

**CP Geometry**  
**Box Principle Problems II**

**Name:** \_\_\_\_\_

- 1.) There are eight teachers in the CHS math department. How many different math classes must be offered each year in order for one teacher to have at least four classes?
  
  
  
  
  
  
  
  
  
  
- 2.) Suppose there are 22 different lunches served at CHS throughout the year. How many students must attend CHS to guarantee that at least twenty students have the same favorite CHS lunch?
  
  
  
  
  
  
  
  
  
  
- 3.) How many people would you need to have in a crowd to be sure that at least seven people have the same birthday (month / day)?
  
  
  
  
  
  
  
  
  
  
- 4.) How many people must have 4-digit locks for their lockers to guarantee at least four of them have the same locker combination?
  
  
  
  
  
  
  
  
  
  
- 5.) 70,125 people attend a football game. What is the maximum number of people who were guaranteed to have the same birthday (month and day)?

- 6.) Forty-three different people have served as President of the United States under the US Constitution. A group of history teachers meets in Washington, D.C. to debate who was the best President in history. How many history teachers would have to attend to guarantee that at least 100 of them chose the same President as the best of all time?
- 7.) Approximately 750 people are in the CHS Auditorium. At least how many are guaranteed to have the same favorite color among red, blue, green, orange, yellow, purple, and pink?
- 8.) How many letters must someone have in their last name to guarantee that at least one letter appears three times?
- 9.) Some person's full name has 150 letters. What is the most number of times this person is guaranteed to have the same letter appear in his name?
- 10.) Suppose you select any 11 integers from  $\{1, 2, 3, \dots, 19, 20\}$ . Show that you must have two consecutive numbers in your list of 11.
- 11.) \*\* Jimmy has a collection of socks. He has 300 white socks, 200 black socks, 120 brown socks, 100 navy blue socks, 80 green socks, and 30 red socks. His drawer is dark and he cannot see the colors of the socks. What is the **fewest number of socks** Jimmy has to take from the drawer to be **sure** he has at least 10 pairs of matching socks?