SOLUTIONS

KING FAHD UNIVERSITY OF PETROLUEM & MINERALS
Math 131 - Term 041
Quiz #4   Section: 1 & 2

Name: ID: Serial:

Q1 (3-Points):

a) How many different 4-letter words is possible using the word "QUESTION" if no letter is repeated?

$n = 8$ # of possible 4-letter words $= 8P_4 = \dfrac{8!}{4!} = 1680$ ①

or   [8 | 7 | 6 | 5] $\Rightarrow$ # of ways $= 8 \cdot 7 \cdot 6 \cdot 5$
                              $= 1680$.

b) How many distinguishable permutations of the letters are possible of the word "SUADIARABIA"?

$n = 11$, $n_1 = 1$, $n_2 = 1$, $n_3 = 4$, $n_4 = 1$, $n_5 = 2$, $n_6 = 1$, $n_7 = 1$ ②

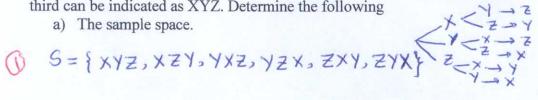# of distinguishable permutations $= \dfrac{11!}{1! \, 1! \, 1! \, 4! \, 1! \, 2! \, 1! \, 1!} = 831,600$

Q2 (3-Points)

A committee has five males and four females. In how many ways can a subcommittee of four be selected if at least tow females are to serve on it?

# of ways $= $#$(2F, 2M) + $#$(3F, 1M) + $#$(4F, 0M)$ ③

$= 4C_2 \cdot 5C_2 + 4C_3 \cdot 5C_1 + 4C_4 \cdot 5C_0$

$= (6)(10) + (4)(5) + (1)(1) = 60 + 20 + 1 = 81$.

Q3 (4-Points)

Persons X, Y, Z enter an office at different times. The person X arriving first, Y second, and Z third can be indicated as XYZ. Determine the following

a) The sample space.

① $S = \{XYZ, XZY, YXZ, YZX, ZXY, ZYX\}$

$X < \begin{matrix} Y \to Z \\ Z \to Y \end{matrix}$
$Y < \begin{matrix} X \to Z \\ Z \to X \end{matrix}$
$Z < \begin{matrix} X \to Y \\ Y \to X \end{matrix}$

b) The event E that Y arrives first

.5) $E = \{YXZ, YZX\}$

c) The event F that Z does not arrive third

.5) $F = \{XZY, YZX, ZXY, ZYX\}$

d) Find $\left(E \bigcap F\right)'$

.5) $E' = \{XYZ, XZY, ZXY, ZYX\}$

.5) $E' \cap F = \{XZY, ZXY, ZYX\}$

① $(E' \cap F)' = \{XYZ, YXZ, YZX\}$