Math 111 - Quiz 6
Nov 19 2010

Name:
Stu#: SOLUTIONS.

(1) [7] Suppose

$$U = \{0,1,2,3,4,5,6,7,8,9\}, \quad A = \{0,1,5,7\}, \quad B = \{0,2,3,5,8\}, \quad C = \{5,6,8,9\}$$

(i) Determine $\overline{B \cap A}$

$B \cap A = \{0,5\}$

$\therefore \overline{B \cap A} = \{1,2,3,4,6,7,8,9\}$

(ii) Determine $(A \cap B) \cup (B \cap C)$

$A \cap B = \{0,5\}$

$B \cap C = \{5,8\}$

$\therefore (A \cap B) \cup (B \cap C) = \{0,5,8\}.$

(2) [4] Using the 26 letters of the alphabet, how many different five letter codes are possible if adjacent letters within the codes must be different? (That is, a code can have multiple occurrences of the same letter, as in ababa, but codes having two of the same letter side-by-side are not permitted, as with aabab.)

There are 26 choices for the first letter, and 25 choices for each of the next 4 letters (since each letter after the first must differ from the one immediately before.)

$\therefore$ by the multiplication principle there are $(26)(25)(25)(25)(25) = 10,156,250$ possible codes.

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(3) [4] How many different ways are there of arranging the letters in the word SUNDAY if the arrangements must begin with S and end with Y?

S _ _ _ _ Y

This is equivalent to asking for the number of possible arrangements of the letters UNDA, which is $P(4,4) = 4! = 24$