

Assign 12B Most Challenging Counting Problems:

1. Montreal and Toronto are playing in the baseball World Series. (Games cannot end in a tie, and the first team to win four games wins the Series.) How many different outcomes are possible? Here are a couple: MMMM (Montreal won in four straight) and MMMTTTT (Montreal won the first three, but Toronto came back to win the Series).
2. An integer is “lucky” if its decimal representation has two or more identical neighbouring digits. So 2337 is lucky, as is 11145, but 2464 is not lucky. How many lucky numbers are there from 1000 to 9999 inclusive?
3. IN a school cafeteria, there are 2 different soups, 3 different main courses, and 3 different desserts. You are allowed to take at most one soup, at most one main course and up to three desserts (but you cannot have two or more servings of the same dessert). How many different meals could you have? Include in your count the “meal” in which you eat nothing.
4. Jason and his girlfriend both walk into a restaurant and they serve 3 types of appetizers, 5 main course, and 4 types of desserts. If you can have only 1 appetizer, up to 2 main courses and up to 3 types of desserts, how many different types of meals can Jason and his girlfriend have? You are allowed to have the same main course and dessert. However, either one of you must order something to be considered a meal.
5. How many 3 letter words can be made using letters chosen from the letters in “CANADA”? For example, “AND” is an acceptable word as are “AAA” and “DAA”. But “NCC” is not acceptable, since it has two C’s while “CANADA” has only one
6. Six soccer teams are competing in a tournament. Every team is to play three games, each against a different team. Note that not every pair of teams plays a game together. Judene is in charge of pairing up the teams to create a schedule of games that will be played. Ignoring the order and times of the games, how many different schedules are possible?

7. 3 pennies are placed on a 8 by 8 checker board. The pennies are placed in a way such that none of them share the same column. However, the 3 pennies can be placed so that either 2 of them share the same row or none of them share the same row. How many different ways can the pennies be placed?

Answer: \_\_\_\_\_

8. Twenty (20) people come to a party. We know that 11 of the people are friends with everyone else who came to the party. Also, the other 9 people each have exactly 13 friends at the party. (Assume that if "A" is a friend of "B", then B is a friend of A. Assume also that A is never a friend of A.) Each person shakes hands with each of his/her friends. What is total number of handshakes

9. The picture below shows 7 stools arranged in a row. Initially they were all unoccupied. Alfie chose a stool at random and sat down. Then Beti chose an empty stool at random and sat down. What is the probability that Alfie and Beti chose stools that are next to each other? Express your answer as a common fraction.

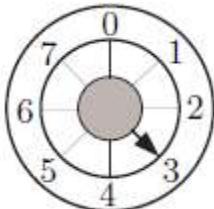


Answer: \_\_\_\_\_

10. A six team league has a schedule that requires each team to play every other team four times. What is the total number of games in the league ?

Answer: \_\_\_\_\_

11. A combination for a simple bicycle lock is a sequence (a, b, c), where a, b, and c can be any of 0, 1, 2, 3, 4, 5, 6, or 7, but adjacent numbers in the combination are different. For example (5, 0, 7) is a legitimate combination, as is (5, 0, 5), but (2, 4, 4) is not allowed. How many combinations ( combos) are possible, altogether?



12.