Warm-up 4/6/17
Find each permutation and combination below.

1. ${}_7P_3 = \frac{7!}{4!} = 7 \cdot 6 \cdot 5 = 210$

2. ${}_8C_2 = \frac{8!}{2!\,6!} = \frac{\overset{4}{\cancel{8}} \cdot 7}{\cancel{2}} = 28$

$$(a+b)^0 = 1$$

$$(a+b)^1 = 1a^1b^0 + 1a^0b^1 = a + b$$

$$(a+b)^2 = 1a^2b^0 + 2a^1b^1 + 1a^0b^2 = a^2 + 2ab + b^2$$

$$(a+b)^3 = 1a^3b^0 + 3a^2b^1 + 3a^1b^2 + 1a^0b^3$$

$$(a+b)^4 = 1a^4b^0 + 4a^3b^1 + 6a^2b^2 + 4a^1b^3 + 1a^0b^4$$

Pascal's Triangle

$1 \longrightarrow {}_0C_0$

$1 \quad 1 \longrightarrow {}_1C_0 \quad {}_1C_1$

$1 \quad 2 \quad 1 \longrightarrow {}_2C_0 \quad {}_2C_1 \quad {}_2C_2$

$1 \quad 3 \quad 3 \quad 1 \longrightarrow {}_3C_0 \quad {}_3C_1 \quad {}_3C_2 \quad {}_3C_3$

$1 \quad 4 \quad 6 \quad 4 \quad 1 \longrightarrow {}_4C_0 \quad {}_4C_1 \quad {}_4C_2 \quad {}_4C_3 \quad {}_4C_4$

Expand each binomial.

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

2. $(2x - y^2)^4$

$= {}_4C_0(2x)^4 + {}_4C_1(2x)^3(-y^2)^1 + {}_4C_2(2x)^2(-y^2)^2 + {}_4C_3(2x)(-y^2)^3$

$+ {}_4C_4(-y^2)^4$

$= 16x^4 - 32x^3y^2 + 24x^2y^4 - 8xy^6 + y^8$

Recursion Formula for Pascal's Triangle

$$\binom{n}{r} = \binom{n-1}{r-1} + \binom{n-1}{r}$$

$${}_nC_r = {}_{n-1}C_{r-1} + {}_{n-1}C_r$$

Assignment: Pg. 656 #1-14e, 24, 38, 39