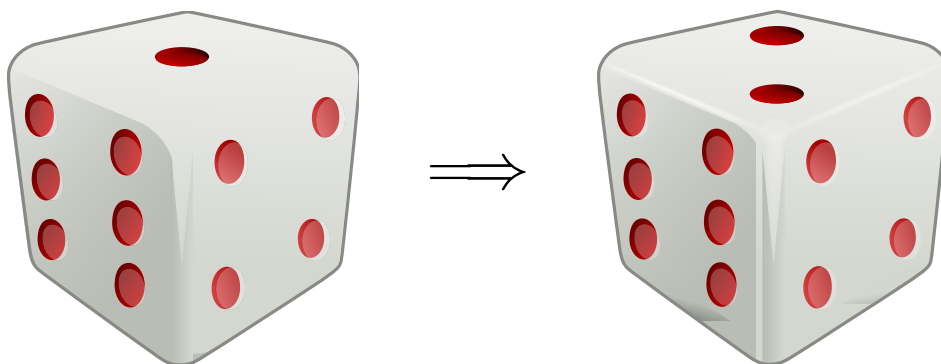


Problem of the Week

Problem D

This Die is Magic

A die has the numbers 1, 2, 3, 4, 6, and 8 on its six faces. When this die is rolled, if an odd number appears on the top face, all of the odd numbers on the die magically double. For example, if the number appearing on the top face was a 1, the 1 and 3 on the original die would double and the other four numbers would remain the same. (This is illustrated below.)



However, if an even number appears on the top face as a result of the roll, all of the even numbers on the die are halved. For example, if the number appearing on the top face was an 8, the 2, 4, 6, and 8 on the original die would change to half of their initial value and the other two numbers would remain the same.

Suppose the die with 1, 2, 3, 4, 6, and 8 on its six faces is rolled once and changes as described above. The changed die is rolled again. No change occurs when the die is rolled this time. What is the probability that the number appearing on the top face after this roll is a 2?

