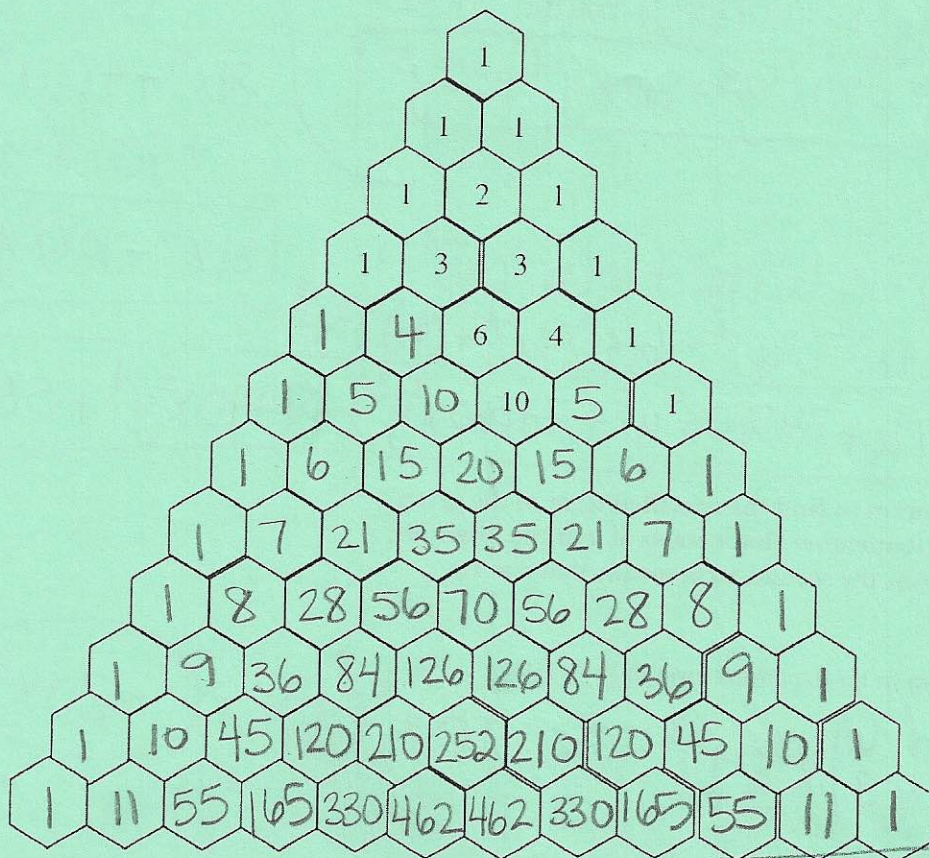


Finish filling in Pascal's Triangle:



Use the Binomial Theorem to expand each power of a binomial.

3.  $(x + 6)^3$

$$\binom{3}{0}x^3(6)^0 + \binom{3}{1}x^2(6)^1 + \binom{3}{2}x(6)^2 + \binom{3}{3}x^0(6)^3$$

$$x^3 + 3x^2 \cdot 6 + 3x \cdot 36 + 216$$

$$\boxed{x^3 + 18x^2 + 108x + 216}$$

7.  $(3x + 4)^5$

$$\binom{5}{0}(3x)^5(4)^0 + \binom{5}{1}(3x)^4(4)^1 + \binom{5}{2}(3x)^3(4)^2 + \binom{5}{3}(3x)^2(4)^3$$

$$+ \binom{5}{4}(3x)^1(4)^4 + \binom{5}{5}(3x)^0(4)^5$$

$$243x^5 + 5(81x^4)(4) + 10(27x^3)(16) + 10(9x^2)(64)$$

$$+ 5(3x)(256) + 1024$$

$$\boxed{243x^5 + 1620x^4 + 4320x^3 + 5760x^2 + 3840x + 1024}$$

4.  $(x - 5)^4$

$$\binom{4}{0}x^4(-5)^0 + \binom{4}{1}x^3(-5)^1 + \binom{4}{2}x^2(-5)^2 + \binom{4}{3}x^1(-5)^3$$

$$x^4 + 4x^3(-5) + 6x^2 \cdot 25 + 4x(-125) + 625$$

8.  $(2x - 3)^3$

$$\binom{3}{0}(2x)^3(-3)^0 + \binom{3}{1}(2x)^2(-3)^1 + \binom{3}{2}(2x)^1(-3)^2 + \binom{3}{3}(2x)^0(-3)^3$$

$$\boxed{8x^3 - 36x^2 + 54x - 27}$$

$$\boxed{x^4 - 20x^3 + 150x^2 - 500x + 625}$$



9.  $(x + 2y)^5$

$$\binom{5}{0}x^5(2y)^0 + \binom{5}{1}x^4(2y)^1 + \binom{5}{2}x^3(2y)^2 + \binom{5}{3}x^2(2y)^3 + \binom{5}{4}x(2y)^4 + \binom{5}{5}x^0(2y)^5$$

$$x^5 + 5x^4 \cdot 2y + 10x^3(4y^2) + 10x^2(8y^3) + 5x(16y^4) + 32y^5$$

$$x^5 + 10x^4y + 40x^3y^2 + 80x^2y^3 + 80xy^4 + 32y^5$$

10.  $(3x - y)^4$

$$\binom{4}{0}(3x)^4(-y)^0 + \binom{4}{1}(3x)^3(-y)^1 + \binom{4}{2}(3x)^2(-y)^2 + \binom{4}{3}(3x)^1(-y)^3 + \binom{4}{4}(3x)^0(-y)^4$$

$$81x^4 + 4(27x^3)(-y) + 6(9x^2)y^2 + 4(3x)(-y^3) + y^4$$

14.  $(4x + 3y)^6$

$$1(4x)^6(3y)^0 + 6(4x)^5(3y)^1 + 15(4x)^4(3y)^2 + 20(4x)^3(3y)^3 + 15(4x)^2(3y)^4 + 6(4x)(3y)^5 + (4x)^0(3y)^6$$

$$81x^4 - 108x^3y + 63x^2y^2 - 12xy^3 + y^4$$

$$4096x^6 + 18432x^5y + 34560x^4y^2 + 34560x^3y^3 + 19440x^2y^4 + 5832xy^5 + 729y^6$$

Use the Binomial Theorem to find the specified term of the given power of a binomial. (Remember that  $r$  starts at 0 in the Binomial Theorem, so finding, say, the second term means that  $r = 1$ .)

15. Find the fourth term in the expanded form of  $(x - 1)^6$ .

$$\binom{6}{3}x^3(-1)^3 = 20x^3(-1) = -20x^3$$

17. Find the third term in the expanded form of  $(3x - 2y)^5$ .

$$\binom{5}{3}(3x^3)(-2y)^2 = 10 \cdot 27x^3 \cdot 4y^2 = 1080x^3y^2$$

22. Explain the Error Two students used binomial expansion to expand  $(a + b)^2$ .

Which answer is incorrect? Identify the error.

A

$$(a + b)^2 \begin{matrix} \swarrow a^1 \\ \searrow b^1 \end{matrix}$$

$$1a^2b^0 + 2a^2b^1 + 1a^0b^2$$

$$a^2 + 2ab + b^2$$

B

$$(a + b)^2 \begin{matrix} b^0 \\ b^1 \\ b^2 \end{matrix}$$

$$1a^2b^2 + 2a^1b^1 + 1a^0b^0$$

$$a^2b^2 + 2ab + 1$$

$$a^2 + 2ab + b^2$$

Review

State the transformations for the following functions.

Given the transformations, write a function.

c. absolute value: vertical stretch by 2, reflection over the x-axis, shifted up 4

$$y = -2|x| + 4$$

d. quadratic: vertical compression by 1/3, shifted down 2

$$y = \frac{1}{3}x^2 - 2$$

a.  $f(x) = -3(x+1)^3$

Vertical Stretch 3  
Vertical Flip  
Left 1 unit

b.  $g(x) = \sqrt{x-4} + 3$

Right 4 units  
Up 3 units