

Review Probability

Determine whether the following problem involves a permutation or combination. (It is not necessary to solve the problem.)

1. A medical researcher needs 7 people to test the effectiveness of an experimental drug. If 19 people have volunteered for the test, in how many ways can 7 people be selected?

combo

$${}_{19}C_7$$

$$50388$$

2. How many different 7-letter passwords can be formed from the letters S, T, U, W, X, Y, and Z if no repetition of letters is allowed?

Perm. ${}_7P_7$

$$5040$$

3. You volunteer to help drive children at a charity event to the zoo, but you can fit only 7 of the 15 children present in your van. How many different groups of 7 children can you drive?

$${}_{15}C_7$$

$$6435$$

4. To win at LOTTO in one state, one must correctly select 7 numbers from a collection of 46 numbers (1 through 46). The order in which the selection is made does not matter. How many different selections are possible?

$${}_{46}C_7$$

$$= 53,524,680$$

5. In a race in which six automobiles are entered and there are no ties, in how many ways can the first three finishers come in?

$${}_6P_3$$

$$= 120$$

6. 14 people are struggling to survive in the wilderness. In this week's episode, the producers will send 5 of the 14 back to civilization. In how many ways can the 5 be selected?

Dorkin Dorks

$${}_{12}P_{12} / (2! \cdot 3! \cdot 2!)$$

$$19,958,400$$

7. This problem involves empirical probability. The table shows the breakdown of 99 thousand single parents on active duty in the U.S. military in a certain year. All numbers are in thousands and rounded to the nearest thousand. Use the data in the table to find the probability that a randomly selected single parent in the U.S. military is a woman in the Air Force.

	Army	Navy	Marine Corps	Air Force	Total
Male	27	25	5	16	73
Female	11	8	1	6	26
Total	38	33	6	22	99

- a. The probability that a randomly selected single parent in the U.S. military is a woman in the Air Force is .

$$6/99$$

$$6.1\%$$

- b. Find the probability of a person being male or in the Navy.

$$73 + 33 - 25 = 81/99$$

$$81.8\%$$

- c. Find the Probability that a person is in the Air Force given they are male.

$$\frac{16}{73}$$

$$21.9\%$$

8. A 7-sided die is rolled. The die's faces are labeled with the numbers 1 through 7, and each number is equally likely to be rolled. Find the probability of rolling an odd number.
 What is the probability of rolling an odd number? $\frac{4}{7}$

9. A single die is rolled twice. Find the probability of rolling a 4 the first time and a 6 the second time.
 $\frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$

10. A single die is rolled twice. Find the probability of rolling an odd number the first time and a number greater than 1 the second time.
 $\frac{3}{6} \cdot \frac{5}{6} = \frac{5}{12}$

11. You buy one raffle ticket for \$2.00. There are 250 raffle tickets sold. The prizes are \$100, \$75 and \$50. If you can only win one prize, what is the expected value for your ticket?
 $100\left(\frac{1}{250}\right) + 75\left(\frac{1}{249}\right) + 50\left(\frac{1}{249}\right) = 0.90 = -\1.10

12. A cell phone company knows that in NC on average 8% of calls are dropped because of a bad connection. If you make 25 calls this week, what is the probability that:

a. You drop exactly 4 of them? $P(25, .08, 4) = 8.99\% \text{ or } 9\%$

b. You drop 3 or less calls? $C(25, .08, 3) = 86.5\%$

c. You drop at least 3 calls? $1 - C(25, .08, 2) = 32.3\%$

