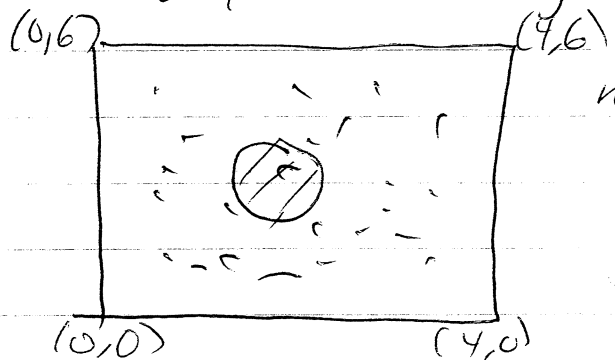


1. I asked my computer to place 10000 uniformly distributed points in a rectangle with vertices  $(0,0)$ ,  $(4,0)$ ,  $(4,6)$ , and  $(0,6)$ . I found that 1423 of them were in a circle of radius  $r$ . Using the method, what is a good estimate for  $r$ .

Math 461  
HW1  
Handwritten  
Due Fri 9/4  
10 AM



not necessarily  
to scale.

Don't look for a "nice" answer.

2. A tetrahedral die has 1, 2, 3, 4 written on its faces. All 16 possible rolls of two tetrahedral dice are equally likely and chosen from the data set

$$\{2, 3, 4, 5, 3, 4, 5, 6, 4, 5, 6, 7, 5, 6, 7, 8\}$$

Let  $A$  be the event that you choose an even number  $\{2, 4, 6, 8\}$  and let  $B$  be the event that you choose a prime  $\{2, 3, 5, 7\}$ .

Determine (a)  $P(A)$  (b)  $P(B)$  (c)  $P(A \cup B)$  (d)  $P(A \cap B)$   
(e)  $P(A^c \cap B)$  (f)  $P(A \cup B^c)$

Venn diagrams may help.

3. You have a deck of four cards numbered 1, 2, 3, 4. You choose one card and then choose a different card, and look at the sum of the two cards. Answer the same questions as in 2. Big hint: not all answers are the same!

4. Let  $\Omega$  be the outcome of three flips of a fair coin. That is,  $\Omega = \{HHH, HHT, \dots, TTT\}$ . Let  $A$  be the event that the first flip equals the second flip. Let  $B$  be the event that the first flip is different from the third flip. Let  $C$  be the event that the second flip is different from the third flip. Determine  $P(A)$ ,  $P(B)$ ,  $P(C)$ ,  $P(A \cap B)$ ,  $P(A \cap C)$ ,  $P(B \cap C)$ ,  $P(A \cap B \cap C)$