

## Warm-up

Grab a chromebook



Log onto canvas through ncedcloud

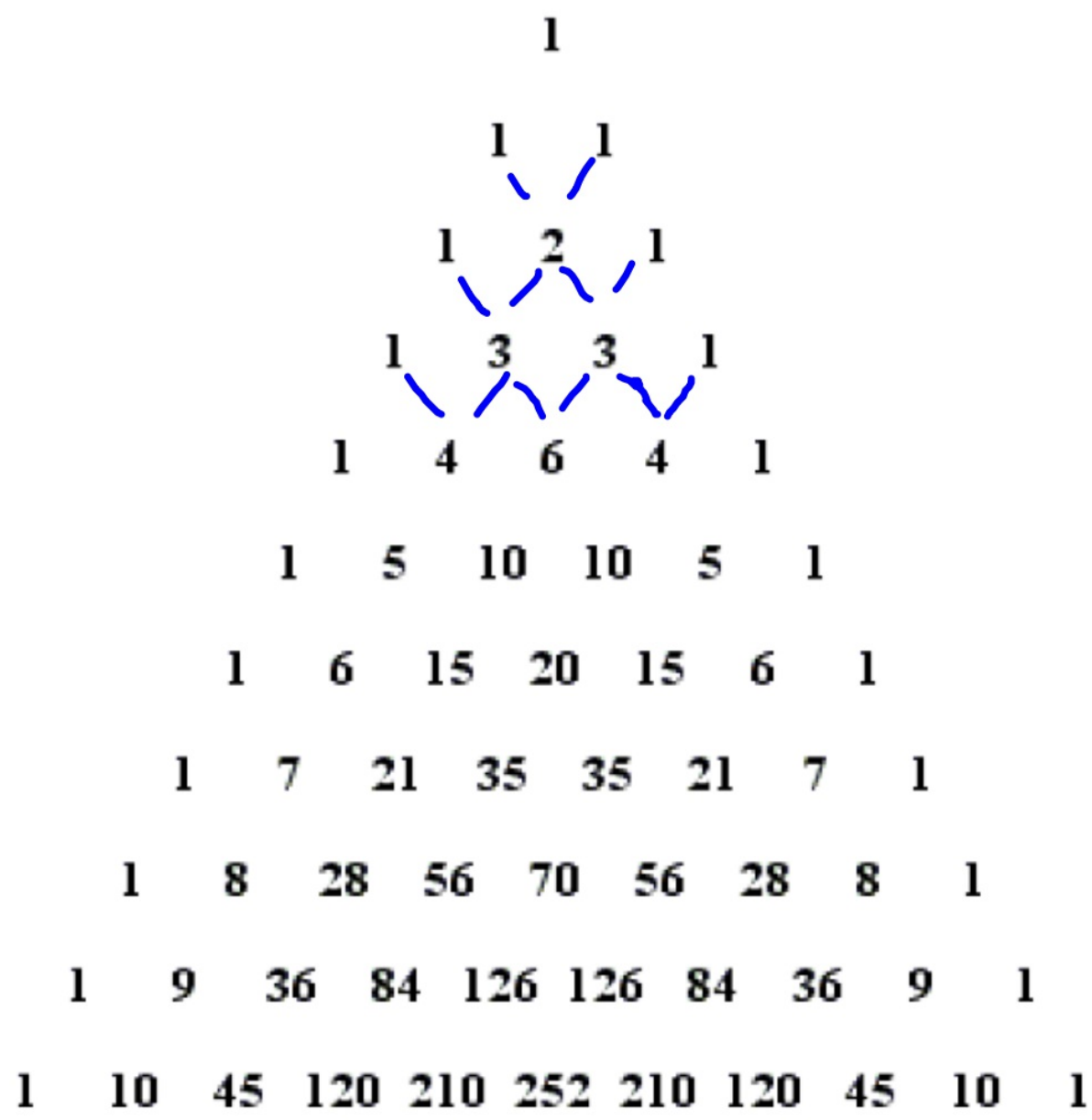
Finish the PDF and CDF assignment

Click on Discussions and respond to the questions about 1.9 Binomial Expansion



## 1.9 Binomial Expansion

In mathematics, **Pascal's triangle** is a triangular array of the binomial coefficients. In much of the Western world it is named after French mathematician Blaise Pascal, although other mathematicians studied it centuries before him in India, Iran, China, Germany, and Italy.



.

The **binomial theorem** describes the algebraic expansion of powers of a binomial, hence it is referred to as **binomial expansion**. According to the theorem, it is possible to expand the power  $(x + y)^n$  into a sum involving terms of the form  $ax^b y^c$ , where the exponents  $b$  and  $c$  are nonnegative integers with  $b + c = n$ , and the coefficient  $a$  of each term is a specific positive integer depending on  $n$  and  $b$ . When an exponent is zero, the corresponding power is usually omitted from the term

## Ex 1: Expand the following binomials

$$(x + y)^0 =$$

$$(x + y)^1 =$$

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

$$(x + y)^3 =$$

$$(x + y)^4 =$$

$$(x + y)^5 =$$

$$(x + y)^6 =$$

$$(x + y)^7 =$$

$$\begin{aligned} & 1 \\ & 1x + 1y \\ & 1x^2 + 2xy + 1y^2 \\ & 1x^3 + 3x^2y + 3xy^2 + 1y^3 \\ & 1x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + 1y^4 \\ & 1x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 + 5xy^4 + 1y^5 \\ & 1x^6 + 6x^5y + 15x^4y^2 + 20x^3y^3 + 15x^2y^4 + 6xy^5 + 1y^6 \\ & 1x^7 + 7x^6y + 21x^5y^2 + 35x^4y^3 + 35x^3y^4 + 21x^2y^5 + 7xy^6 + 1y^7 \end{aligned}$$

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

Ex. 2: Expand the binomial.

$$(3a + 5b)^3 =$$

$$\begin{aligned} & 1(3a)^3 + 3(3a)^2(5b) + 3(3a)(5b)^2 + (5b)^3 \\ &= 27a^3 + 3 \cdot 9 \cdot 5a^2b + 3 \cdot 3 \cdot 25ab^2 + 125b^3 \\ &= 27a^3 + 135a^2b + 225ab^2 + 125b^3 \end{aligned}$$

a) Expand the binomial.

$$(2a + 3b)^6 = (2a)^6 \quad (2a)^5(3b)^1 \quad (2a)^4(3b)^2 \quad (2a)^3(3b)^3 \quad (2a)^2(3b)^4$$

b) What is the middle term?

c) What is the 6th term?

Ex. 2: Expand the binomial

$$(3a + 5b)^3 =$$

Ex. 3:a) Expand the binomial.

$$(2a - 3b)^6 =$$

b) What is the middle term?

c) What is the 6th term?