Lesson 3: Permutations Involving Identical Objects

GOAL:

- Determine the number of permutations possible when some of the elements are identical.

The next type of permutations that need to be explored is permutations of objects where some of the objects are identical.

Example 1

In how many ways can you re-arrange the letters in the word SEA? Once you have determined the number of ways it can be done, list the different ways.

$3 \times 2 \times 1 = 6$ different ways

SEA
AES
EAS
ESA
SAE
ASE

} 6 ways SEA can be arranged

Example 2

In how many ways can you re-arrange the letters in the word SEE? Is this answer different from example 1? List the different possibilities.

SEE
ESE
EES

3 ways

$$\frac{\#\text{ of objects }!}{\#\text{ of identical objects}} = \frac{3!}{2!}$$

$= 3$ different ways