

## Permutations, Combinations and Probability

**Evaluate each expression.**

1)  ${}_8P_3$

2)  $3 \cdot {}_7P_4$

**Find the number of unique permutations of the letters in each word.**

3) STREET

4) NEUTRAL

**Evaluate each expression.**

5)  $\frac{{}_{21}C_{18}}{10}$

6)  $3 \cdot {}_{14}C_8$

**List all possible combinations.**

7) 4, 5, 6, 7, taken two at a time

8) ☺, ☀, ♥, ▲, taken two at a time

**State if each scenario involves a permutation or a combination.**

9) The batting order for eight players on a 10 person team.

10) A team of 14 soccer players needs to choose two players to refill the water cooler.

11) The student body of 165 students wants to elect three representatives.

12) The student body of 125 students wants to elect a president, vice president, and secretary.

**Find the number of possibilities in each scenario.**

13) There are 10 students at a meeting. They each give a Valentine's Day card to everyone else. How many cards were given?

14) Kathryn has homework assignments in four subjects. She only has time to do two of them.

15) A group of 35 people are going to run a race. The top three runners earn gold, silver, and bronze medals.

16) Darryl has homework assignments in six subjects. He only has time to do three of them.

17) There are 20 athletes at a meeting. They each give a Valentine's Day card to everyone else. How many cards were given?

18) A group of 50 people are going to run a race. The top three runners earn gold, silver, and bronze medals.

19) There are 10 applicants for two Computer Programmer positions.

20) The batting order for nine players on a 12 person team.