CS2022/MA2201
HW#7 SOLUTIONS

1) (*a*) 1/64 (*b*) 3/64 (*c*) 1/8.

2) The probabilities of the three outcomes are not equal. The probability that both are heads is ¼.

3) (*a*) $10/10^5$ (*b*) $9^5/10^5$.

4. (*a*) 15/40
(*b*) 35/40
(*c*) There are 15*14 ways to choose two history books, and 40*39 ways to choose two books. Thus, the answer is $\frac{15*14}{40*39}$.
(*d*) This is the complement of the event of choosing two books from the same discipline, which is the union of the events of chossing two math (history, geography) books. Hence, $1-\frac{20*19+15*14+5*4}{40*39}$.

5) There are $C(48,6)$ ways to choose 6 distinct losing numbers, and $C(54,6)$ ways to choose 6 distinct numbers. Hence, the answer is $C(48,6)/\ C(54,6)$.

6) (*a*)There are $C(10,5)$ ways to choose 5 men, and $C(10,5)$ ways to choose 5 women. Hence, there are $C(10,5)+\ C(10,5)$ ways to choose 5 men or 5 women. There are $C(20,5)$ ways to choose 5 people. Hence, the answer is $\frac{C(10,5)+C(10,5)}{C(20,5)}$.

(*b*) $\frac{C(10,4)}{C(20,4)}$

7) 1/16

8) E={001, 010, 100, 111} and $p(E)$=1/2. F={100, 101, 110, 111} and $p(F)$=1/2. $E\cap F=\{100,111\}$ and $p(E\cap F)=1/4$. Since $p(E)*p(F)=1/4=p(E\cap F)$, we can conclude that E and F are independent.