

STA 4321/5325

Quiz 1

Fall 2010

Name: \_\_\_\_\_

All problems have exactly one correct answer.

*Problem 1* Consider an experiment which consists of tossing a fair die (6 faces) 200 times. The total number of possible outcomes for the complete experiment is

- (a)  $6^{200}$ .
- (b)  $200^6$ .
- (c) 200.
- (d) 6.

200 tasks, each with 6 possible choices.  
Hence, the number of outcomes  
 $= \underbrace{6 \times 6 \times \dots \times 6}_{200 \text{ times}} = 6^{200}$ .

*Problem 2* If  $S$  is the sample space of a random experiment, then

- (a)  $P(S) = 1$ .
- (b)  $P(S) > 1$ .
- (c)  $P(S) = 0.5$ .
- (d)  $P(S) < 1$ .

See Lecture 2.

*Problem 3* If  $A$  and  $B$  are mutually exclusive events, then  $P(A \cap B) = 0$ . This statement is

- (a) True.
- (b) False.

$P(A \cap B) = P(\emptyset) = 0$ . See Lecture 2

*Problem 4* The total number of ways of choosing  $r$  objects from  $n$  objects **without replacement** when order is **not important** is

- (a)  $C_r^{n+r-1}$ .
- (b)  $n^r$ .
- (c)  $C_r^n$ .
- (d)  $P_r^n$ .

Another way to represent  $\binom{n}{r}$  is  $C_r^n$ .  
Both quantities are equal to  $\frac{n!}{r!(n-r)!}$ .

Problem 5 Consider a random experiment which consists of tossing a fair coin 3 times. If  $A$  denotes the event that there are exactly 2 heads, then

(a)  $P(A) = \frac{1}{8}$ .

$$|S| = 2 \times 2 \times 2 = 8$$

(b)  $P(A) = \frac{1}{4}$ .

(c)  $P(A) = \frac{5}{8}$ .

$$\begin{aligned} A &= \text{There are exactly two heads} \\ &= \{HHT, THH, HTH\} \end{aligned}$$

(d)  $P(A) = \frac{3}{8}$ .

$$|A| = 3.$$

Since all outcomes are equally likely,

$$P(A) = \frac{3}{8}.$$