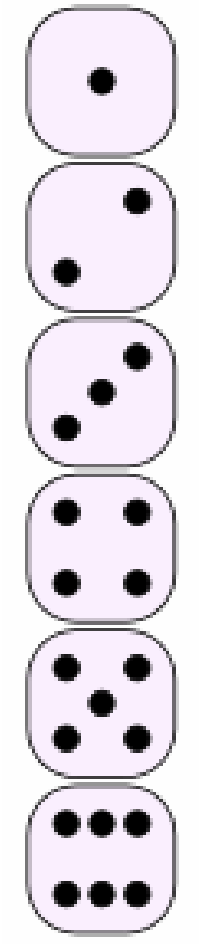
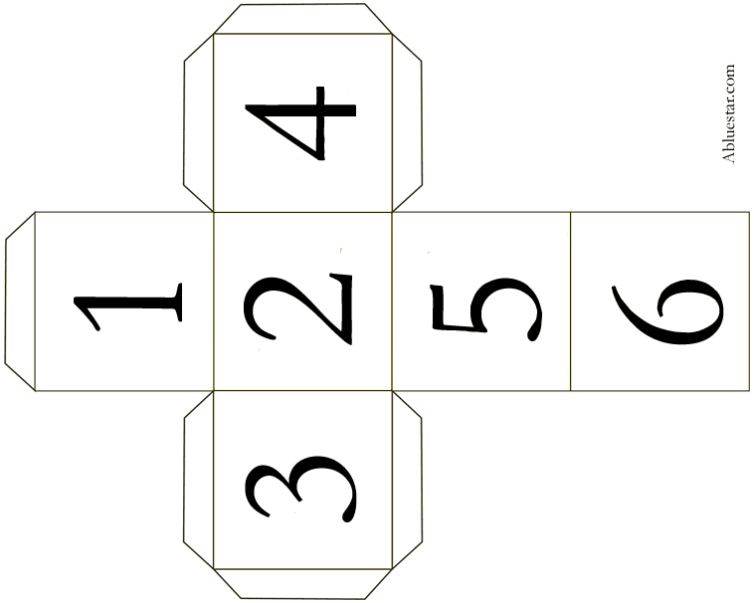
Probability: Dice

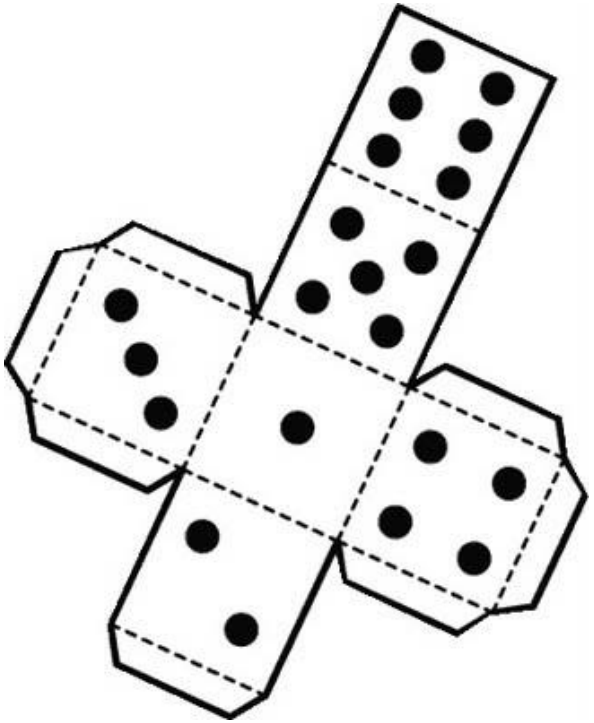
Dice are thrown to provide random numbers for gambling and other games, and thus are a type of hardware random number generator. The result of a die roll is random in the sense of lacking predictability, not lacking cause. Exactly how dice are thrown determines how they will land according to the laws of classical mechanics. However, dice also can exhibit sensitive dependence on initial conditions, making it difficult to predict the outcome of a die roll even with good information about exactly how it is thrown.

Dice are thrown, singly or in groups, from the hand or from a cup or box designed for the purpose, onto a flat surface. The face of each die that is uppermost when it comes to rest provides the value of the throw. A typical dice game today is craps, wherein two dice are thrown at a time, and wagers are made on the total value of up-facing pips on the two dice. They are also frequently used to randomize allowable moves in board games, usually by deciding the distance through which a piece will move along the board; examples of this are ludo and backgammon.

Source: http://en.wikipedia.org/wiki/Dice



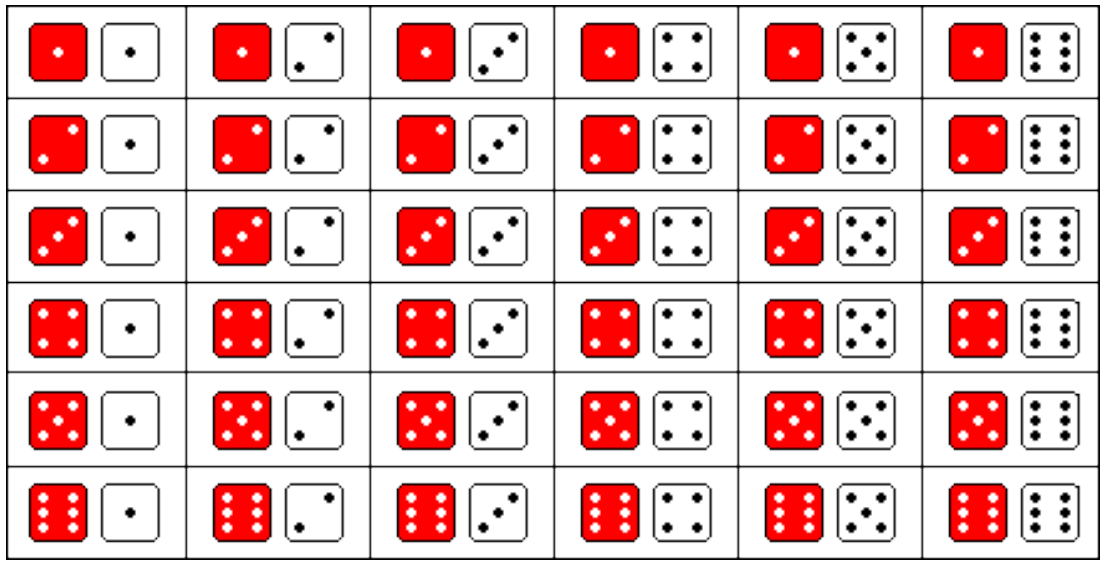




Probability: Dice

When you roll just one die, there are six different ways the die can land.

When two dice are rolled, there are now 36 different and unique ways the dice can come up. This figure is arrived at by multiplying the number of ways the first die can come up (six) by the number of ways the second die can come up (six). 6 x 6 = 36.



This graphic shows this very nicely. We've used two different colored dies to help show a roll of 2-1 is different from a roll of 1-2.

If you use the above graphic and count the number of times is 6 appears when two dice are rolled, you will see the answer is eleven. Eleven times out of 36 or 30.5 %, slightly less than the 33.3% (2/6). When you roll two dice, you have a 30.5 % chance at least one 6 will appear.

This figure can also be figured out mathematically, without the use of the graphic. One way to do so is to take the number of ways a single die will NOT show a 6 when rolled (five) and multiply this by the number of ways the second die will NOT show a 6 when rolled. (Also five.) 5 x 5 = 25. Subtract this from the total number of ways two dice can appear (36) and we have our answer...eleven.

Determine the chances of at least one 6 appearing when three dice are rolled.

Take the chances of a 6 NOT appearing on the first die... 5/6

and multiply this by the chances of a 6 NOT appearing on the second die... 5/6 x 5/6 = 25/36

and multiply this by the chances of a 6 NOT appearing on the third die... 25/36 x 5/6 = 125/216

So, there are 125 out of 216 chances of a 6 NOT appearing when three dice are rolled. Simply subtract 125 from 216 which will give us the chances a 6 WILL appear when three dice are rolled, which is 91. 91 out of 216 or 42.1 %.

Source: Edward D. Collins, http://www.edcollins.com/math-questions.htm