Name: ______________________________ Date: ______________________________

6.3 Pascal's Triangle and Expanding Binomial Powers

BLM 6–6

1. Expand each expression, using Pascal's triangle.

a) $(x + 4)^3$
b) $(1 - 2x)^4$
c) $(3x + y)^2$
d) $(x - 5)^5$

2. What is the sum of the values in each row of Pascal's triangle?

a) 5th row
b) 10th row
c) 13th row

3. How many terms will there be in each expansion?

a) $(3 + 2n)^6$
b) $(x - 7)^{11}$
c) $(3x - 5y)^{15}$
d) $(2x + 5)^{12}$

4. Use patterns in the terms of the expansion to determine the value of w in each term of $(2a + b)^8$.

a) wa^8
b) $128wa^7b$
c) $448a^3b^w$
d) $224a^2b^{2w}$

5. In the expansion of $(a + x)^8$, the coefficient of x^7 is 24. Determine the value of a.

6. A diagonal row of Pascal's triangle has entries of 1, 3, 6, 10, 15, …

a) Write out Pascal's triangle until these values have been included.
b) Write this pattern as a recursion formula.
c) Use this formula to determine the next three values in the pattern.
d) Extend Pascal's triangle to verify these values.

7. In each row of a new version of Pascal's triangle, alternate the signs of each entry, starting with the first entry as a positive quantity, as follows:

$$\begin{array}{ccccccc} & & & 1 & & & \\ & & 1 & & -1 & & \\ & 1 & & -2 & & 1 & \\ 1 & & -3 & & 3 & & -1 \end{array}$$

a) Determine the sum of each row for this version of Pascal's triangle. Complete the following table for the first six rows.

Row	Sum
0	1
1	0
2	
3	
4	
5	
6	

b) Use this pattern to predict the sum of row 11 in this version of Pascal's triangle.
c) Extend your triangle to include row 11 to check your prediction.

8. Using the first four rows of Pascal's triangle (with $n = 1$ representing the first row), show that the sum of all entries down to, and including, the nth row is given by the formula $S_n = 2^n - 1$.

978-0-07-000985-1