

STAT 3332 Statistics for Life Sciences

Fall 2006

Quiz 2

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Your Name (Please **PRINT CLEARLY**):

Your *Signature*:

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1. The sample space of outcomes for a roll of a die is  $S = \{1, 2, 3, 4, 5, 6\}$ . Consider three events:  $A = \{1, 6\}$ ,  $B = \{1, 3, 5\}$ , and  $C = \{1, 3, 5, 6\}$ . Then (encircle best answer)

$C = A \text{ union } B$        $C = A \text{ intersection } B$        $C = A \times B$        $C = \frac{A}{B}$

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2. (Continuation) Let probability function  $P$  attach equal probability  $1/6$  to the six outcomes in  $S$ . Then  $A$  and  $B$  above are *independent*, and this fact is justified by (encircle best answer)

- (A)  $P(A) \neq P(B)$ .
- (B)  $P(A \cap B) = P(A) \times P(B)$ .
- (C)  $P(A \cap B) \neq P(A) \times P(B)$ .
- (D)  $P(A \cup B) \neq P(A) + P(B)$ .
- (E)  $A$  and  $B$  are mutually exclusive.

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3. (Continuation) For  $A$  and  $B$  as above, the conditional probability of  $A$  given  $B$  is (encircle)

- (A)  $P(A | B) = \frac{P(A \cup B)}{P(B)} = \frac{4/6}{3/6} = 4/3$ .
- (B)  $P(A | B) = \frac{P(A \cap B)}{P(B)} = \frac{1/6}{3/6} = 1/3$ .
- (C)  $P(A | B) = P(A) \times P(B) = (2/6) \times (3/6) = 6/36 = 1/6$ .
- (D)  $P(A | B) = \frac{P(A)}{P(B)} = \frac{2/6}{3/6} = 2/3$ .

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4. *Cardiovascular Disease*. Suppose for a population of persons it is known that

$P(\text{person is hypertensive}) = .02$ ,  
 $P(\text{person is normal}) = .98$ ,  
 $P(\text{hypertensive person has chest pain}) = .10$ ,  
 $P(\text{normal person has chest pain}) = .05$ .

Then the probability that a randomly selected person has chest pain is (encircle)

$.10 + .05 = .15$        $.98 \times .05 = .049$        $.98 \times .05 + .02 \times .10 = .051$

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5. (Continuation) The conditional probability  $P(\text{normal} | \text{chest pain}) =$  (encircle)

$\frac{.049}{.051} = .96$        $.049$        $.98$

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