

AFM Worksheet  
1-2 Combinations

Name \_\_\_\_\_  
Date \_\_\_\_\_ Period \_\_\_\_\_

Evaluate each expression.

1. a)  ${}^6C_3 = 20$       b)  ${}^8C_7 = 8$       c)  ${}^{24}C_3 = 2024$       d)  ${}^{15}C_3 = 455$   
 e)  ${}^{12}C_6 = 924$       f)  ${}^{20}C_1 = 20$       g)  ${}^{20}C_{19} = 20$       h)  ${}^{20}C_{20} = 1$

2. Find the number of ways of making each choice.

- a) Selecting a 4-member committee from a 20-member club.

$${}^{20}C_4 = 4845$$

- b) Selecting a 4-member committee from a 20-member club if the president of the club must be on the committee.

$${}^{19}C_3 = 969$$

- c) Selecting a 4-member committee from a 20-member club if the president of the club cannot be on the committee but the treasurer must be on the committee.

$${}^{18}C_3 = 816$$

- d) Selecting a 4-member committee from a 20-member club if there are 12 women and 8 men in the club and the committee must include 2 men and 2 women.

$${}^{12}C_2 \cdot {}^8C_2 = 1848$$

- e) Selecting three days out of a week.

$${}^7C_3 = 35$$

- f) Selecting three days out of a week if exactly two of them must be weekdays.

$$\frac{{}^5C_2 \cdot {}^2C_1}{{}^7C_3} = 20$$

weekday
weekend

3. The Debate Club wants to create a 4-person committee (i.e., no officers) from its membership of 30 people.

a) How many different committees are possible?

$$30C_4 = 27405$$

b) Carlos is a member of the Debate Club. How many different committees are possible that have Carlos as a committee member?

$$29C_3 = 3654$$

c) What's the probability that Carlos will be on a committee consisting of randomly selected members?

$$3654/27405 = 0.13$$

4. There are 10 fourth-graders, 12 fifth-graders, and 8 sixth-graders in a Girl Scout troop. Mrs. Sullivan, the troop leader, needs five girls to serve on the troop's camping committee. To make the selection fair, she lets the girls draw names out of a hat to fill the five places on the committee. 30 total

a) How many different committees are possible?

$$30C_5 = 142,506$$

b) What is the probability that Lisa, one of the sixth-grade scouts, will be on the committee?

$$29C_4 = 23751 / 142506 \text{ or } 0.16$$

c) What is the probability that Lisa and her best friend Naomi will both be on the committee?

$$28C_3 = 3276 / 142506 \text{ or } 0.0229$$

d) What is the probability that all the committee members will be fifth-graders?

$$12C_5 = 792 / 142506 \text{ or } 0.0055$$

e) What is the probability that the committee will be made up of 2 fourth-graders, 2 fifth-graders, and 1 sixth-grader?

$$\begin{matrix} C \\ 10 \\ 4^{th} \end{matrix} \cdot \begin{matrix} C \\ 12 \\ 5^{th} \end{matrix} \cdot \begin{matrix} C \\ 8 \\ 6^{th} \end{matrix} = 23760 / 142506 \text{ or } 0.1667$$