Practice Worksheet ch. 12

4) 0

6) 20 ${}_6C_3$

7) 6

8) .3

9) 720 ${}_6P_6 = 6! = 1 \times 6 \times 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$

11) 240

Combinations and Probability

- First, find the total number of possible outcomes.
- Then find the number of outcomes that we care about in this problem.
- Finally, divide those two numbers, and you've got a probability!

Probabilities with Combinations:

Pg. 40

1. A committee of 5 members is to be randomly selected from a group of 8 teachers and 25 students.

   a. Determine how many different committees can be formed if 2 members must be teachers and 3 members must be students.

   Have: 8T and 25S
   Want: 2T and 3S

   $${}_8C_2 \times {}_{25}C_3 = 28 \times 2300 = 64{,}400$$

   b. What's the probability that a randomly selected group of 5 people selected from 8 teachers and 25 students will consist of 3 students and 2 teachers?

   $$P(2T \text{ and } 3S) = \frac{64{,}400}{{}_{33}C_5} = \frac{64{,}400}{237{,}336}$$

   33 People to Choose 5 from

2. A committee of 2 men and 2 women is chosen from a group of 7 men and 9 women.

a. How many committees are possible?

Have: 7M and 9W
Want: 2M and 2W

$${}_7C_2 \times {}_9C_2$$
$$21 \times 36 = 756$$

b. What is the probability that a committee of 4 people chosen from a group of 7 men and 9 women will consist of an equal number of men and women?

$$P(2M \text{ and } 2W) = \frac{756}{{}_{16}C_4} = \frac{756}{1820} \quad (2M \text{ and } 2W)$$

3. A delivery of 2 tulips, 6 roses and 8 carnations arrives at a florist. From that delivery, the florist randomly makes different bouquets consisting of 6 flowers each.

a. What is the probability that there will be 1 tulip, 3 roses and 2 carnations in the bouquet?

Have: 2T 6R 8C
Want: 1T 3R 2C

$$P(1T, 3R, 2C) = \frac{{}_2C_1 \times {}_6C_3 \times {}_8C_2}{{}_{16}C_6} = \frac{2 \times 20 \times 28}{8008} = \frac{1120}{8008}$$

b. What is the probability that there will be 5 roses and 1 carnation?

Have: ~~2T~~ 6R 8C
Want: 5R 1C

$$P(5R \text{ and } 1C) = \frac{{}_6C_5 \times {}_8C_1}{{}_{16}C_6} = \frac{6 \times 8}{8008} = \frac{48}{8008}$$

c. What is the probability that there will be an equal number of each type of flower in the bouquet?

6 flowers

Have: 2T 6R 8C
Want: 2T 2R 2C

$$\frac{{}_2C_2 \times {}_6C_2 \times {}_8C_2}{{}_{16}C_6} = \frac{1 \times 15 \times 28}{8008} = \frac{420}{8008}$$

d. What is the probability that there will be exactly 4 roses in the bouquet?

Have: 6R and 10 others (8C and 2T)
Want: 4R and 2 others

$$\frac{{}_6C_4 \times {}_{10}C_2}{{}_{16}C_6} = \frac{15 \times 45}{8008} = \frac{675}{8008}$$

Homework:

Practice Worksheet Chapter 12

~~#1 - 5~~ = 1-3, 5, 10, 12-14

1) Have: 4G 2W
Want: 2G (or) 2W (*)

$$\frac{{}_4C_2 + {}_2C_2}{{}_6C_2} = \frac{6+1}{15} = \frac{7}{15}$$

2) Have: 7M 5W
Want: 3M and 2W ⇒ 5 People

$$\frac{{}_7C_3 \times {}_5C_2}{{}_{12}C_5} = \frac{35 \times 10}{792} = \frac{350}{792}$$

Homework Answers: Practice Worksheet Ch.12

1. 7/15 or 14/30
2. 350/792
3. A
4. ~~0~~
5. 20/126 or 10/63

10) 3/45

12) 1260

* 13) 350/924

14a. 35
b. 4
c. 4/35
d. 8/35