MATH 407 FALL 2009

QUIZ 3

1. You have two coins. Coin 1 is unbiased (P(heads) = P(tails) = 1/2) and Coin 2 is biased, with P(heads) = 1/4, P(tails) = 3/4. With probability 1/3 you choose Coin 1 and with probability 2/3 you choose Coin 2, and you will flip whichever coin you choose. Compute the probability of heads.

2. You wish to randomly select a number from the set $\{1, 2, 3, 4\}$ with equal probability (i.e. P(1)=P(2)=P(3)=P(4)=1/4). All you have is a standard six-sided die labeled $\{1, 2, 3, 4, 5, 6\}$, each number occuring with probability 1/6. You decide to roll the die, and if it is a 5 or a 6, roll again, otherwise record the value shown on the die. Prove that this method randomly generates a number from $\{1, 2, 3, 4\}$ with equal probability.