Instructions

These questions are to help with reviewing the material covered since Test 4.

1. Suppose that a fair die is marked with one dot on one side, two dots on two sides and three dots on three sides. What is the expected number of dots shown when this die is rolled?

2. What are the variance and the standard deviation of the number of dots shown when the die of the previous question is rolled?

3. What is the probability that a random person who tests positive for a certain blood disease actually has the disease, if we know that 1% of the population actually has the disease, that 95% of those who actually have the disease test positive for it, and that 2% of those who do not have the disease test positive for it?

4. Find a recurrence relation for the number of ways to climb a flight of $n$ stairs if they must be climbed two or three at a time. Give initial conditions for your recurrence, then calculate how many ways there are to climb a flight of eight stairs.

5. Find the solution of the linear homogeneous recurrence relation $a_n = 7a_{n-1} - 6a_{n-2}$ with $a_0 = -1$ and $a_1 = 4$.

6. Find the solution of the linear nonhomogeneous recurrence relation $a_n = 3a_{n-1} + 2^n$ with $a_0 = 0$. 