1. A fair die is rolled 25 times. Let X be the number of times a six is obtained. Find the exact value of P( X=6) and compare it with a normal approximation of P( X=6).
2. (Dice Sums). Suppose a fair die is rolled 1000 times. Compute an approximation to the probability that the sum of the 1000 rolls will exceed 3600.
3. (Dice Sums). How many times should a fair die be rolled if you want to be 99% sure that the sum of all the rolls will exceed 100?
4. (A Gambling Example). It costs one dollar to play a certain slot machine in Las Vegas. The machine is set by the house to pay two dollars with net winnings on the ith play of the machine. Then Sn=Σin=1 Xi is the house’s winnings after n plays of the machine. Assuming that successive plays are independent, find
5. E(Sn)
6. Var(Sn)
7. The approximate probability that after 10,000 plays of the machine the house’s winnings are between 800 and 1100 dollars.
8. (Test Your Intuition). Suppose a fair coin is tossed 100 times. Is it more likely that you will get exactly 50 heads or that you will get more than 60 heads?
9. (Test Your Intuition). Suppose a fair die is rolled 60 times. Is it more likely that you will get at least 20 sixes or that you will score a total of at least 250?