

Washington State Math Championship – 2009

Probability and Statistics – 5th

WASHINGTON STATE
MATH CHAMPIONSHIP



BLAINE SCHOOL DISTRICT
ConocoPhillips
Ferndale Refinery

If asked for a probability, express your answer as a reduced fraction unless otherwise stated.

1. If the numbers below describe the height (in inches) of the top eleven math elves in Elfville, what is their average height (in inches)? **Round your answer to the nearest tenth of an inch.**

24, 30, 23, 33, 39, 38, 24, 28, 24, 34, 40

2. Many restaurants offer five-course meals consisting of a soup, salad, appetizer, main course, and dessert. If such a restaurant has three unique soups, two unique salads, five unique appetizers, three unique main course options, and six unique desserts (including Pumpkin Pi), how many unique five-course meals could be created?
3. In how many different ways can 55 cents be formed using nickels, dimes, and quarters? (Note: A combination need not use all three types of coins.)
4. What is the probability that a number formed using each of the digits 1, 2, 3, 5, and 7 once will be divisible by nine?
5. I have five unique mathematics books that I want to arrange on my shelf. How many unique ways are there to arrange the books on the shelf?
6. If a two-digit number is randomly selected, what is the probability that the tens digit will be greater than the units digit? **Express your answer as a reduced fraction.**
7. On a piano, chords are often played by pressing down three out of twelve different keys. If no key can be struck twice during a given chord, how many different chords are possible?
8. Suppose that the probability that July 4th will be rainy is $\frac{1}{10}$, the probability that July 3rd is sunny is $\frac{3}{4}$, and the probability that July 5th is sunny is also $\frac{3}{4}$. What is the probability that all three days will be rainy? **Express your answer as a reduced fraction.**
9. If two of the nine non-zero digits (1-9) are randomly selected, and each digit is used once to form a two-digit number, what is the probability that number will be divisible by three? **Express your answer as a reduced fraction.**
10. In the Seattle Mariners' historical 2001 season, Edgar Martinez batted 0.306 (meaning 30.6% of the times he was at the plate he got a hit), Ichiro Suzuki batted 0.350, and Bret Boone batted 0.331. If these three players were to each come up to bat one more time, what is the probability that none of them would get a hit? **Express your answer as a decimal rounded to the nearest thousandth.**

Washington State Math Championship – 2009

Probability and Statistics – 6th

If asked for a probability, express your answer as a reduced fraction unless otherwise stated.

WASHINGTON STATE
MATH CHAMPIONSHIP



BLAINE SCHOOL DISTRICT
ConocoPhillips
Ferndale Refinery

1. What is the probability that a number formed using each of the digits 1, 2, 3, 5, and 7 once will be divisible by nine? **Express your answer as a reduced fraction.**
2. I have five unique mathematics books that I want to arrange on my shelf. How many unique ways are there to arrange the books on the shelf?
3. If a two-digit number is randomly selected, what is the probability that the tens digit will be greater than the units digit? **Express your answer as a reduced fraction.**
4. On a piano, chords are often played by pressing down three out of twelve different keys. If no key can be struck twice during a given chord, how many different chords are possible?
5. Suppose that the probability that July 4th will be rainy is $\frac{1}{10}$, the probability that July 3rd is sunny is $\frac{3}{4}$, and the probability that July 5th is sunny is also $\frac{3}{4}$. What is the probability that all three days will be rainy? **Express your answer as a reduced fraction.**
6. If two of the nine non-zero digits (1-9) are randomly selected, and each digit is used once to form a two-digit number, what is the probability that number will be divisible by three? **Express your answer as a reduced fraction.**
7. In the Seattle Mariners' historical 2001 season, Edgar Martinez batted 0.306 (meaning 30.6% of the times he was at the plate he got a hit), Ichiro Suzuki batted 0.350, and Bret Boone batted 0.331. If these three players were to each come up to bat one more time, what is the probability that none of them would get a hit? **Express your answer as a decimal rounded to the nearest thousandth.**
8. If two fair, standard six-sided dice are rolled, what is the probability that the sum of the two numbers rolled is greater than six or that at least one of the two numbers is a five? **Express your answer as a reduced fraction.**
9. What is the smallest number of times you would have to flip a fair coin if you wanted to be at least 90% sure of flipping at least one head?
10. What is the mean of the following values?
 - the range of the integers from 4 to 9, inclusive (that is, including 4 and 9)
 - the average of the first ten positive odd numbers
 - the median of the two-digit prime numbers less than 40

Washington State Math Championship – 2009

Probability and Statistics – 7th

If asked for a probability, express your answer as a reduced fraction unless otherwise stated.

WASHINGTON STATE
MATH CHAMPIONSHIP



BLAINE SCHOOL DISTRICT

ConocoPhillips
Ferndale Refinery

1. On a piano, chords are often played by pressing down three out of twelve different keys. If no key can be struck twice during a given chord, how many different chords are possible?
2. Suppose that the probability that July 4th will be rainy is $\frac{1}{10}$, the probability that July 3rd is sunny is $\frac{3}{4}$, and the probability that July 5th is sunny is also $\frac{3}{4}$. What is the probability that all three days will be rainy? **Express your answer as a reduced fraction.**
3. If two of the nine non-zero digits (1-9) are randomly selected, and each digit is used once to form a two-digit number, what is the probability that number will be divisible by three?
4. In the Seattle Mariners' historical 2001 season, Edgar Martinez batted 0.306 (meaning 30.6% of the times he was at the plate he got a hit), Ichiro Suzuki batted 0.350, and Bret Boone batted 0.331. If these three players were to each come up to bat one more time, what is the probability that none of them would get a hit? **Express your answer as a decimal rounded to the nearest thousandth.**
5. If two fair, standard six-sided dice are rolled, what is the probability that the sum of the two numbers rolled is greater than six or that at least one of the two numbers is a five? **Express your answer as a reduced fraction.**
6. What is the smallest number of times you would have to flip a fair coin if you wanted to be at least 90% sure of flipping at least one head?
7. What is the mean of the following values?
 - the range of the integers from 4 to 9, inclusive (that is, including 4 and 9)
 - the average of the first ten positive odd numbers
 - the median of the two-digit prime numbers less than 40
8. It's an early morning, and you are just too tired to even open your eyes. If your drawer contains 12 white socks, 10 blue socks, and 20 black socks, what is the probability that you will pull out a pair of socks that are of the same color? **Express your answer as a reduced fraction.**
9. The Monty Hall problem is a famous problem from the game show *Let's Make a Deal*. It goes as follows: You are on a game show and are shown three doors to choose from, only one of which has the grand prize behind it. After you have chosen a door, one of the other two doors is opened, and this door does not contain the grand prize. If you then change your original pick, what is the probability that you will win the grand prize? **Express your answer as a reduced fraction.**
10. Suppose that there is a 40% chance it will rain on any given day in Bellingham and that there is a 20% chance that frogs will be playing leapfrog out in the fields *and* it will be a rainy day in Bellingham. What is the probability, as a percentage, that the frogs will be playing leapfrog in the fields, given that it is a rainy day in Bellingham? **Express your answer as a reduced fraction.**

Washington State Math Championship – 2009

Probability and Statistics – 8th

WASHINGTON STATE
MATH CHAMPIONSHIP



BLAINE SCHOOL DISTRICT

ConocoPhillips
Ferndale Refinery

If asked for a probability, express your answer as a reduced fraction unless otherwise stated.

1. In the Seattle Mariners' historical 2001 season, Edgar Martinez batted 0.306 (meaning 30.6% of the times he was at the plate he got a hit), Ichiro Suzuki batted 0.350, and Bret Boone batted 0.331. If these three players were to each come up to bat one more time, what is the probability that none of them would get a hit? **Express your answer as a decimal rounded to the nearest thousandth.**
2. If two fair, standard six-sided dice are rolled, what is the probability that the sum of the two numbers rolled is greater than six or that at least one of the two numbers is a five? **Express your answer as a reduced fraction.**
3. What is the smallest number of times you would have to flip a fair coin if you wanted to be at least 90% sure of flipping at least one head?
4. What is the mean of the following values?
 - the range of the integers from 4 to 9, inclusive (that is, including 4 and 9)
 - the average of the first ten positive odd numbers
 - the median of the two-digit prime numbers less than 40
5. It's an early morning, and you are just too tired to even open your eyes. If your drawer contains 12 white socks, 10 blue socks, and 20 black socks, what is the probability that you will pull out a pair of socks that are of the same color? **Express your answer as a reduced fraction.**
6. The Monty Hall problem is a famous problem from the game show *Let's Make a Deal*. It goes as follows: You are on a game show and are shown three doors to choose from, only one of which has the grand prize behind it. After you have chosen a door, one of the other two doors is opened, and this door does not contain the grand prize. If you then change your original pick, what is the probability that you will win the grand prize? **Express your answer as a reduced fraction.**
7. Suppose that there is a 40% chance it will rain on any given day in Bellingham and that there is a 20% chance that frogs will be playing leapfrog out in the fields *and* it will be a rainy day in Bellingham. What is the probability, as a percentage, that the frogs will be playing leapfrog in the fields, given that it is a rainy day in Bellingham? **Express your answer as a reduced fraction.**
8. A *four-of-a-kind* is a poker hand where four of the five cards in the hand are of the same rank (i.e. 3, 3, 3, 3, Q or K, K, K, K, J). If you are given five randomly chosen cards from a standard 52-card deck, what is the probability that you will have a four-of-a-kind? **Express your answer as a reduced fraction.**
9. Suppose you have twelve unique books of three different categories – three fantasy, five children's books, and four biographies. In how many ways can the books be arranged on a bookshelf if all of the children's books must be together?
10. Each of six indistinguishable marbles is randomly placed into one of three distinguishable boxes. What is the probability that the three boxes will *not* each contain two marbles? **Express your answer as a reduced fraction.**