

Name: _____
UT EID: <u>Solution.</u>

(1) How many ways are there of ordering the set  $\{3, 5, 7, 9\}$  ?

The number of permutations of a set of 4 elements is  $4! = 24 = 4 \times 3 \times 2 \times 1$ .

(2) Consider the following modern classics.

- "Should I or Shouldn't I" by Charles Dickens.
- "Russian Parliaments" by Sasha Dumas.
- "The Other Side of the Tracks" by Herman Melville.
- "When Hell Freezes Over" by John Melting.
- "Jumonjiyari and Kamayari" by William Shakespear.
- "A History of Eastern European Automobiles" by Victor Yugo.

(a) How many ways are there of choosing an ordered selection of 3 books from this list ?

Number of ordered selections of 3 books from the list of 6 books is  ${}^6P_3 = \frac{6!}{(6-3)!} = 6 \times 5 \times 4 = 120$ .

Ordered selection means permutation.

(b) How many different ways are there of ordering these 3 books ?

The number of permutations of a set of 3 elements is  $3! = 3 \times 2 \times 1 = 6$ .

(c) How many ways are there of choosing 3 books from this collection if the books have to be in alphabetical order by author's surname ?

For each subset of 3 books there are 6 possible permutations. Every possible permutation is a permutation of an alphabetically ordered selection. Thus we get 1 out of each 6 3-permutation is in alphabetic order.

(d) Explain how you got the answer for (c).

Thus the total number is  $\frac{120}{6} = 20$ .