Multiplying Larger Polynomials

To multiply larger polynomials, we first need to look at exactly what the FOIL method does. It takes the two **first** terms and multiplies them, then takes the two **outside** terms and multiplies them, then takes the two **inside** terms and multiplies them, then takes the two **last** terms and multiplies them:

$$(a+b)(c+d)$$

$$=ac+ad+bc+bc$$

Basically, what's going on is that each term in the first polynomial is being matched up with every term in the second polynomial. The a gets multiplied by the c and d, and then the b gets multiplied by the c and d.

So, we could write:

$$(a+b)(c+d)$$

$$=a(c+d)+b(c+d)$$

$$=ac+ad+bc+bd$$

And this is exactly how we multiply larger polynomials. For example:

$$(a+b+c)(x+y+z)$$

$$=a(x+y+z)+b(x+y+z)+c(x+y+z)$$

$$=ax+ay+az+bx+by+bz+cx+cy+cz$$

Now, try expanding these polynomials on your own.

1. $(2z+3x)(x+3x^2-y)=$

2. $(4x-3x^2)(1+2y-4x)=$

3. $(5-3z)(3x^2-x+2xy)=$

4. $(x+y-1)(2x^2-5yx+2)=$

5. $(z^2x-5x)(3x+4x^2-7xz^2+1)=$

6. $(-1-x^2+3y^2x+z)(2x+4)=$

7. $(2kx+4k-k^3)(k^2+3kx-5)=$

8. $(xyz-x^2y+3x)(yz+6+2xy)=$

9. $(3xy+x^2-2y)(2x-1-8y+x^2)=$

10. $(-2x+y+yz-2)(3zx+4-x^2-2xy^3)=$