

## Permutations and Combinations WS 1

1. How many different ways can 5 cars be arranged on a carrier truck with room for 5 vehicles?

$${}_5P_5 = 5! = 120$$

2. A computer operator must select 4 jobs from among 10 available jobs waiting to be completed. How many different sequences are possible?

$${}_{10}P_4 = \frac{10!}{6!} = 5040$$

3. You are working on a prom planning committee with 5 other people. Your committee has to decide on two committee members randomly to present the prom theme to the student body. How many pairings are possible?

$${}_6C_2 = \frac{6!}{4!2!} = 15$$

4. A health inspector has time to visit 7 of the 20 restaurants on a list. How many different routes are possible?

$${}_{20}P_7 = \frac{20!}{13!} = 390,700,800$$

5. A pollster must randomly select 3 of 12 available people. How many different groups of 3 are possible?

$${}_{12}C_3 = \frac{12!}{9!3!} = 220$$

6. A union must elect 4 officers from 16 available candidates. How many different slates are possible if 1 candidate is nominated for each office?

$${}_{16}P_4 = \frac{16!}{12!} = 43680$$

7. A typical combination lock is opened with the correct sequence of 3 numbers between 0 and 49 inclusive. How many different sequences are possible? (A number can only be used once.) Are the sequences combinations or are they actually permutations?

$${}_{50}P_3 = \frac{50!}{47!} = 50 \cdot 49 \cdot 48 = 117600$$

8. A television program director has 14 shows available for Monday night, and 5 shows must be chosen. How many different possible combinations are there?

$${}_{14}C_5 = \frac{14!}{9!5!} = 2002$$

$$\frac{14 \cdot 13 \cdot 12 \cdot 11 \cdot 10}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}$$

9. How many ways can you rearrange the letters in the phrase "ILOVEMATH".

$${}_9P_9 = 9! = 362,880$$

10. In order to complete a quiz you must answer four questions from a list of twelve. How many different ways can you complete the quiz.

$${}_{12}C_4 = \frac{12!}{8!4!} = 495$$