Summer Math Packet for Students Entering AP Statistics

This problem set is the summer requirement for all Hawken students entering AP Statistics.

The questions in this packet will cover
- Means, medians, & modes,
- Probability, and
- General problem solving

You probably remember learning about averages and probability in earlier math courses, but if you want to review some before the summer packets become available, you can explore these links to IXL. Note that you are permitted only 20 free practice problems per day on the IXL site.


Have a great summer!
Summer Math Packet for students entering AP Statistics

Do not reference any sources of any kind to answer these questions.

I don’t particularly care if you get all of the answers to these questions, but you should get most of them. I really want to know the processes you use and the educated solutions you find to every question. Again, do not use any external resources.

Short Answers:

1. Make a list of 5 numbers that has a median of 7.

2. Can you create another list of five numbers that has a median of 7 where none of the numbers in your new list match any of the numbers in your list from question 1? Explain.

3. Can you create a list of four numbers that has a median of 7 where none of the numbers in your new list match any of the numbers in your list from question 1? Explain.

4. Create a list of 5 different numbers that has a mean of 10.

5. Is it possible to create a list of numbers with its mean larger than its median? Explain.

6. Is it possible to create a list of numbers with its median larger than its mean? Explain.

7. Describe an easy way to make a list of 1000 numbers that has a mean of 3.14? I don’t need to see the list, but you should describe your process clearly enough that any classmate could create your list.

8. I flipped a fair coin and have gotten tails six times in a row. What is the probability that my next flip will extend this streak to seven in a row?

9. Which event is LESS likely, getting heads 5 times in a row when flipping a fair coin or rolling two normal six-sided dice and getting a 12?
**Problem Solving:** Be sure to show how you determine your solutions. Again, do not use any external resources of any kind.

10. Which, if either, event is more likely when you roll a normal six-sided die 6 times:
   - Getting 6 every time, or
   - Getting each of 1, 2, 3, 4, 5, and 6 exactly once?

11. Bonnie has two white balls, two black balls, and two empty boxes. She may place the balls in the boxes in any way she pleases. Her boyfriend, Clyde, then enters the room, picks a box without ever looking inside, reaches in and picks a ball. If the draws a black ball, the couple wins $500. How should Bonnie arrange the balls to maximize their chance of winning?

12. The children in a particular class are left-handed, right-handed, or ambidextrous. For this problem, consider ambidextrous children to be both left-handed and right-handed.

   One-seventh of the left-handed children are also right-handed, and one-ninth of the right-handed children are also left-handed.

   A. Are there more right-handed or left-handed children in the class?
   
   B. What is the probability that a random child from this room is ambidextrous?

13. Heading into game 4 on June 14, 2015, the Cleveland Cavaliers led the Golden State Warriors 2-1 in the best-of-7 NBA championship finals. Before the game started, one announcer claimed that, historically, the team leading the series 2-1 heading into game 4 won the NBA championship 81.8% of the time. Is that a higher or lower winning percentage for a team with a 2-1 lead in a best-of-7 series than you would expect if both teams were equally likely to win each remaining game?

14. It should make sense that any 2 random people most likely don’t share a birthday, but a group of 300 random people most likely has at least one pair of people with a common birthday.

   A. What is the probability of at least one shared birthday in a group of 4 people?
   
   B. What if there were 40 people in the group?

15. Tell me a little about who you are as a math student. What are your strengths? What do you want to work on this year? Where do you anticipate needing help?