

Warm-up

students have appeared in a test in which the top three will get a prize. How many possible there to get the prize winners?

want to change her password which is ELLIE9 but with same letters and number. In how many ways she can do that?

4. Four marbles are drawn at random from a bag containing five orange marbles and seven brown marbles. What is the probability that

(a) all four marbles are orange?

(b) all four marbles are brown?

5. In Hillcross High School there are 300 freshmen, 280 sophomores, 275 juniors, and 256 seniors. What is the probability that a student selected at random will be

(a) a freshman?

(b) a sophomore?

(c) a junior?

(d) a senior?

6. In how many ways can the offices of president, secretary and treasurer be filled from a group of nine people?

7. In how many ways can five girls be arranged in a straight line?

8. A theater has five entrances. In how many ways can you enter and leave by a different entrance?

$$5P_2$$

9. How many different permutations can be made using all the letters of the word dinner?

10. How many distinct permutations can be made using all the letters of the word

(a) challenge

(b) banana

(c) staff

(d) tuition

(e) assassination

(f) committee?

$$\frac{3P_3}{3! \cdot 4! \cdot 2! \cdot 2!}$$

ursday 2/2/17 1.4 Combinations

Key Concept: Combination - order of the objects in the arrangement does not matter

n objects taken r at a time

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



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1. Evaluate ${}_{60}C_{57}$.

$$\frac{60!}{(60-57)!57!} = \frac{60 \cdot 59 \cdot 58 \cdot \cancel{57!}}{(60-57)! \cancel{57!}}$$
$$= \frac{60 \cdot 59 \cdot 58}{3!}$$

2. Evaluate ${}_{21}C_{17}$.

$$= \frac{21!}{(21-17)!17!} = \frac{21 \cdot 20 \cdot 19 \cdot 18 \cdot \cancel{17!}}{4! \cancel{17!}}$$
$$= 5985$$

Examples

order does not matter

3. In how many ways can a committee of four be chosen from ten people?

$${}_{10}C_4 = 210$$

4. How many combinations can be made from seven objects, using them five at a time?

$${}_7C_5 = 21$$

5. There are 3 freshmen, 2 sophomores, 4 juniors, and 4 seniors to choose from to form a committee. How many ways can someone choose 2 from each class for the committee?

$3C_2 \cdot 2C_2 \cdot 4C_2 \cdot 4C_2$ order does not matter

$3 \cdot 1 \cdot 6 \cdot 6 = 108$

$6 \cdot 5 \cdot 4 \cdot 3 =$

6. There are 12 boys and 14 girls in Mrs. Schultzkie's math class. Find the number of ways Mrs. Schultzkie can select a team of ~~3~~ students from the class to work on a group project. The team is to consist of 1 girl and 2 boys.

$$\begin{array}{l} \text{Boys} \\ 12C2 \end{array} \cdot \begin{array}{l} \text{Girls} \\ 14C1 \end{array} = \boxed{924}$$

7. From 32 dancers in a club, 6 dancers are to be selected to take a performance. In how many different ways can this group of 6 dancers be selected?

$${}_{32}C_6 = 906,192$$

1. Permutation - order matters

2. Combination order does not matter

3. Repetitions? divide by $(!)$ of repetitions

n-Up

Two dice are thrown, what is the probability of getting a sum of five?

You are going through the drive-through at Cook Out and you are ordering a tray. How many different trays could you purchase? (You can double up on sides!)



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