

Warm-up

1) How many ways can 8 friends circle around a campfire?

$$\frac{8!}{8}$$

5,040

2) A PE class is doing inventory. They line up 5 footballs, 6 rackets and 8 basketballs. How many ways could they be arranged?

$$\frac{19!}{5!6!8!}$$

34,918,884

3) How many ways could a family of 5 sit around a table for dinner with one seat by the window?

$$5!$$

120

For problems 1 – 3, state whether the events are independent or dependent.

- 1) Flipping a coin 2) Choosing 1st, 2nd and 3rd at a dog show 3) Making a seating chart

Ind.

Dep.

Dep.

- 4) Kevin is picking his outfit. He is deciding between 6 shirts, 3 pants and 4 hats. How many different outfits are possible?

$$\underline{6} \cdot \underline{3} \cdot \underline{4} = 72$$

- 5) Jill is selecting classes for her college schedule. She needs to choose two humanities courses, one math course, two science courses, and three electives. He can choose between 6 humanities, 3 mathematics, 5 sciences and 8 electives. How many schedule possibilities does Jill have?

$$\underline{6C_2} \cdot \underline{3C_1} \cdot \underline{5C_2} \cdot \underline{8C_3} = 25,200$$

- 6) How many codes consisting of two letters followed by 4 digits can be made if no digit can be used more than once?

$$\underline{26} \cdot \underline{26} \cdot \underline{10} \cdot \underline{9} \cdot \underline{8} \cdot \underline{7} = 3,407,040$$

- 7) Evaluate $5!$

120

- 8) Evaluate ${}_{10}P_4$

5,040

- 9) Evaluate ${}_{6}C_3$

20

Determine how many ways each situation could be done;

10) 8 students standing in line to get lunch

$${}^8P_8 = 8! \quad 40,320$$

11) 8 students gathered around a conference table

$$\frac{8!}{8} \quad 5,040$$

12) Selecting 4 students from 10 to work in a group

$${}^{10}C_4 \quad 210$$

13) Selecting those 4 students from 10 to work on specific problems on the board

$${}^{10}P_4 \quad 5,040$$

How many ways can the letters in each word be rearranged? Show work.

14) chairs

720

$6!$

15) calculus

5,040

$\frac{8!}{2!2!2!}$

16) treasurers

151,200

$\frac{10!}{3!2!2!}$

A county ballot has 30 names on it; 11 are male, and 19 are female.

17) How many ways could 10 members be elected if all candidates have an equal chance?

$${}_{30}C_{10} \quad 30,045,015$$

18) How many ways could a president, a vice president, a treasurer, and a secretary be elected from the 30?

$${}_{30}P_4 \quad 657,720$$

19) How many ways could 5 males and 5 females be elected?

$${}_{11}C_5 \cdot {}_{19}C_5 \quad 5,372,136$$

20) A group of 10 friends are gathered around a campfire, in how many ways could they be arranged?

$$\frac{10!}{10} \quad 362,880$$

21) A family of 8 is gathered around a circular table for dinner, in how many ways could the family sit around the table with one person sitting nearest the window?

$$8! \quad 40,320$$



Extra Credit Questions

22) A committee is being formed from 12 volunteers. How many more ways could they select a committee with 4 set roles than they could a committee of 6 with the same role?

10,956

23) There is a fruit stand with 8 watermelons, 12 apples and 15 peaches. How many different selections are possible if you pick out 2 watermelons, 4 apples and 5 peaches?

41,621,580

24) Jerry's basketball team has 9 guys on it and Gary's has 11. How many unique match ups would be possible for them picking the starting 5 players, including their position?

$${}^9P_5 \cdot {}^{11}P_5$$

838,252,800

25) Tom is picking 4 movies to take on vacation. He has 8 action and 10 comedies to pick from. How many ways could he select 4 movies with at least 3 comedies?

960

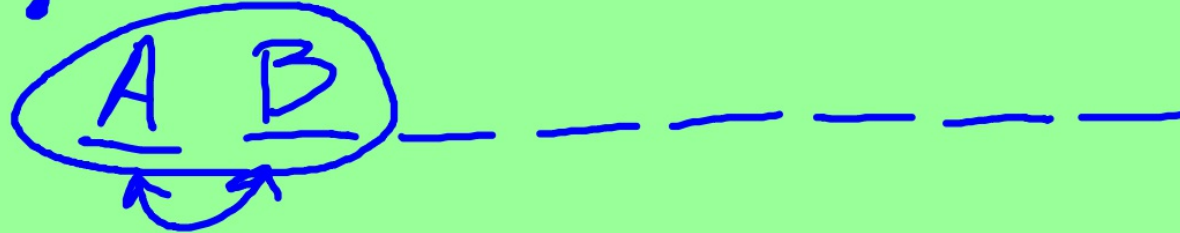
210

1,170

$${}^{10}C_3 \cdot {}^8C_1 + {}^{10}C_4$$

More Challenging Problems

1) Eight friends are getting in line for movie tickets. Two of them refuse to separate. How many ways could they line up?

$${}^8P_8 = 8! \quad \text{B A}$$


$$7! = 5040$$

x 2

$$\boxed{10,080}$$

2) There are 8 seniors, 6 juniors, 5 sophomores and 5 freshmen trying out for 10 spots on the soccer team. If the team is going to have exactly 5 seniors, how many unique teams are possible?

$$\frac{{}^8C_5}{\text{Seniors}} \cdot \frac{{}^{16}C_5}{\text{Not Seniors}} = \boxed{244,608}$$

3) A teacher is making a group of 5 in class. The class has 12 boys and 10 girls. If the group will have at least 3 boys, how many groups are possible?

(3B) $\frac{{}^{12}C_3 \cdot {}^{10}C_2}{=} = 9,900$

(4B) $\frac{{}^{12}C_4 \cdot {}^{10}C_1}{=} = 4,950$

(5B) $\frac{{}^{12}C_5}{=} = 792$

$15,642$

4) Pam, Toby and Oscar read through 5 books. They each ranked their top 3 from the books. How many different rankings are possible between the 3 of them?

$$\begin{array}{c} \frac{{}_5P_3}{} \\ \text{Pam} \end{array} \quad \begin{array}{c} \frac{{}_5P_3}{} \\ \text{Toby} \end{array} \quad \begin{array}{c} \frac{{}_5P_3}{} \\ \text{Oscar} \end{array} = \boxed{216,000}$$

$60 \cdot 60 \cdot 60 = \boxed{216,000}$