Washington State Math Championship 2012

ConocoPhillips Ferndale Refinery

Blaine School District

Probability and Statistics
5th Grade

Bubble in your answers on the answer sheet. Be sure to erase all mistakes completely. You do not need to bubble in leading zeros – the answer of "7" does not need to be answered as "007". If your answer is a fraction like $\frac{3}{16}$, bubble in 316.

1. **2 points:** What is the probability of choosing either an ace or a two from a standard deck of cards? **Express your answer as a reduced fraction.**

2. **2 points:** If you went to the Eye Scream ice cream store that had 9 unique flavors to choose from, how many unique two-scoop ice cream cones could you create using two different flavors? Assume that the order matters for the flavors on the cone.

3. **2 points:** If the numbers from 1 to 99, inclusively, are put into a hat, and a number is randomly chosen, what is the probability this number will be a perfect square? **Express your answer as a reduced fraction.**

4. **3 points:** What is the sum of the median, mode, and range of the eleven test scores below?

$$75, 45, 70, 75, 25, 40, 45, 75, 85, 100, 90$$

5. **3 points:** Out of a group of 200 students, 70 students participated in the Jog-a-Thon, 55 students participated in the Book Sale, and 95 students participated in neither. How many students participated in both the Jog-a-Thon and the Book Sale?

6. **3 points:** Suppose that one soda company makes 5% of its sodas such that they contain instant prizes. If you buy two sodas, what is the probability that one soda will contain an instant prize and the other soda will not contain an instant prize? **Express your answer to the nearest percent.**

7. **3 points:** A teacher who had just finished grading her 30 students' tests realized that she accidentally entered 350 as a score for one of the students instead of a 50. If the average test score for the class with the mistake included was 70, what will the average test score be after the mistake is fixed?

8. **4 points:** If you were to roll a fair 12-sided die, where each side of the die is labeled with a unique integer between 1 and 12 inclusively, what is the probability that you will either roll an even number or a prime number? **Express your answer as a reduced fraction.**

9. **4 points:** How many unique 5-digit numbers can be created using the digits 2, 3, 4, 4, and 8?

10. **4 points:** What is the probability of selecting the same letter twice if you are choosing two letters randomly, without replacement, from the word SWEET? **Express your answer as a reduced fraction.**

Washington State Math Championship 2012
ConocoPhillips Ferndale Refinery
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Probability and Statistics
6th Grade

Bubble in your answers on the answer sheet. Be sure to erase all mistakes completely. You do not need to bubble in leading zeros – the answer of "7" does not need to be answered as "007". If your answer is a fraction like $\frac{3}{16}$, bubble in 316.

1. **2 points:** What is the sum of the median, mode, and range of the eleven test scores below?

$$75, 45, 70, 75, 25, 40, 45, 75, 85, 100, 90$$

2. **2 points:** Out of a group of 200 students, 70 students participated in the Jog-a-Thon, 55 students participated in the Book Sale, and 95 students participated in neither. How many students participated in both the Jog-a-Thon and the Book Sale?

3. **2 points:** Suppose that one soda company makes 5% of its sodas such that they contain instant prizes. If you buy two sodas, what is the probability that one soda will contain an instant prize and the other soda will not contain an instant prize? **Express your answer to the nearest percent.**

4. **3 points:** A teacher who had just finished grading her 30 students' tests realized that she accidentally entered 350 as a score for one of the students instead of a 50. If the average test score for the class with the mistake included was 70, what will the average test score be after the mistake is fixed?

5. **3 points:** If you were to roll a fair 12-sided die, where each side of the die is labeled with a unique integer between 1 and 12 inclusively, what is the probability that you will either roll an even number or a prime number? **Express your answer as a reduced fraction.**

6. **3 points:** How many unique 5-digit numbers can be created using the digits 2, 3, 4, 4, and 8?

7. **3 points:** What is the probability of selecting the same letter twice if you are choosing two letters randomly, without replacement, from the word SWEET? **Express your answer as a reduced fraction.**

8. **4 points:** Suppose that you have two fair six-sided dice such that the six numbers on each die are the six smallest positive prime numbers. If you were to roll the two dice and add the two numbers that are facing up, what is the average of the two sums that are most likely to occur?

9. **4 points:** Suppose that a wheel is divided into four equally-sized wedges, each labeled with a unique number between 1 and 4 inclusive. When you spin the wheel, it will land on one of the wedges with equal probability, and you will earn the number of points the wedge has been labeled. What is the probability that after two spins, you will have earned at least 7 points? **Express your answer as a reduced fraction.**

10. **4 points:** As a surprise end-of-the-year event, your math teacher set up a Kool-Aid dunk tank with her sitting on the plank. All you had to do was hit the bulls-eye, a circle with a radius of 2 inches, on a circular board with a radius of 5 inches. Being creative, you decide to bring a pitching machine. If the pitching machine is guaranteed to hit the board, and has an equal probability of landing anywhere within that board, what is the probability that the lever will be hit and your teacher will be taking an ice-cold plunge? **Express your answer as a reduced fraction.**

Washington State Math Championship 2012

ConocoPhillips Ferndale Refinery

Blaine School District

Probability and Statistics
7^{th} Grade

Bubble in your answers on the answer sheet. Be sure to erase all mistakes completely. You do not need to bubble in leading zeros – the answer of "7" does not need to be answered as "007". If your answer is a fraction like $\frac{3}{16}$, bubble in 316.

1. **2 points:** A teacher who had just finished grading her 30 students' tests realized that she accidentally entered 350 as a score for one of the students instead of a 50. If the average test score for the class with the mistake included was 70, what will the average test score be after the mistake is fixed?

2. **2 points:** If you were to roll a fair 12-sided die, where each side of the die is labeled with a unique integer between 1 and 12 inclusively, what is the probability that you will either roll an even number or a prime number? **Express your answer as a reduced fraction.**

3. **2 points:** How many unique 5-digit numbers can be created using the digits 2, 3, 4, 4, and 8?

4. **3 points:** What is the probability of selecting the same letter twice if you are choosing two letters randomly, without replacement, from the word SWEET? **Express your answer as a reduced fraction.**

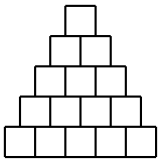
5. **3 points:** Suppose that you have two fair six-sided dice such that the six numbers on each die are the six smallest positive prime numbers. If you were to roll the two dice and add the two numbers that are facing up, what is the average of the two sums that are most likely to occur?

6. **3 points:** Suppose that a wheel is divided into four equally-sized wedges, each labeled with a unique number between 1 and 4 inclusive. When you spin the wheel, it will land on one of the wedges with equal probability, and you will earn the number of points the wedge has been labeled. What is the probability that after two spins, you will have earned at least 7 points? **Express your answer as a reduced fraction.**

7. **3 points:** As a surprise end-of-the-year event, your math teacher set up a Kool-Aid dunk tank with her sitting on the plank. All you had to do was hit the bulls-eye, a circle with a radius of 2 inches, on a circular board with a radius of 5 inches. Being creative, you decide to bring a pitching machine. If the pitching machine is guaranteed to hit the board, and has an equal probability of landing anywhere within that board, what is the probability that the lever will be hit and your teacher will be taking an ice-cold plunge? **Express your answer as a reduced fraction.**

8. **4 points:** Suppose there is a set of 10 distinct positive integers. If you are told that the range is 40 and the median is 50, what is the smallest possible mean?

9. **4 points:** Suppose you start at the top level of a five-level triangle. The top level has one square, the second level has two squares, and so on, as seen below. When going down each level, you flip a coin to determine whether to go to the right or to the left. What is the probability of ending up on the middle square on the bottom level? **Express your answer as a reduced fraction.**



10. **4 points:** If five fair standard six-sided dice are rolled, what is the probability that exactly one of them is a 6? **Express your answer to the nearest percent.**

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Probability and Statistics
8th Grade

Bubble in your answers on the answer sheet. Be sure to erase all mistakes completely. You do not need to bubble in leading zeros – the answer of "7" does not need to be answered as "007". If your answer is a fraction like $\frac{3}{16}$, bubble in 316.

1. **2 points:** What is the probability of selecting the same letter twice if you are choosing two letters randomly, without replacement, from the word SWEET? **Express your answer as a reduced fraction.**

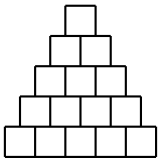
2. **2 points:** Suppose that you have two fair six-sided dice such that the six numbers on each die are the six smallest positive prime numbers. If you were to roll the two dice and add the two numbers that are facing up, what is the average of the two sums that are most likely to occur?

3. **2 points:** Suppose that a wheel is divided into four equally-sized wedges, each labeled with a unique number between 1 and 4 inclusive. When you spin the wheel, it will land on one of the wedges with equal probability, and you will earn the number of points the wedge has been labeled. What is the probability that after two spins, you will have earned at least 7 points? **Express your answer as a reduced fraction.**

4. **3 points:** As a surprise end-of-the-year event, your math teacher set up a Kool-Aid dunk tank with her sitting on the plank. All you had to do was hit the bulls-eye, a circle with a radius of 2 inches, on a circular board with a radius of 5 inches. Being creative, you decide to bring a pitching machine. If the pitching machine is guaranteed to hit the board, and has an equal probability of landing anywhere within that board, what is the probability that the lever will be hit and your teacher will be taking an ice-cold plunge? **Express your answer as a reduced fraction.**

5. **3 points:** Suppose there is a set of 10 distinct positive integers. If you are told that the range is 40 and the median is 50, what is the smallest possible mean?

6. **3 points:** Suppose you start at the top level of a five-level triangle. The top level has one square, the second level has two squares, and so on, as seen below. When going down each level, you flip a coin to determine whether to go to the right or to the left. What is the probability of ending up on the middle square on the bottom level? **Express your answer as a reduced fraction.**



7. **3 points:** If five fair standard six-sided dice are rolled, what is the probability that exactly one of them is a 6? **Express your answer to the nearest percent.**

8. **4 points:** Suppose that A and B are each randomly chosen integers, with replacement, between 1 and 9 inclusive. What is the probability that $\frac{A}{B}$ can be written as a terminating decimal? **Express your answer to the nearest percent.**

9. **4 points:** In a two-player game, Evan has developed a strategy that allows him to have a 70% probability of winning against a randomly selected opponent. In a best-of-three match with the same opponent, though, that probability of winning decreases to 60% in the second game and only 50% if a third round is necessary. What is the probability that Evan will win a best-of-three match? **Express your answer as a percent.**

10. **4 points:** Assume that birthdays are evenly distributed throughout a non-leap year. If there are 6 people in a room, what is the probability that there will be at least two people who have the same birthday? **Express your answer to the nearest percent.**