

ND -- Number of dice

$$\begin{array}{r} 378 \\ \hline 43 \end{array}$$

In[12]:= Kurtosis[Dist]

Out[12]=

$$\frac{451}{175}$$

In[13]:= NS = 6; Results = {};

For[ND = 1, ND ≤ 6, ND++,

gen = Normal[Series[Dice[NS, ND, x], {x, 0, NS * ND}]];

Dist = {};

For[i = ND, i ≤ NS * ND, i++,

For[j = 1, j ≤ SeriesCoefficient[gen, {x, 0, i}], j++,

AppendTo[Dist, i]

](* end For Loop j *)

](* end For Loop i *);

mytuple = {};

AppendTo[mytuple, ND];

AppendTo[mytuple, Mean[Dist]];

AppendTo[mytuple, Variance[Dist]];

AppendTo[mytuple, 3 - Kurtosis[Dist]];

AppendTo[Results, mytuple];

](* end For Loop ND *); Print[Results]

$$\left\{ \left\{ 1, \frac{7}{2}, \frac{7}{2}, \frac{222}{175} \right\}, \left\{ 2, 7, 6, \frac{111}{175} \right\}, \left\{ 3, \frac{21}{2}, \frac{378}{43}, \frac{74}{175} \right\}, \right. \\ \left. \left\{ 4, 14, \frac{432}{37}, \frac{111}{350} \right\}, \left\{ 5, \frac{35}{2}, \frac{4536}{311}, \frac{222}{875} \right\}, \left\{ 6, 21, \frac{23328}{1333}, \frac{37}{175} \right\} \right\}$$

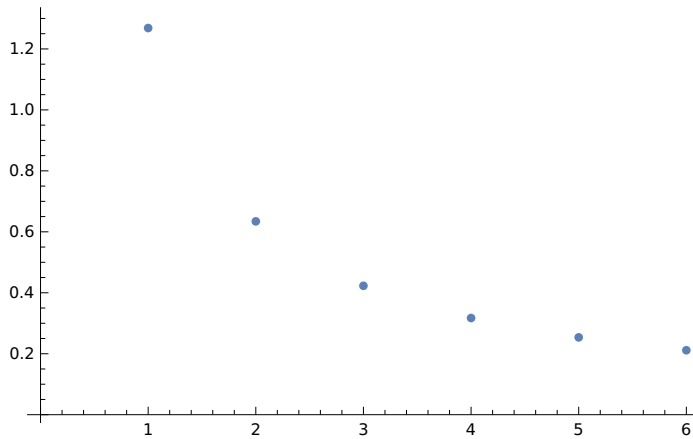
In[15]:= kurts = Results[[1 ;; -1, {1, 4}]]

Out[15]=

$$\left\{ \left\{ 1, \frac{222}{175} \right\}, \left\{ 2, \frac{111}{175} \right\}, \left\{ 3, \frac{74}{175} \right\}, \left\{ 4, \frac{111}{350} \right\}, \left\{ 5, \frac{222}{875} \right\}, \left\{ 6, \frac{37}{175} \right\} \right\}$$

In[16]:= ListPlot[kurts]

Out[16]=



In[17]:= FindFit[kurts, a * x^b, {a, b}, x]

Out[17]=

{a → 1.26857, b → -1.}

In[27]:= NS = 6; Results = {};

For[ND = 1, ND ≤ 6, ND++,

gen = Normal[Series[Dice[NS, ND, x], {x, 0, NS * ND}]];

Dist = {};

For[i = ND, i ≤ NS * ND, i++,

For[j = 1, j ≤ SeriesCoefficient[gen, {x, 0, i}], j++,

AppendTo[Dist, i]

](* end For Loop j *)

](* end For Loop i *);

mytuple = {};

AppendTo[mytuple, ND];

AppendTo[mytuple, Mean[Dist]];

(* AppendTo[mytuple, Variance[Dist]]; *)

AppendTo[mytuple, Variance[Dist]];

AppendTo[mytuple, (3 - Kurtosis[Dist])];

AppendTo[Results, mytuple];

](* end For Loop ND *) ; Print[Results]

$\left\{ \left\{ 1, \frac{7}{2}, \frac{7}{2}, \frac{222}{175} \right\}, \left\{ 2, 7, 6, \frac{111}{175} \right\}, \left\{ 3, \frac{21}{2}, \frac{378}{43}, \frac{74}{175} \right\}, \right.$
 $\left. \left\{ 4, 14, \frac{432}{37}, \frac{111}{350} \right\}, \left\{ 5, \frac{35}{2}, \frac{4536}{311}, \frac{222}{875} \right\}, \left\{ 6, 21, \frac{23328}{1333}, \frac{37}{175} \right\} \right\}$

In[20]:= DiceVar[ND_, NS_] := ND * NS^ (ND - 1) * (NS^ 3 - NS) / (12 * (NS^ ND - 1))

In[29]:= **DiceVar[4, 6]**

Out[29]=

$$\frac{432}{37}$$

In[30]:= **DiceDefKurt[ND_, NS_] := 6 * (NS ^ 2 + 1) / (5 * (NS ^ 2 - 1) * ND)**

In[32]:= **DiceDefKurt[4, 6]**

Out[32]=

$$\frac{111}{350}$$

In[33]:= **DiceDefKurt[1, 6]**

Out[33]=

$$\frac{222}{175}$$

In[34]:= **N[DiceDefKurt[1, 6]]**

Out[34]=

1.26857