

STAT 3332 Statistics for Life Sciences

Spring 2007

Quiz 2

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

Your *Signature*:

1. The sample space of outcomes for tossing 3 coins is

$$S = \{HHH, HHT, HTH, HTT, THH, THT, TTH, TTT\}.$$

Consider two events:  $A = \{HHT, HTH, THH\}$  and  $B = \{HHT, TTH\}$ . Their *union* is

$$A \cup B =$$

2. (Continuation) And their *intersection* is

$$A \cap B =$$

3. (Continuation) Let probability function  $P$  attach equal probability  $1/8$  to the eight outcomes in  $S$ . Then the conditional probability of  $A$  given  $B$  is (encircle best answer)

(A)  $P(A|B) = \frac{P(A \cup B)}{P(B)} = \frac{4/8}{2/8} = 2.$

(B)  $P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{1/8}{2/8} = 1/2.$

(C)  $P(A|B) = P(A) \times P(B) = (3/8) \times (2/8) = 6/64 = 3/32.$

(D)  $P(A|B) = \frac{P(A)}{P(B)} = \frac{3/8}{2/8} = 3/2.$

4. *Cardiovascular Disease*. For a population of persons, let

$$A = \{\text{person exhibits chest pain}\}$$

$$B = \{\text{person is hypertensive}\}.$$

Suppose it is known that

$$P(\text{person exhibits chest pain}) = P(A) = .051,$$

$$P(\text{person is hypertensive}) = P(B) = .020,$$

$$P(\text{person both exhibits chest pain and is hypertensive}) = P(A \cap B) = .002.$$

Then the probability that a randomly selected person exhibits chest pain or is hypertensive or satisfies both conditions is  $P(A \cup B) =$  (encircle best answer)

$$.051 + .020 + .002 = .073$$

$$.051 \times .020 = .00102$$

$$\boxed{.051 + .020 - .002 = .069}$$

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

$$\frac{.020}{.051} = .392$$

$$\boxed{\frac{.002}{.051} = .039}$$

$$\frac{.002}{.069} = .029$$

$$\frac{.051}{.020} = 2.55$$