

MA 110 SECTION 7.4: PERMUTATIONS & COMBINATIONS
HOMEWORK: 1, 3, 9, 11, 13, 25, 27, 29, 53, 55, 61, 63, 65

1. **FACTORIALS:**

If eight horses are entered in a race. How many ways can the horses finish?

Using the multiplication principle:

$$8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 8! \quad \text{DEFINITION IN TEXT PAGE 375}$$

CALCULATOR NOTE: The factorial command is under MATH PRB #4

2. Computing with factorials:

A. $9!$

B. $1000!/(1000 - 2)!$

C. $20!/(8!(20 - 8)!)$

3. **WORKSHEET:**
SPECIAL COUNTING TECHNIQUES: PERMUTATIONS & COMBINATIONS

4. **FORMULAS:**

A. **PERMUTATIONS: PAGE 377**

$$P_{n,r} = n!/(n - r)!$$

CALCULATOR: MATH PRB #2

B. **COMBINATIONS: PAGE 380**

$$C_{n,r} = P_{n,r}/r!$$

CALCULATOR MATH PRB #3

5. **EXAMPLES:**

- A. Molly has ten distinct figurines that she wants to arrange on a shelf. How many ways can she do this?

- B. Molly decides that all ten figurines make the shelf too cluttered. She decides to choose three figurines to put in storage. How many ways can she choose the three figurines for storage?

- C. Mary has seven different plants. She has room for four plants on her kitchen window sill. How many ways can she arrange four plants in her window?

- D. Three departments have 12, 15, and 18 members, respectively. If each department is to select a delegate and an alternate to represent the department at conference how many ways can this be done?

- E. A real estate company with 14 employees in their central office, 8 in their north office, and 6 in their south office is planning to lay off 12 employees.
 - i. How many ways can this be done?

 - ii. The company decides to lay off 5 employees from the central office, 4 from the north office, and 3 from the south office. In how many ways can this be done?