480/81
Day 3
Notes

# 7.3 PASCAL'S TRIANGLE

**OBJECTIVES**: 1) Use Pascal's Triangle to complete binomial expansions.

## BINOMIAL EXPANSIONS

Find the product.

$(a+b)^0 = 1$

$(a+b)^1 = a+b$

$(a+b)^2 = a^2+2ab+b^2$

$(a+b)^3 = a^3+3a^2b+3ab^2+b^3$

$(a+b)^4 = a^4+4a^3b+6a^2b^2+4ab^3+b^4$

$(a+b)^5 = a^5+5a^4b+10a^3b^2+10a^2b^3+5ab^4+b^5$

## PATTERNS IN EXPANSION OF $(A+B)^N$:

- There are n + 1 terms.
- The expansion begins with $a^n$ and ends with $b^n$
- The sum of the exponents in each term is n.
- The exponents of a decrease by 1 from term to term.
- The exponents of b increase by 1 from term to term.
- When n is even, the coefficients are symmetric about the middle term.
- When n is odd. the coefficients are symmetric about the two middle terms.

## PASCAL'S TRIANGLE

1

1 1

1 2 1

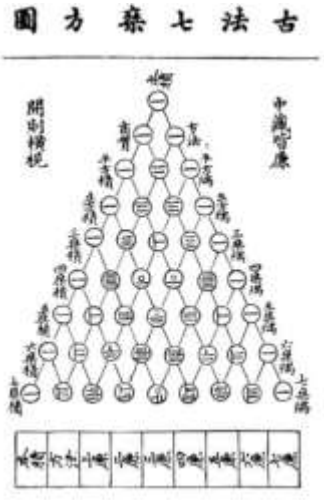
1 3 3 1

1 4 6 4 1

1 5 10 10 5 1

1 6 15 20 15 6 1

The triangle was studied by Blaise Pascal (born 1623), although it had been described centuries earlier by Chinese mathematician Yanghui (about 500 years earlier, in fact) and the Persian astronomer-poet Omar Khayyám. It is therefore known as the Yanghui triangle in China.



**Expand the binomial using Pascal's Triangle.**

1) $(x-2)^4$

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

3) $(2x-y)^5$

**YOU TRY! DO THIS PLEEEEEEEEEEAAAAAASE:**

4) $(2x-5)^5$

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

$32x^5 - 400x^4 + 2000x^3 - 5000x^2 + 6250x - 3125$