Extra Practice Problems: *Counting Rules*

- Basic Counting Rule
  The number of ways a sequence of n events can occur if the first event can occur in k_1 ways, the second in k_2 ways, etc. is equal to

$$k_1 \cdot k_2 \cdot \ldots \cdot k_n$$

- The number of permutations of n objects is

$$n!$$

- The number of permutations of n objects taking r objects at a time (order is important) is

$${}_nP_r = \frac{n!}{(n-r)!}$$

- The number of combinations of r objects taken from n objects is

$${}_nC_r = \frac{n!}{r!\,(n-r)!}$$

1. There are 8 different statistics books, 6 different geometry books, and 3 different trigonometry books. A student must select one book of each tyoe. How many different ways can this be done?

   (144)

2. How many 5-digit zip codes are possible if digits can be repeated? If there cannot be repetitions?

   (100,000; 30,240)

3. How many different ways can 6 radio commercials be played during 1-hour radio program?

   (720)

4. How many different 4-color code stripes can be made on a sports car if each code consists of the colors green, red, blue and white?

   (24)

5. How many different 4-letter permutations can be formed from the letters of the word decagon?

   (840)

6. How many different ways can 5 Public Service announcement be run during 1 hour time?

(120)

7. How many different test can be made from a test bank of 20 questions if the test consists of 5 questions?

(15,504)

15,504

8. How many different ways can a theatrical group select 2 musicals and 3 dramas from 11 musicals and 8 dramas to be presented during the year?

(3,080)

9. How many ways can a jury of 6 women and 6 men be selected from 10 women and 12 men?

(194,040)

10. How many wasy can a person select 8 videotapes from 10 tapes?

(45)