

# Statistical Analysis of Dice

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## Introduction

This document contains charts to help illustrate the statistical difference between rolling different combinations of dice. These charts are meant to compliment Fear the Boot, episode 28. For more information on how dice-related math can affect your game, be sure to download that episode.

Throughout this document, we use the dice notation that's common to most RPGs. This notation looks something like: 3d6. If you have never seen this before, it's very easy to understand. Simply read it like a sentence...

"3d6 means I should roll 3 dice with 6 sides."

"2d8 means I should roll 2 dice with 8 sides."

"1d10 means I should roll 1 die with 10 sides."

Whenever rolling multiple dice in this fashion, it is assumed you should always add the numbers together. So if you roll 2d4 (2 dice with 4 sides), getting a 2 on one die and a 4 on the other, your result was 6.

Continue on to the next page for the analyses of common dice combinations.

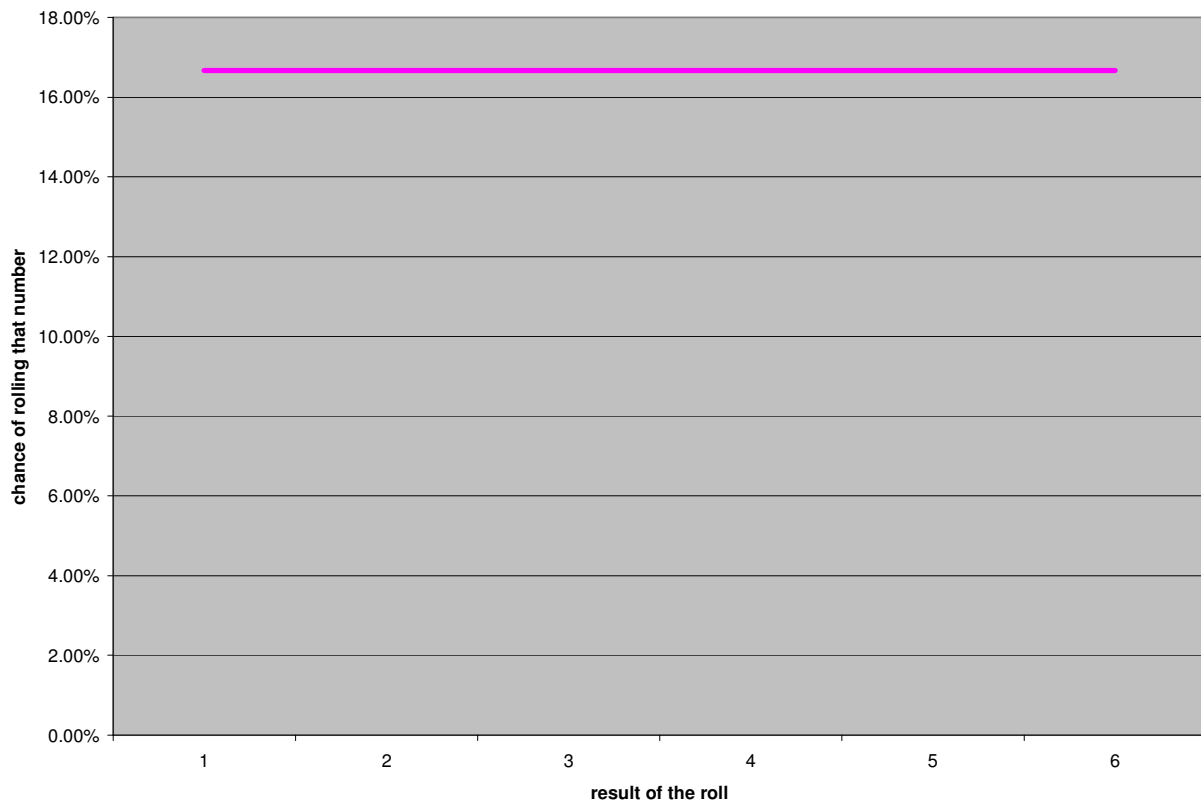
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## I. 1d6

While 1d6 is not a common decision-making roll in most RPGs, we are still including it for comparison purposes against 2d6 and 3d6 rolling. Since rolling 1d6 uses only one die, there is an equal chance of any possible result being rolled. In this case, the chance is  $1/6$  or 16.67%.

Total Roll	% Chance
1	16.67%
2	16.67%
3	16.67%
4	16.67%
5	16.67%
6	16.67%



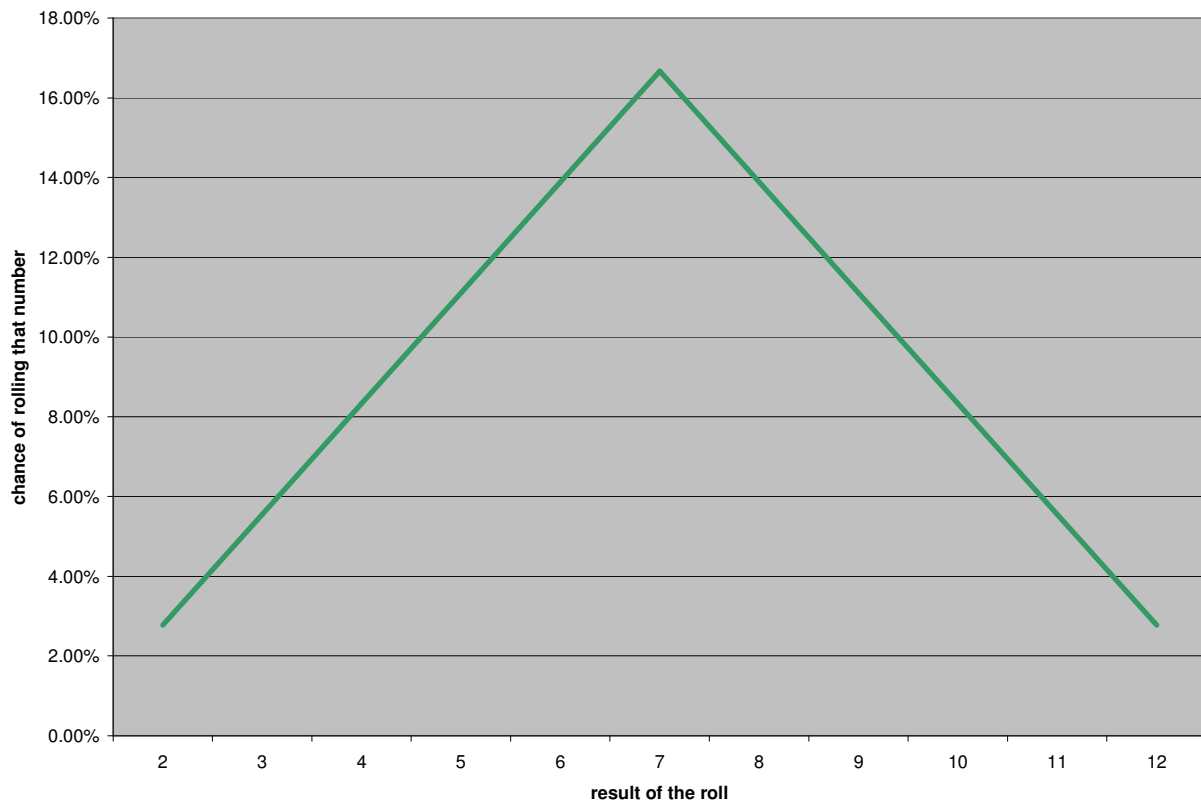
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## II. 2d6

When two dice are involved, notice how the possible results begin to bunch up toward the middle numbers. This makes it more likely that rolls will be "average" instead of outstandingly high or low. To help illustrate the point, we have included the following chart to show all the possible combinations when two six-sided dice are rolled.

Total Roll	% Chance
2	2.78%
3	5.56%
4	8.33%
5	11.11%
6	13.89%
7	16.67%
8	13.89%
9	11.11%
10	8.33%
11	5.56%
12	2.78%

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

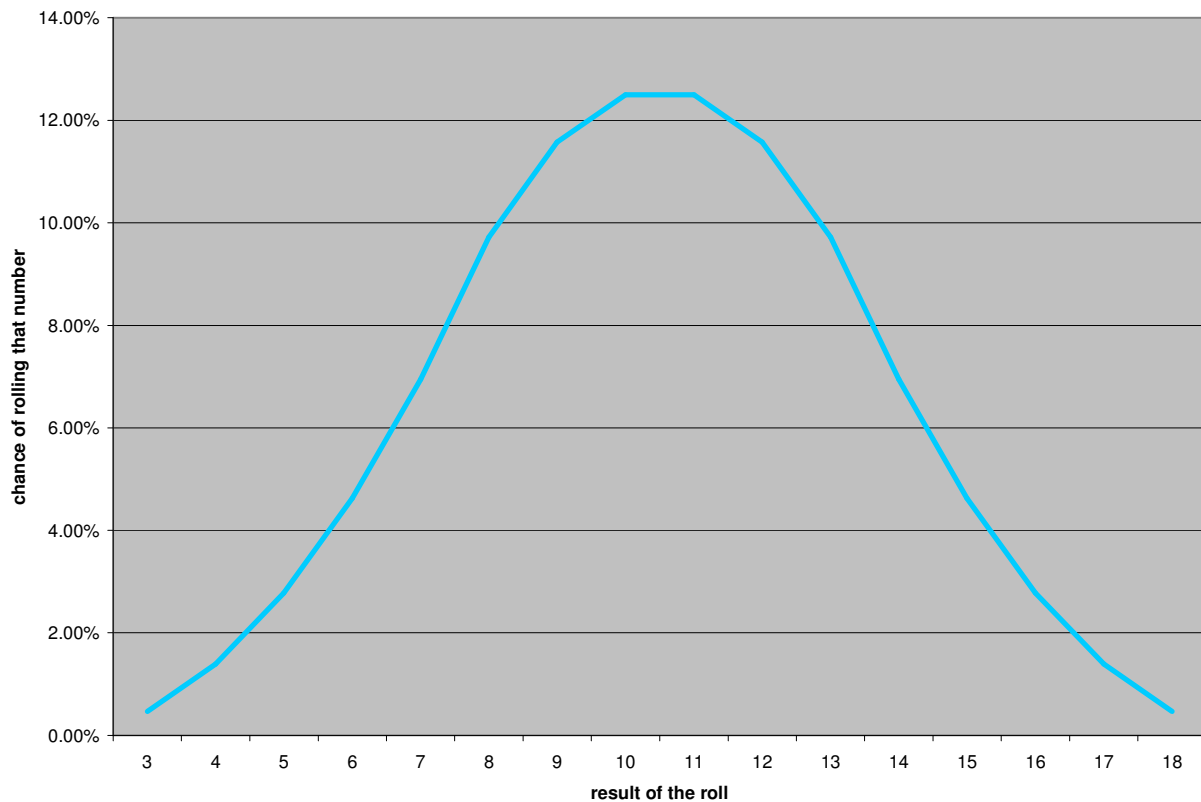


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## III. 3d6

Adding a third die (or fourth or fifth or...) only makes the middle rolls even more likely. Conversely, the high and low rolls become less likely. While this sort of average may be attractive for some games, it also means the players will have to add up more dice when making success checks.

Total Roll	% Chance
3	0.46%
4	1.39%
5	2.78%
6	4.63%
7	6.94%
8	9.72%
9	11.57%
10	12.50%
11	12.50%
12	11.57%
13	9.72%
14	6.94%
15	4.63%
16	2.78%
17	1.39%
18	0.46%



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## IV. 1d20

Rolling 1d20 has very similar results to 1d6: you have an equal chance of rolling any result. We are including the 1d20 chart since it is currently in popular use through the D20 System.

Total Roll	% Chance
1	5.00%
2	5.00%
3	5.00%
4	5.00%
5	5.00%
6	5.00%
7	5.00%
8	5.00%
9	5.00%
10	5.00%

Total Roll	% Chance
11	5.00%
12	5.00%
13	5.00%
14	5.00%
15	5.00%
16	5.00%
17	5.00%
18	5.00%
19	5.00%
20	5.00%

