw your arrows ... make a SMILE!

You Try
Use the FOIL method to multiply the following binomials.

11. \((x - 1)(x - 7)\)  
12. \((x - 1)(x + 6)\)

13. \((x + 2)(x + 2)\)  
14. \((x - 4)(x + 4)\)
9.2 Multiplying Polynomials Homework - You can use the boxes if you want.

1. \( x(x^2 + 9x - 5) \)

2. \( 2x(4x^3 + 3x - 8) \)

3. \( (x - 3)(x + 5) \)

4. \( (x^2 + 2)(x + 11) \)

5. \( (6 + x^2)(4 + x^2) \)

6. \( (2 - x)(1 - x) \)

7. \( (9 - x)(4 + x^3) \)

8. \( (x - 4)(x^2 - 2x + 6) \)
9. \((2x - 3)(4x^2 - 3x + 3)\)

10. \((6x + 2)(2x^3 + x + 1)\)

Multiply using the FOIL METHOD.

11. \((x + 5)(x - 5)\)

12. \((3x + 2)(3x - 2)\)

13. \((x + 20)(\quad)\)

14. \((x + 3)(\quad)\)

15. \((y + 6)^2\)

16. \((4a - 7)^2\)