

(17) $(x+2)^4$

$(x+y)^4 =$

$$x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$$

$x^4 + 4x^3(2) + 6x^2(2)^2 + 4x(2)^3 + 2^4$

$$x^4 + 8x^3 + 24x^2 + 32x + 16$$

8-6 Counting Principles

Permutation - a way of selecting n items taken r at a time
order matters!

$${}_n P_r = \frac{n!}{(n-r)!}$$

Combination - a way of selecting n items taken r at a time
order doesn't matter!

$${}_n C_r = \frac{n!}{(n-r)!r!}$$

Ex 1 How many ways can we select a president, vice president, and secretary from our class?

$${}_{28}P_3 = \frac{28!}{(25)!} = 28 \cdot 27 \cdot 26$$

$$= 19,656$$

$${}_{28}P_3$$

Ex 2 How many ways can we select three class representatives?

$${}_{28}C_3 = \frac{28!}{(25)! 3!} = \frac{28 \cdot 27 \cdot 26}{6}$$

$${}_{28}C_3$$

$$= 3,276$$

Ex 3 How many different five card poker hands are possible?

$$52 \binom{\quad}{5}$$

$$2,598,960$$

Ex 4 How many ways can the letters in the word "CALCULUS" be arranged?

$$\frac{8!}{(2!2!2!)} = 5040$$

Ex 5 How many ways can the letters in the word "MISSISSIPPI" be arranged?

$$\frac{11!}{4!4!2!} = 34,650$$

Homework
p.635
#23-35, 43-56