

## Worksheet #5 -- Factorials, Permutations, and Combinations

1. Evaluate:

a.  $6! = 720$

b.  $7! = 5040$

c.  $0! = 1$

d.  $8! = 40320$

e.  $\frac{9!}{5!} = 3024$

f.  $\frac{10!}{3!} = 604,800$

g.  $\frac{12!}{3!(9!)} = 220$

2. In how many ways can you arrange four books on a shelf? 24

3. Liza wants to take three travel books with her on vacation. In how many ways can she do this if she has ten travel books to choose from? 120

4. A play has been written that requires a cast of three men. The roles are Mr. Atkins, Tom and Officer Flannigan. Seven men try out for the three roles. How many different casts are possible? 210

5. Another play requires a cast of four women. The roles are Angela, Pamela, Sandra, and Rita. How many casts are possible if ten women try out for the roles? 5040

6. From a class of 25 students, three are to be chosen to serve on the homecoming committee. In how many ways can this be done? 2300

7. How many four-letter words (real or imaginary) can be formed from the letters of the word "ANSWER"? 360

8. In how many ways can you draw five cards from a standard deck of cards? (Order does not matter) 2,598,960

9. In how many ways can you draw two queens from a standard deck of cards? (Order does not matter) 6

10. To play the California lottery, a person must correctly select 6 out of 51 numbers, paying \$1 for each six-number selection. What is the probability that a person with one combination of six numbers will win? What is the probability of winning if 100 different lottery tickets are purchased?  $\frac{1}{18009460} \cdot 100 = 5.553 \times 10^{-6}$

11. The math team has six boys and four girls. Three members are selected at random to attend a competition. Find the probability that the selected group consists of:

A. three boys  $\frac{1}{6} = .167$

B. two boys and one girl  $\frac{1}{2} = .5$