

Math 421**Quiz 2**

Justify all answers with neat and organized work. Clearly indicate your answers.
20 points possible.

1. (10 pts.) A coin is tossed four times, and the sequence of heads and tails is observed.

(a) List each of the 16 sequences in the sample space S .

Let A , B , C , and D be given by $A = \{\text{at least 3 heads}\}$, $B = \{\text{at most 2 heads}\}$, $C = \{\text{heads on the third toss}\}$, and $D = \{\text{1 head and 3 tails}\}$. If the probability set function assigns $1/16$ to each outcome in the sample space, find the following.

(b) $P(D)$

(c) $P((B \cap D)')$

(d) $P(D | B)$

(e) $P(A | C)$

2. (5 pts.) (a) How many six-letter code words are possible using the letters in MULDER if the letters may not be repeated?

(b) How many six-letter code words are possible using the letters in MULDER if the letters may be repeated?

(c) How many rearrangements of the letters in SAMANTHA are possible?

3. (5 pts.) Use the formula

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

to prove the formula

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C).$$