

Probability Handout – STAT 509 – Fall 2011

**For all these problems, show fully how you got your answers!**

1. The following table summarizes the race and positions of NBA players in 1993.

Race:	<u>Position</u>			Totals
	Guard	Forward	Center	
White	26	30	28	84
Black	128	122	34	284
Totals	154	152	62	368

Suppose one player is chosen at random from this group. Let us define the following events:

A = {the selected player is white}

B = {the selected player is a center}

C = {the selected player is black}

D = {the selected player is a guard}

(a) Find  $P(A)$ .

(b) Find  $P(B)$ .

(c) Find  $P(C \cap D)$ .

(d) Find the probability that the player is NOT a guard.

(e) Find  $P(A \cup B)$ .

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2. For two **independent events** A and B, suppose  $P(A) = 0.4$  and  $P(B) = 0.2$ .

(a) Find  $P(A \cap B)$ .

(b) Find  $P(A | B)$ .

(c) Find  $P(A \cup B)$ .

3. Define the two events A and B as follows:

$A = \{\text{we have rain tomorrow}\}$  and  $B = \{\text{we have 10-plus mph wind tomorrow}\}$ .

Assume  $P(A) = 0.4$ ,  $P(B) = 0.2$ , and  $P(A \cap B) = 0.1$ .

(a) What is the probability that we have **at least one** of either rain **or** 10-mph wind tomorrow?

(b) What is the probability of rain tomorrow, **given that** we have 10-mph wind?

(c) Are events A and B independent? Give a mathematical justification for your answer.

4. (a) Suppose events A and B are independent and that  $P(A) = 0.3$  and  $P(B) = 0.4$ . What is  $P(A \cup B)$ ? What is  $P(A | B)$ ?

(b) Are A and B mutually exclusive events? Why or why not?

5. In a country club, 60% of the members use the golf course, 80% use the tennis courts, and 5% use neither facility. For a randomly selected member, consider events  $G = \{\text{uses the golf course}\}$  and  $T = \{\text{uses the tennis courts}\}$ .

(a) *Given that a randomly selected member uses the tennis courts*, what is the probability that this member uses the golf course?

(b) Based on your answer to part (a), are T and G independent events? Why or why not?

Answers: (1) a) .2283 b) .1685 c) .3478 d) .5815 e) .3207 (2) a) .08 b) .4 c) .52  
(3) a) .5 b) .5 c) No (4) a) .58, .3 b) No (5) a) .5625 b) No