Name:_____ Date:_____

6.4b Counting Using the Piano Method

1. If I have 10 identical stones, how many ways can I split them into 4 groups?

2. 8 fair standard 6sided dice are rolled. How many ways can you get a sum of 12?

3. How many ways can three whole numbers add to 9?

4. How many ways can four whole numbers add to 15?

5. In a basketball game, a team of 6 players took 45 shots. How many ways can the 45 shots be distributed to the 6 players?

6. Tom walks to a buffet to pick his food. There are 5 types of meat, chicken, beef, pork, lamb, and fish. He can have up to 6 servings of any meat he wants. How many can he select his food?

7. You are ordering a half-dozen doughnuts (6), and need to choose from among four flavors: glazed, powdered, cream-filled, and jelly-filled. How many different doughnut orders are possible?

8. David has 10 coins in his pocket: nickels, dimes, and quarters. How many different combinations of coins can he have?

9. Each of the numbers from 1 to 10 are placed in a bag and three numbers are taken out with replacement. How many ways can the three numbers drawn add to a sum of 11?

10. Suppose Tom goes to a different buffet to eat. If there are "X" types of meat to choose from and he can have up to "Y" servings of any meat he wants, how many can he select his food in terms of "x" and "Y"?

11. Let a,b,c be three different positive integer. What is the number of triple pairs (a,b,c) such that the equation is true? $a+b+c<18$

12. Given that $0 \le x_1 \le x_2 \le x_3 \le x_4 \le 6$, how many ways are there to select $\left(x_1, x_2, x_3, x_4\right)$?

13. Given that $0 \le x_1 \le x_2 \le x_3 .... \le x_6 \le 20$, where $x_1, x_2, ... \; and \; x_6$ are whole numbers. How many different combinations of $\left(x_1, x_2, x_3, x_4, x_5, x_6\right)$ can there be?

14. Determine the number of 5-tuples of integers $\left(x_1, x_2, x_3, x_4, x_5\right)$ such that

Rule #1) $x_i \ge i \quad for \;\; 1 \le i \le 5$ and Rule #2) $\sum_{i=1}^{5} x_i = 25$

When 7 fair standard 6-sided dice are thrown, the probability that the sum of the numbers on the top faces is 10 can be written as

$$\frac{n}{6^7},$$

where n is a positive integer. What is n?

(A) 42 **(B)** 49 **(C)** 56 **(D)** 63 **(E)** 84