Discrete Mathematics – Day 38 – Monday, Nov. 29, 2004

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Each card drawn from a standard 52 card deck is assumed to be equally likely

See handout for these responses

A). Prob[event] #favorable outcomes/total # possible outcomes = 13/52 = 1/4

B). Prob[not club] 39/52 = ¾

C). Prob[it's a 3] 4/52 = 1/13

D). Prob[1^{st} is 6] 1/6

E). Prob[2^{nd} is different from 1^{st}] 5/6

For the second die, it just needs to be different from the first die. There are 5 out of 6 outcomes for that die which are different.

F). Prob[sum is even] standard die {1 2 3 4 5 6}
{1 2 3 4 5 6} Prob[even] = ½

Ryan's dice {2 4 6 8 10 12}
{1 2 3 5 7 9} Prob[even] = 1/6

My dice {1 3 5 5 5 7}
{1 2 3 4 7 8} Prob[even] = ½

Show all outcomes:

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Even 18/36 = ½

Prime Sum 15/36

$2^{nd} > 1^{st}$ 15/36

G). Prob[3^{rd} is heads] = ½

H). Prob[1^{st} heads and 5^{th} heads] = ½ * ½ = ¼

I). HHHHH 2 * 2 * 2 * 2 * 2 = 32
HHHHT
HHHTH 2 possibilities of all heads or all tails
:
TTTTTT 2/32 = 1/16

Or we could use the multiplication rule for probability. The first coin can come up any way, and each successive coin has a ½ chance of matching the first coin:
1 * ½ * ½ * ½ * ½ = 1/16
The first is arbitrary and the next four must be the same as the first.

J). Prob[exactly 3 heads] 5!/ 2!3! = 5*4/2 = 10 10/32 = 5/16

HHHTT find the anagrams of these letters

Now suppose we have 7 dice of various sorts:
7 dice {1 2 2 2 2 2 } 3 of these dice
{1 1 1 1 2 2 } 2 of these dice
{1 3 4 5 6 8 } 1 of these dice
{1 2 3 4 5 6 } 1 of these dice
What is the probability that the sum is even when these dice are tossed?

Prob[sum is even] = ½

As long as one dice is ½ even and ½ odd , even # won't change even/ odd outcome but odd # will change