

# Homework 4.6: The Expansion

Name: \_\_\_\_\_

Math 3

Directions: Expand and simplify each of the following. Use Pascal's Triangle to help!

1.  $(1 + 3x)^2$

$$1(1)^2(3x)^0 + 2(1)^1(3x)^1 + 1(1)^0(3x)^2$$

$$1 + 2(1)(3x) + 1(9x^2)$$

$$1 + 6x + 9x^2$$

$$\boxed{9x^2 + 6x + 1}$$

2.  $(2 + x)^3$

$$1(2)^3(x)^0 + 3(2)^2(x)^1 + 3(2)(x)^2 + 1(2)^0(x)^3$$

$$1(8) + 3(4)(x) + 3(2)(x^2) + 1(x^3)$$

$$8 + 12x + 6x^2 + x^3$$

$$\boxed{x^3 + 6x^2 + 12x + 8}$$

3.  $(1 - x)^3$

$$1(1)^3(-x)^0 + 3(1)^2(-x)^1 + 3(1)^1(-x)^2 + 1(1)^0(-x)^3$$

$$1 + 3(1)(-x) + 3(1)(x^2) + 1(-x^3)$$

$$1 - 3x + 3x^2 - x^3$$

$$\boxed{-x^3 + 3x^2 - 3x + 1}$$

4.  $(1 - 5x)^5$

$$1(1)^5(-5x)^0 + 5(1)^4(-5x)^1 + 10(1)^3(-5x)^2 + 10(1)^2(-5x)^3 + 5(1)(-5x)^4 + 1(1)^0(-5x)^5$$

$$1 + 5(-5x) + 10(25x^2) + 10(-125x^3) + 5(625x^4) + 1(-3125x^5)$$

$$1 - 25x + 250x^2 - 1250x^3 + 3125x^4 - 3125x^5$$

$$\boxed{-3125x^5 + 3125x^4 - 1250x^3 + 250x^2 - 25x + 1}$$

5.  $(x + 6)^3$

$$1(x)^3(6)^0 + 3(x)^2(6)^1 + 3(x)(6)^2 + 1(x)^0(6)^3$$

$$x^3 + 3(x^2)(6) + 3(x)(36) + 1(216)$$

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

6.  $(a - b)^7$

$$\boxed{a^7 - 7a^6b + 21a^5b^2 - 35a^4b^3 + 35a^3b^4 - 21a^2b^5 + 7ab^6 - b^7}$$