Where Are the Like Terms?

We've already seen that standard and factored forms of equations reveal different properties about the functions they represent. While expanding the factors of a quadratic is fairly simple, working with higher degree polynomials can be a bit trickier. Let's see if we can identify and make use of any patterns.

1. Use the area model to expand $(x + y)^2$. Write your simplified answer on the right.

	x	y
x		
y		

2. Expand $(x + y)^3$ using your result from question 1. Write your simplified answer on the right.

x			
y			

3. a. Expand $(x + y)^4$ using your result from question 2. Write your simplified answer on the right.

x				
y				

   b. What do you notice about the exponents on x and y in each term?

   c. What do you notice about the coefficients of the terms in the expansion?

4. Use highlighters or colored pencils to show the like terms in each expansion.
5. Which terms in the expansion do not have any like terms? Why?

6. How are the coefficients in the expansion of $(x + y)^4$ related to the coefficients of $(x + y)^3$? Why does happen?

7. Can you predict what the expansion of $(x + y)^5$ will be without distributing all the terms?

8. The expansion of $(x + y)^6$ is $x^6 + 6x^5y + 15x^4y^2 + 20x^3y^3 + 15x^2y^4 + 6xy^5 + y^6$.
   a. Write the first 4 terms of the expansion of $(x + y)^7$.

   b. What other term in the expansion has the same coefficient as the x^5y^2 term?

Lesson 2.9 – The Binomial Theorem

QuickNotes

Check Your Understanding

1. Write $y = (x - 4)^3$ in standard form.

2. Let $f(x) = (2x - 5)(x + 3)^4(x - 2)$.

    a. What is the degree of the polynomial?

    b. What is the leading coefficient of the polynomial?

    c. What is the constant term of the polynomial?

3. Kelly and Rowan are asked to write $f(x) = (x + 2)^4$ in standard form.
   Kelly wrote $f(x) = x^4 + 4x^3 + 6x^2 + 4x + 16$.
   Rowan wrote $f(x) = x^4 + 8x^3 + 24x^2 + 32x + 16$.
   Which of these students, if any, is correct? Explain.

4. In the expansion of $(x + 2y)^5$ there is a term that looks like $\square xy^4$. Determine what number goes in the box.

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