Math in Living C O L O R !!

1.08 Polynomials

Intermediate Algebra: One Step at a Time, **Pages 96 - 100: #25, 26.**

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See Section 1.08 with explanations, examples, and exercises, coming soon!

P. 100 # 25. $[(3x+8y)-7][(3x+8y)+7]$

Solution: There are two ways to approach this exercise.

The first method is to treat this as a product of two binomials, as the following colors indicate. Do you see the F O I L process below?

$$[(3x+8y)-7]\bullet[(3x+8y)+7]$$
$$\text{F} \qquad \text{O} \qquad \text{I} \qquad \text{L}$$
$$(3x+8y)^2+7(3x+8y)-7(3x+8y)-49$$

Notice that you can square out the first part, the middle terms subtract out, and this leaves:

$$9x^2+48xy+64y^2-49$$

The second method is to drop the parentheses inside, and change the brackets to parentheses. Now, you can treat this as a product of two trinomials, as the following colors indicate. Then, multiply the first times everything in the second parentheses, the second times everything in the second parentheses, and the third times everything in the second parentheses.

$$[(3x+8y)-7][(3x+8y)+7]$$
$$(3x+8y-7)(3x+8y+7)$$

$$\begin{array}{lrcl}
\text{First:} & 3x(3x+8y+7) & = & 9x^2+24xy \quad +21x \\
\text{Second:} & +8y(3x+8y+7) & & +24xy+64y^2 \quad +56y \\
\text{Third:} & -7(3x+8y+7) & & \underline{\qquad\qquad\qquad\qquad\qquad -21x-56y-49} \\
\text{Finally, combine like terms :} & & = & 9x^2+48xy+64y^2 \quad -\ 49
\end{array}$$

Compare this answer to the answer that resulted by the first method.
They are the same (of course!)

P. 100 # 26. $(x+y)^3$

Solution: Of course you realize this means: $(x+y)(x+y)(x+y)$.

In math, everything is "binary." That is, if you have three numbers to be multiplied, you must multiply two together first, and then multiply that product times the third number. It does not matter in what order you perform the multiplications. It might be convenient to multiply the second two factprs together (by F O I L) first, like this:

$$(x+y)(x+y)(x+y)$$

$$(x+y)(x^2+2xy+y^2)$$

Now, you can treat this as a product of a binomial times a trinomial, as the following colors indicate. Multiply the first times everything in the second parentheses, the second times everything in the second parentheses.

$$(x+y)(x^2+2xy+y^2)$$

First: $x(x^2+2xy+y^2) = x^3+2x^2y + xy^2$

Second: $+y(x^2+2xy+y^2) \quad +x^2y+2xy^2 + y^3$

Finally, combine like terms : $= x^3+3x^2y+3xy^2+y^3$