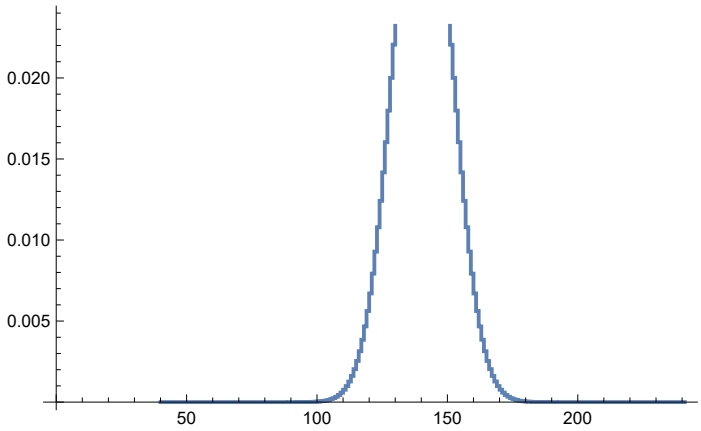
Resources
https://mathematica.stackexchange.com/questions/268990/how-can-i-efficiently-calculate-exact-probability-distributions-for-dd-dice-lik

https://mathematica.stackexchange.com/questions/164151/combine-two-lists-with-all-possible-combinations

https://rpg.stackexchange.com/questions/15971/is-it-possible-to-produce-a-bowl-shaped-probability-curve-with-dice-rolls

In[•]:=
```
exactDice[sides_] := Sum[1/Abs[sides] x^(Sign[sides] * n), {n, 1, Abs[sides]}]
diceList = Table[6, 40];
ndice = Length@diceList;
diceDistribution = Product[exactDice[d], {d, diceList}];
probs = CoefficientList[diceDistribution * x^Abs[Total[diceList]], x];
probs = DeleteCases[probs, 0];
values = Exponent[diceDistribution, x, List];
ListStepPlot[Thread[{values, probs}]]
```

Out[•]=



A combination-based method. Create tuples to enumerate each possible roll. Sum. Count.

In[•]:=
```
d6 = Range[6];
d12 = Range[12];
dn[sides_] := Range[sides];
diceList = Table[dn[20], 2];
Times @@ (Length /@ diceList)
```

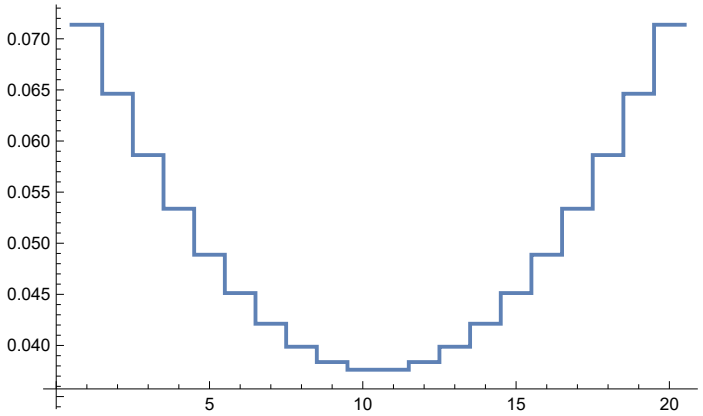
Out[•]=

400

In[•]:=
```
plotRolls[outcomes_] :=
 ListStepPlot[
  KeySort[
   Counts[outcomes] / Length[outcomes]
  ],
  "Center"
 ]
```

In[•]:=
```
plotRolls[Join[Min /@ Tuples[diceList], Max /@ Tuples[diceList]]]
```

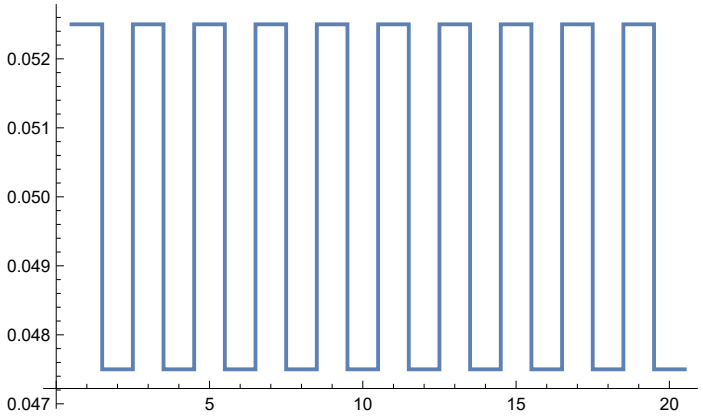
Out[•]=



In[•]:=
```
sortedRoller[list_] := If[Mod[Median[list], 2] == 0, Max[list], Min[list]]
summedRoller[list_] := If[Mod[Total[list], 2] == 0, Max[list], Min[list]]
```

In[•]:=
```
plotRolls[summedRoller /@ Tuples[diceList]]
```

Out[•]=



In[•]:=
```
Counts[summedRoller /@ Tuples[diceList]]
```

Out[•]=

⟨| 1 → 21, 3 → 21, 5 → 21, 7 → 21, 9 → 21, 11 → 21, 13 → 21, 15 → 21, 17 → 21, 19 → 21,
2 → 19, 4 → 19, 6 → 19, 8 → 19, 10 → 19, 12 → 19, 14 → 19, 16 → 19, 18 → 19, 20 → 19 |⟩

In[•]:=
```
Counts[Total[Tuples[diceList], {2}]]
```

Out[•]=

$$\langle| 5 \to 1, 6 \to 5, 7 \to 15, 8 \to 35, 9 \to 70, 10 \to 126, 11 \to 205, 12 \to 305, 13 \to 420, 14 \to 540, 15 \to 651, 16 \to 735, 17 \to 780, 18 \to 780, 19 \to 735, 20 \to 651, 21 \to 540, 22 \to 420, 23 \to 305, 24 \to 205, 25 \to 126, 26 \to 70, 27 \to 35, 28 \to 15, 29 \to 5, 30 \to 1 |\rangle$$

In[•]:=
```
Counts[Total[Tuples[diceList], {2}]] / (Times @@ (Length /@ diceList))
```

Out[•]=

$$\left\langle\left| 5 \to \frac{1}{7776}, 6 \to \frac{5}{7776}, 7 \to \frac{5}{2592}, 8 \to \frac{35}{7776}, 9 \to \frac{35}{3888}, 10 \to \frac{7}{432}, 11 \to \frac{205}{7776}, 12 \to \frac{305}{7776}, 13 \to \frac{35}{648}, 14 \to \frac{5}{72}, 15 \to \frac{217}{2592}, 16 \to \frac{245}{2592}, 17 \to \frac{65}{648}, 18 \to \frac{65}{648}, 19 \to \frac{245}{2592}, 20 \to \frac{217}{2592}, 21 \to \frac{5}{72}, 22 \to \frac{35}{648}, 23 \to \frac{305}{7776}, 24 \to \frac{205}{7776}, 25 \to \frac{7}{432}, 26 \to \frac{35}{3888}, 27 \to \frac{35}{7776}, 28 \to \frac{5}{2592}, 29 \to \frac{5}{7776}, 30 \to \frac{1}{7776} \right|\right\rangle$$

In[•]:=
```
KeySort[%]
```

Out[•]=

$$\left\langle\left| 5 \to \frac{1}{7776}, 6 \to \frac{5}{7776}, 7 \to \frac{5}{2592}, 8 \to \frac{35}{7776}, 9 \to \frac{35}{3888}, 10 \to \frac{7}{432}, 11 \to \frac{205}{7776}, 12 \to \frac{305}{7776}, 13 \to \frac{35}{648}, 14 \to \frac{5}{72}, 15 \to \frac{217}{2592}, 16 \to \frac{245}{2592}, 17 \to \frac{65}{648}, 18 \to \frac{65}{648}, 19 \to \frac{245}{2592}, 20 \to \frac{217}{2592}, 21 \to \frac{5}{72}, 22 \to \frac{35}{648}, 23 \to \frac{305}{7776}, 24 \to \frac{205}{7776}, 25 \to \frac{7}{432}, 26 \to \frac{35}{3888}, 27 \to \frac{35}{7776}, 28 \to \frac{5}{2592}, 29 \to \frac{5}{7776}, 30 \to \frac{1}{7776} \right|\right\rangle$$

In[•]:=
```
ListStepPlot[%36, Center]
```

Out[•]=