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 drawing either a heart or an ace from a standard deck of 52 cards? **Express your answer as a reduced fraction.**

2. **2 points:** Suppose that there are 30 kids in Gole's class. 20 kids play soccer, 10 play baseball, and 3 play both soccer and baseball. How many kids play neither soccer nor baseball?

3. **2 points:** What is the mean of the set of all positive two-digit integers? **Express your answer as a decimal.**

4. **3 points:** In order to make their sales competition fair, for each magazine sold, 3rd graders got 3 tickets into a random drawing, 4th graders got 2 tickets, and 5th graders got 1 ticket. If the 3rd graders sold a total of 200 magazines, the 4th graders sold 100 magazines, and the 5th graders sold 200 magazines, what is the probability that the person who is selected in the drawing will be a 3rd grader? **Express your answer as a reduced fraction.**

The following information is needed to solve problems 5 and 6:

At a mother get-together at the park, several kids were playing at the playground as their moms sat around and watched. The following table describes the number of kids of each age that were at the park.

Age of Kid	Number of Kids
1	2
2	3
3	5
4	3
5	2

5. **3 points:** Based on the table above, what is the sum of the mean, median, and mode of the ages of the kids at the playground?

6. **3 points:** How many more 5-year-olds would have to join the group of kids on the playground in order to raise the average age to 4 years old?

7. **3 points:** In order to mess with your math teacher's mind, suppose that you took the four unique math textbooks that were on her bookshelf and placed them back on the shelf in random order. What is the probability that the books were put back in the exact same order as they were originally? **Express your answer as a reduced fraction.**

8. **4 points:** On a tasting table, there are apple, peach, chocolate, and pistachio pieces of pie. There are three times as many chocolate pieces as apple pieces, half as many apple pieces as pistachio pieces, and twice as many peach pieces as pistachio pieces. If you were to randomly select a piece of pie from the table, what is the probability that it is a pistachio piece? **Express your answer as a reduced fraction.**

9. **4 points:** What is the probability that a randomly selected two-digit integer will have a 0 as one of its digits? **Express your answer as a reduced fraction.**

10. **4 points:** While shopping at the clothing store, you had to make some difficult decisions. You had to choose 2 shirts out of 3 unique shirts, 3 pairs of pants out of 4 unique pairs of pants, and 1 pair of shoes out of 5 unique pairs of shoes. How many unique sets of clothing could you walk out of the store with?
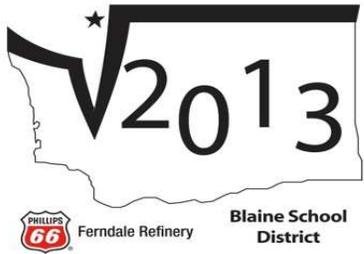
Probability and Statistics
6th Grade

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:** In order to make their sales competition fair, for each magazine sold, 3rd graders got 3 tickets into a random drawing, 4th graders got 2 tickets, and 5th graders got 1 ticket. If the 3rd graders sold a total of 200 magazines, the 4th graders sold 100 magazines, and the 5th graders sold 200 magazines, what is the probability that the person who is selected in the drawing will be a 3rd grader? **Express your answer as a reduced fraction.**

The following information is needed to solve problems 2 and 3:

At a mother get-together at the park, several kids were playing at the playground as their moms sat around and watched. The following table describes the number of kids of each age that were at the park.

Age of Kid	Number of Kids
1	2
2	3
3	5
4	3
5	2

2. **2 points:** Based on the table above, what is the sum of the mean, median, and mode of the ages of the kids at the playground?

3. **2 points:** How many more 5-year-olds would have to join the group of kids on the playground in order to raise the average age to 4 years old?

4. **3 points:** In order to mess with your math teacher's mind, suppose that you took the four unique math textbooks that were on her bookshelf and placed them back on the shelf in random order. What is the probability that the books were put back in the exact same order as they were originally? **Express your answer as a reduced fraction.**

5. **3 points:** On a tasting table, there are apple, peach, chocolate, and pistachio pieces of pie. There are three times as many chocolate pieces as apple pieces, half as many apple pieces as pistachio pieces, and twice as many peach pieces as pistachio pieces. If you were to randomly select a piece of pie from the table, what is the probability that it is a pistachio piece? **Express your answer as a reduced fraction.**

6. **3 points:** What is the probability that a randomly selected two-digit integer will have a 0 as one of its digits? **Express your answer as a reduced fraction.**

7. **3 points:** While shopping at the clothing store, you had to make some difficult decisions. You had to choose 2 shirts out of 3 unique shirts, 3 pairs of pants out of 4 unique pairs of pants, and 1 pair of shoes out of 5 unique pairs of shoes. How many unique sets of clothing could you walk out of the store with?

8. **4 points:** If three numbers are randomly selected without replacement from the numbers $1, 2, 3, 4$, and 5, what is the probability that the three numbers chosen could be the lengths of the three sides of a triangle? **Express your answer as a reduced fraction.**

9. **4 points:** How many four-digit numbers can be formed using the following rules?

   - The thousands digit must be odd.
   - The hundreds digit must be prime.
   - The tens and ones digits must be identical.

10. **4 points:** For Mr. Klutz, the probability of him tripping on a given day is $\frac{1}{4}$ and the probability of him slipping is $\frac{1}{2}$. Assuming these two events are independent, what is the probability that at least one of the two events will happen? **Express your answer as a reduced fraction.**
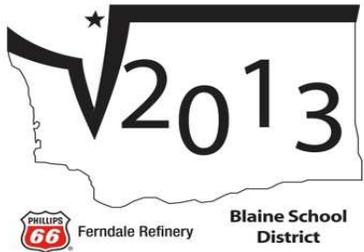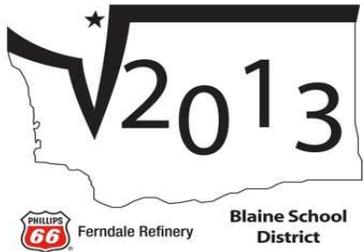
Probability and Statistics
7th Grade

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 $\dfrac{3}{16}$, bubble in 316.

1. **2 points:** In order to mess with your math teacher's mind, suppose that you took the four unique math textbooks that were on her bookshelf and placed them back on the shelf in random order. What is the probability that the books were put back in the exact same order as they were originally? **Express your answer as a reduced fraction.**

2. **2 points:** On a tasting table, there are apple, peach, chocolate, and pistachio pieces of pie. There are three times as many chocolate pieces as apple pieces, half as many apple pieces as pistachio pieces, and twice as many peach pieces as pistachio pieces. If you were to randomly select a piece of pie from the table, what is the probability that it is a pistachio piece? **Express your answer as a reduced fraction.**

3. **2 points:** What is the probability that a randomly selected two-digit integer will have a 0 as one of its digits? **Express your answer as a reduced fraction.**

4. **3 points:** While shopping at the clothing store, you had to make some difficult decisions. You had to choose 2 shirts out of 3 unique shirts, 3 pairs of pants out of 4 unique pairs of pants, and 1 pair of shoes out of 5 unique pairs of shoes. How many unique sets of clothing could you walk out of the store with?

5. **3 points:** If three numbers are randomly selected without replacement from the numbers $1, 2, 3, 4,$ and 5, what is the probability that the three numbers chosen could be the lengths of the three sides of a triangle? **Express your answer as a reduced fraction.**

6. **3 points:** How many four-digit numbers can be formed using the following rules?

   - The thousands digit must be odd.
   - The hundreds digit must be prime.
   - The tens and ones digits must be identical.

7. **3 points:** For Mr. Klutz, the probability of him tripping on a given day is $\dfrac{1}{4}$ and the probability of him slipping is $\dfrac{1}{2}$. Assuming these two events are independent, what is the probability that at least one of the two events will happen? **Express your answer as a reduced fraction.**

8. **4 points:** Seven students are standing in random spots on a circle in the middle of the playground. A triangle can be formed by connecting any three students with a line of string between each of them. How many different triangles could be made by connecting the students with string?

9. **4 points:** Suppose that you have two fair 10-sided dice, each of which has the digits 0-9 on them. If you were to roll the two dice, what is the probability that you will be able to form a two-digit number that, when rounded to the nearest hundred, will round up to 100? **Express your answer as a percent.**

10. **4 points:** Unable to decide what to do, you decide to play a silly walking game. To determine each step, you roll a fair six-sided die. If a 1 or a 2 appears, you turn left 90° and walk forward one yard. If a 3 or a 4 appears, you walk straight forward one yard. If a 5 or a 6 appears, you turn right 90° and walk forward one yard. What is the probability that you will be **less** than 2 yards away from your original position after two rolls of the die? **Express your answer as a reduced fraction.**

Probability and Statistics
8$^{\text{th}}$ 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 $\dfrac{3}{16}$, bubble in 316.

1. **2 points:** While shopping at the clothing store, you had to make some difficult decisions. You had to choose 2 shirts out of 3 unique shirts, 3 pairs of pants out of 4 unique pairs of pants, and 1 pair of shoes out of 5 unique pairs of shoes. How many unique sets of clothing could you walk out of the store with?

2. **2 points:** If three numbers are randomly selected without replacement from the numbers $1, 2, 3, 4$, and 5, what is the probability that the three numbers chosen could be the lengths of the three sides of a triangle? **Express your answer as a reduced fraction.**

3. **2 points:** How many four-digit numbers can be formed using the following rules?

   - The thousands digit must be odd.
   - The hundreds digit must be prime.
   - The tens and ones digits must be identical.

4. **3 points:** For Mr. Klutz, the probability of him tripping on a given day is $\dfrac{1}{4}$ and the probability of him slipping is $\dfrac{1}{2}$. Assuming these two events are independent, what is the probability that at least one of the two events will happen? **Express your answer as a reduced fraction.**

5. **3 points:** Seven students are standing in random spots on a circle in the middle of the playground. A triangle can be formed by connecting any three students with a line of string between each of them. How many different triangles could be made by connecting the students with string?

6. **3 points:** Suppose that you have two fair 10-sided dice, each of which has the digits 0-9 on them. If you were to roll the two dice, what is the probability that you will be able to form a two-digit number that, when rounded to the nearest hundred, will round up to 100? **Express your answer as a percent.**

7. **3 points:** Unable to decide what to do, you decide to play a silly walking game. To determine each step, you roll a fair six-sided die. If a 1 or a 2 appears, you turn left 90° and walk forward one yard. If a 3 or a 4 appears, you walk straight forward one yard. If a 5 or a 6 appears, you turn right 90° and walk forward one yard. What is the probability that you will be **less** than 2 yards away from your original position after two rolls of the die? **Express your answer as a reduced fraction.**

8. **4 points:** At the local ice cream shop, you have a choice between having your ice cream in a cone, cup, or a bowl. Then, when making the choice for ice cream, you can have either 1 or 2 scoops of ice cream, choosing from the flavors of vanilla, chocolate, or plum. If you are allowed to have multiple scoops of the same flavor, how many unique combinations of ice cream and ice cream holder are possible?

9. **4 points:** Suppose that you have created a game, such that you are a winner if you roll three even numbers on three fair six-sided dice. After the first roll, you are allowed to roll any dice that are odd numbers one extra time. What is the probability of winning this game? **Express your answer to the nearest percent.**

10. **4 points:** Moe and Curly each have two buckets. Moe's has 2 blue golf balls and 4 red golf balls, and Curly's has 9 red golf balls and 1 blue golf ball. Each of them randomly selects two balls from his bucket without replacement. If you were to randomly select one of the two boys, what is the probability that the selected boy has chosen two red golf balls? **Express your answer as a reduced fraction.**