

# STATISTICS .. BUSINESS STATISTICS

## PROBABILITY PRACTICE

Answer these questions.

- \_\_\_\_\_ 1. Suppose there is a  $\frac{7}{9}$  probability that an event will happen. What is the probability that the event will **not** happen?
- \_\_\_\_\_ 2. Suppose there is a 83% chance that an event will not happen. What is the chance the event will happen?

Blaine is blind. In a cooler he has 5 cans of Mountain Dew, 2 cans of Pepsi, and 1 can of Squirt. There are no other cans in the cooler. He has no clue which can is which.

- \_\_\_\_\_ 3. If Blaine reaches into the cooler and takes a can of pop, what is the probability it is Mountain Dew?
- \_\_\_\_\_ 4. If Blaine reaches into the cooler and takes a can of pop, what is the probability it is either Mountain Dew or Pepsi?
- \_\_\_\_\_ 5. If Blaine reaches into the cooler and takes a can of pop, what is the probability it is Dr. Pepper?
- \_\_\_\_\_ 6. Blaine takes a can of pop and drinks it. Then he takes another can of pop. What is the probability **both** of the cans of pop were Pepsi?
- \_\_\_\_\_ 7. Blaine takes a can of pop and drinks it. Then he takes another can of pop. What is the probability the first was Mountain Dew **and** the second was Squirt?
- \_\_\_\_\_ 8. Blaine takes a can of pop, but then gets called away before he can open it. He puts it back, and later he takes a can of pop from the cooler again. What is the probability he chose Squirt **both** times?
- \_\_\_\_\_ 9. Blaine takes a can of pop, but then gets called away before he can open it. He puts it back, and later he takes a can of pop from the cooler again. What is the probability he chose Pepsi the first time **and** Mountain Dew the second time?

The following 27 students are in Mrs. Overton's second grade class:

(Girls are in *italics*, and **boys** are in **bold**.)

**Alvin**

*Barbee*

*Caroline*

*Debbi*

**Eugene**

*Flo*

**Gregg**

**Heath**

*Heather*

*Isadora*

**Jesús**

**Kristoffer**

*Laura*

*Madison*

**Nolan**

**Otto**

*Prisha*

**Quest**

**Rhett**

*Sandi*

*Tabatha*

**Umberto**

*Valerie*

**Wolf**

*Xenia*

**Yukon**

**Zeke**

- \_\_\_\_\_ 10. Mrs. Overton calls on a student at random. What is the probability the first student she calls on is a girl?
- \_\_\_\_\_ 11. The first student Mrs. Overton called on **was** a girl. If she calls on a different student next, what is a probability the second student she calls on is a girl?
- \_\_\_\_\_ 12. What is the probability **both** the first **and** second students Mrs. Overton calls on are girls?

Use the counting principal to answer these questions.

- \_\_\_\_\_ 13. A combo meal has a choice of three appetizers, a choice of four entrees, a choice of three kinds of potato, and a choice of either pie or cake for dessert. How many ways could you order this meal?
- \_\_\_\_\_ 14. A quiz has six multiple choice questions, each of which has 4 possible answers. If you answer every question, how many ways could you fill out the quiz?

Use this information for the following problems: Mr. Burrow estimates that when his home phone rings, there is a 50% chance someone is trying to sell him something. There is a 35% chance someone is taking a survey. There is also a 12% chance someone is both taking a survey and trying to sell him something.

- \_\_\_\_\_ 15. According to these numbers, what is the chance that when Mr. Burrow's phone rings someone is either trying to sell him something **or** taking a survey?
- \_\_\_\_\_ 16. What is the probability the person calling is neither selling something nor taking a survey?

Would each of these problems involve **combinations** or **permutations**?

Write "**C**" or "**P**". Do **not** actually solve the problems.

- \_\_\_\_\_ 17. To celebrate Garrigan's 50<sup>th</sup> anniversary, the sports section of the *Algona Upper Des Moines* will be running features on the top 50 Golden Bear sports stories of the past 50 years. To avoid controversy, they are purposely **not** ranking the stories in any particular order. If they choose from a pool of 1,500 different sports stories, how many ways could they do this?

- \_\_\_\_\_ 18. A hotel has 70 identical rooms. Ten of these will be taken out of service for remodeling this week. How many ways can the hotel choose which rooms to take out of service?
- \_\_\_\_\_ 19. A baseball team has 15 decent players. How many ways could the coach choose 9 starters and arrange them in a batting order?
- \_\_\_\_\_ 20. How many different ways could a jury of 12 people is selected from a pool of 40 possible jurors.
- \_\_\_\_\_ 21. Twelve people applied for office jobs at a new company. The first person hired will become the office manager (earning \$19.50 per hour), the second person hired will be the executive assistant (earning \$14.50 per hour), and the third person hired will be the receptionist (earning \$9.50 per hour). How many ways can the company fill these three jobs?

Use combinations or permutations to answer these questions.

- \_\_\_\_\_ 22. There are 10 finalists for a scholarship program at a college. The top recipient will get a \$5000 scholarship, the second place winner receives \$2500, third place gets \$1000, and fourth place receives a \$500 scholarship. How many different ways could these scholarships be awarded?
- \_\_\_\_\_ 23. In some types of poker, you are dealt seven cards out of a 52-card deck. Given that it doesn't matter what order the cards are dealt in, how many different hands are possible?

In 2008, approximately 27% of Iowa adults filed their federal income taxes online. If you surveyed 8 adult lowans, what is the probability that 5 of them filed their taxes online?

24. Give the value of each of these variables:

$p =$  \_\_\_\_\_  $q =$  \_\_\_\_\_  $n =$  \_\_\_\_\_  $r =$  \_\_\_\_\_

Answer: \_\_\_\_\_

In New York City, approximately 60% of all workers take public transportation (bus, subway, etc.) to work each day. In a group of 11 New Yorkers, what is the probability that 10 of them take public transportation to work?

25. Give the value of each of these variables:

$p =$  \_\_\_\_\_  $q =$  \_\_\_\_\_  $n =$  \_\_\_\_\_  $r =$  \_\_\_\_\_

Answer: \_\_\_\_\_

A \$10 lottery game offers the following prizes:

Probability	Prize
0.000001	\$1,000,000
0.01	\$250
0.02	\$75
0.08	\$25
0.11	\$2
0.19	\$1
0.58999	\$0

26. Use the idea of **expected value** to find the average amount someone that plays this lottery game can expect to win on each ticket.

27. There are 38 spaces on a standard American roulette wheel. In the most common bet, you pick one of the spaces, and if your number comes up you win \$35. What is the **expected value** of this game?

ANSWERS (Numbers can be written as fractions, decimals, or percents):

1.  $1 - 7/9 = \underline{2/9}$
2.  $100 - 83 = \underline{17\%}$
3.  $\underline{5/8}$
4.  $(5+2)/8 = \underline{7/8}$
5. There is no Dr. Pepper, so  $\underline{0}$
6.  $2/8 \times 1/7 = \underline{1/28}$
7.  $5/8 \times 1/7 = \underline{5/56}$
8.  $1/8 \times 1/8 = \underline{1/64}$
9.  $2/8 \times 5/8 = \underline{5/32}$
10.  $\underline{13/27}$
11. There are 12 girls out of 26 students who haven't been called, so  $\underline{12/26}$
12.  $13/27 \times 12/26 = \underline{2/9}$
13.  $3 \times 4 \times 3 \times 2 = \underline{72}$
14.  $4 \times 4 \times 4 \times 4 \times 4 \times 4 = \underline{4096}$
15.  $50 + 35 - 12 = \underline{73\%}$
16.  $100 - 73 = \underline{17\%}$
17. **C** (because NOT ranking)
18. **C** (since the rooms are identical, the order of renovation shouldn't matter)
19. **P** (batting ORDER)
20. **C** (it matters whether you are on the jury or not; not whether you are first or last to be selected)
21. **P** (since the jobs are different, they will likely hire in order from best job to worst job)
22.  $10 \text{ nPr } 4 = \underline{5040}$
23.  $52 \text{ nCr } 7 = \underline{133,784,560}$
24.  $p = .27 \dots q = .73 \dots n = 8 \dots r = 5 \dots \text{ So } 8 \text{ nCr } 5 * .27^5 * .73^3 = \underline{.031259}$
25.  $p = .6 \dots q = .4 \dots n = 11 \dots r = 10 \dots \text{ So } 11 \text{ nCr } 10 * .6^{10} * .4^1 = \underline{.026605}$
26.  $.000001*1000000+.01*250+.02*75+.08*25+.11*2+.19*5+.58999*0 = \underline{\$7.41}$
27.  $1/38 \times 35 = .92105$  or  $\underline{92\text{¢}}$