

Homework Answers: Practice Worksheet Ch.12

1.  $7/15$  or  $14/30$

10)  $3/45$

2.  $350/792$

12)  $1260$

3. A

\* 13)  $350/924$

~~4. 0~~

14 a.  $35$

5.  $20/126$  or  $10/63$

b.  $4$

c.  $7/35$

d.  $8/35$

## Practice Worksheet Chapter 12

or  $\rightarrow +$   
and  $\rightarrow \times$

1. A jar contains 4 green marbles and 2 white marbles. If two marbles are selected at random with no replacement, what is the probability that both marbles selected are the same color?
2. If a group consists of 7 men and 5 women, what is the probability that a 5-person committee will contain 3 men?  
want 3R or 3W
3. A jar contains 6 red balls and 4 white balls. If three balls are selected at random (no replacement), what is the probability that all three balls selected are the same color?  

$$\frac{{}^6C_3 + {}^4C_3}{{}^{10}C_3}$$

A)  $\frac{1}{5}$       B)  $\frac{1}{6}$       C)  $\frac{2}{3}$       D)  $\frac{1}{30}$
4. If a committee consists of 3 men and 2 women, what is the probability of selecting a subcommittee of 3 women?
5. If there are 5 girls and 4 boys on a committee, what is the probability that a subcommittee of 4 has a 3 boys and 1 girl on it?

6. A box of candy has 6 different pieces of chocolate. If you can select only 3 of them, how many different combinations can be made?
7. How many different 3-digit numerals can be formed using the digits 1, 2, and 3 if repetition is not allowed?
8. If the probability of an event's happening is 0.7, what is the probability that it will not happen?
9. In how many ways can 7 people be arranged in a line if Tom, 1 of the people, is always first?
10. Two marbles are selected at random, without replacement, from a bag containing 7 red and 3 blue marbles. What is the probability that both marbles will be blue?
11. A man has 6 jackets, 10 shirts, and 4 pairs of slacks. In how many ways can he select an outfit that consists of a jacket, a shirt, and a pair of slacks?

12. In how many ways can 2 men and 2 women be chosen to play "doubles" at tennis from a group of 8 women and 10 men?

13. If a group consists of 5 boys and 8 girls, how many committees that contain 3 boys and 4 girls can be formed from the group if Joan, 1 of the girls, is always on the committee?

14. There are 7 marbles in a jar: 4 white, 2 red, and 1 blue. A 3-marble selection is randomly made.

- How many such selections are possible?  ${}^7C_3 = 35$
- How many of these selections contain marbles that are all the same color?  $3W \rightarrow {}^4C_3 = 4$
- What is the probability that of a 3-marble selection is made it will contain all marbles of the same color?  $P(3W) = \frac{4}{35}$
- What is the probability that the 3-marble selection will contain one marble of each color?

$$P(1W \text{ and } 1R \text{ and } 1B) = \frac{{}^4C_1 \times {}^2C_1 \times {}^1C_1}{{}^7C_3} = \frac{8}{35}$$

## Day 6 - Review Ch. 12 So Far...

1. How many ways can Carol, Joe, Frank and Sue stand in line? *order matter*  
 ${}_4P_4 = 24$  or  $\underline{4} \times \underline{3} \times \underline{2} \times \underline{1}$  or  $4!$
2. How many ways can 3 books be arranged on a shelf?  
 ${}_3P_3 = 6$  or  $\underline{3} \times \underline{2} \times \underline{1}$  or  $3!$
3. There are 7 people in a race...
  - a. How many ways can they all finish the race? *order matters*  
 ${}_7P_7 = 5040$  or  $\underline{7} \times \underline{6} \times \dots$
  - b. How many ways can they finish in first and second place?  
 ${}_7P_2 = 42$  or  $\frac{7}{1} \times \frac{6}{2}$
  - c. How many ways can they finish in first, second, and third place?  
 ${}_7P_3 = 210$  or  $\underline{7} \times \underline{6} \times \underline{5}$
4. A jar contains 2 red marbles, 3 white marbles, and 5 blue marbles. In how many ways can 7 marbles be selected?  
*any 7*  ${}_{10}C_7 = 120$
5. A coach is going to select 5 players from a group of 11 students.
  - a. How many ways can she choose 5?  
 ${}_{11}C_5 = 462$
  - b. How many ways can she choose 5 if Sara (one of the 11 students) must be on the team?  
*Has: 10 left to choose from*  
*Wants: 4 more*  
 ${}_{10}C_4 = 210$
  - c. How many 5-player teams will not include Sara?  
*Has: 10 left to choose from*  
*Wants: 5 players*  
 ${}_{10}C_5 = 252$
  - d. What is the probability that Sara is on the team?  
 $\frac{\text{Part b}}{\text{Part a}} = \frac{210}{462}$

6. From a group of 4 girls and 3 boys, counting # how many ways can I choose:

a. one person?

$$7C_1 = 7$$

people

b. 2 boys?

$$3C_2 = 3$$

c. 3 girls?

$$4C_3 = 4$$

d. 2 boys or 3 girls?

Have 3B 4G

$$3C_2 + 4C_3 = 3 + 4 = 7$$

7. From a group of 6 boys and 3 girls, how many 6-member committees can be formed if:

a. each committee must have 4 boys and 2 girls?

pick 6 every time

$$6C_4 \times 3C_2 = 15 \times 3 = 45$$

b. each committee must have the same number of boys as girls?

Want: 3B and 3G

$$6C_3 \times 3C_3 = 20 \times 1 = 20$$

8. A librarian is arranging a display of new books. She has room for 8 books. She has 5 mysteries, 4 computer books, 3 biographies, and 2 books on family health. If her choices are random, what is the probability that the display will contain 2 of each type of book?

Have: 5M and 4C and 3B and 2F  
Want: 2M and 2C and 2B and 2F

$$\frac{5C_2 \times 4C_2 \times 3C_2 \times 2C_2}{14C_8} = \frac{10 \times 6 \times 3 \times 1}{3003} = \frac{180}{3003}$$

9. A bookshelf contains six mysteries and three biographies. Two books are selected at random without replacement.

a. What is the probability that both books are biographies?

$$P(2B) = \frac{3C_2}{9C_2} = \frac{3}{36}$$

b. What is the probability that one book is a mystery and the other is a biography?

Have: 6M 3B  
Want: 1M and 1B

$$P(1M \text{ and } 1B) = \frac{6C_1 \times 3C_1}{9C_2} = \frac{18}{36}$$

What's the probability of drawing a four Aces in a 5-card poker hand?

What cards would be in your hand?

Have: 4A and 48 other  
Want: 4 Aces and 1 Other card

How many ways can this happen?

$${}_4C_4 \times {}_{48}C_1 = 1 \times 48 = 48$$

How many possible 5-card hands?

$${}_{52}C_5 = 2,598,960$$

Probability of 4 aces?

$$48/2,598,960 = .000018$$

Very unlikely!

What is the probability of drawing any four of a kind in 5-card poker?

There are thirteen sets of four of a kind in a deck. We just calculated the probability of one of the those. We could get 4 Aces or 4 Kings or 4 Queens, etc. Or means add 13 of these together (or multiply by 13)

$.000018 \times 13$   
Probability = .000234 - Still not very likely

What is the probability of drawing a full house with  
 Aces and Kings? 3 + 2

1. What are the possible winning hands?

Have 4A and 4K or 4A and 4K  
want: 2A and 3K or 3A and 2K

2. How many ways can we get those winning hands?

$${}_4C_2 \times {}_4C_3 + {}_4C_3 \times {}_4C_2$$

$$6 \times 4 + 4 \times 6 = 48$$

3. How many total possible hands are there?

$${}_{52}C_5 = 2,598,960$$

4. What is the probability?

$$48 / 2,598,960 = .000018$$

Extremely unlikely!



