Name:_____ **Date:**_____

Combinatorics

1. In how many different ways can a 3-person committee be selected from 6?

_____

2. In a 7 horse race, Bill thinks horses 1, 4, 6 will be the top 3 horses in the race, but not necessarily in that order. If Bill is correct, how many different outcomes are possible?

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3. A committee of 3 students is to be selected from a group of 10 to be on a committee to plan a school trip. How many different committees can be selected?

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4. In a regular heptagon ABCDEFG, how many triangles can be constructed whose vertices are among the points A, B, C, D, E, F, and G?

_____

5. How many different 3-letter "words" are possible such that the letters of each word are in alphabetical order? (For example, the "word" ADF is in alphabetical order.)

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6. 3 pennies are to be placed onto a 5 b y 5 grid. How many ways can you place the 3 pennies such that non of them share the same row or column?

_____

7. An election has three different positions: President, Vice President, and Secretary. There are 4 people running for President, 3 for VP, and 5 for Secretary. If a person is voting on a ballot, how many ways can someone fill in the ballot. Assume that you can not submit an empty ballot.

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8. How many ways can 5 people A, B, C, D and E sit in a row if A must be to the left of B but not necessarily next to each other?

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9. How many ways can 3 boys and 3 girls sit in a row if:
    a. There are no restrictions on where they sit in the row?

    b. All the boys sit together, and all the girls sit together?

    c. Only the boys must sit together, the girls choosing the other seats?

10. A committee consists of 4 men and 2 women. A subcommittee is to be formed consisting of 1 man and 1 woman. In how many different ways can the subcommittee be formed?

11. There are 8 boys and 12 girls in a class. A team of 5 is to be formed with 3 girls. How many different teams are possible?

12. There are 8 boys and 12 girls in a class. A team of 5 is to be formed with 3 girls. If the teams must have at least 2 boys, how many different teams are possible?

13. Three boys and their girlfriends have 6 seats at a hockey game. In how many ways can they be seated if each couple must sit together?

14. There are ten teams in a school district compeittion. Each team plays each other team once. What is the total number of games played in the competition?

15. An intramural league has 4 teams. If each team is scheduled to play each of the remaining teams exactly twice during the season, how many games are scheduled

16. If there are 8 people in a room and each person shakes every other person's hand once, how many handshakes will there be?

17. Nine people apply for a job in which 2 people are selected to work in an office and 3 in the workyard. In how many different ways can the selection be made?