

GENERATING FUNCTIONS ASSIGNMENT

1. You have two unusual six-sided dice. One has faces numbered 1, 1, 2, 3, 3, and 5, while the second has faces numbered 1, 2, 4, 5, 6, and 7. Each face has an equal likelihood of being rolled.

Give the probabilities that each possible roll is obtained.

2. You have two standard six-sided dice, but they are *loaded*; that is, each face is not equally likely to come up.

On the first die, each odd number is twice as likely to be rolled as each even number. On the second die, the opposite is true: each even number is twice as likely to be rolled as each odd number.

What is the probability that a given roll of the dice is even? odd?

3. A coin has a $\frac{5}{9}$ chance of turning up heads, and a $\frac{4}{9}$ chance of turning up tails. What is the probability of getting exactly 6 heads in 10 rolls?

4. In the country of Krzł, there is a strange monetary system. There are only two coins – a 5-cent coin and a 7-cent coin. So you can never buy anything which costs *exactly* 4 cents. Of course, anyone selling goods at the market cannot sell something for an amount which cannot be made with 5-cent and 7-cent coins.

List all the amounts (starting with 1 cent) which *cannot* be made with 5-cent and 7-cent coins.

5. You want to solve the equation $x + y + z = 10$ where x , y , and z are all positive integers (some numbers could be the same). How many ways are there to do this?