Lösungen / Statistik 1/07

```
Remove["Global`*"]

<< Statistics`DescriptiveStatistics`;
<< Statistics`DataManipulation`;
<< Graphics`Graphics`;
```

1.

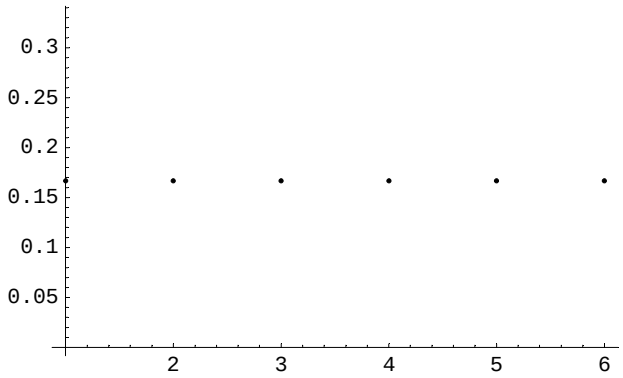
```
t1 = Table[{n, 1 / 6}, {n, 1, 6}]
```

$$\left\{\left\{1, \frac{1}{6}\right\}, \left\{2, \frac{1}{6}\right\}, \left\{3, \frac{1}{6}\right\}, \left\{4, \frac{1}{6}\right\}, \left\{5, \frac{1}{6}\right\}, \left\{6, \frac{1}{6}\right\}\right\}$$

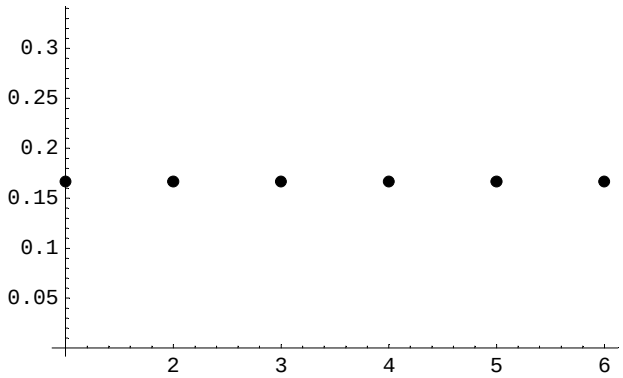
```
t11 = t1 /. {x1_, x2_} → {x2, x1}
```

$$\left\{\left\{\frac{1}{6}, 1\right\}, \left\{\frac{1}{6}, 2\right\}, \left\{\frac{1}{6}, 3\right\}, \left\{\frac{1}{6}, 4\right\}, \left\{\frac{1}{6}, 5\right\}, \left\{\frac{1}{6}, 6\right\}\right\}$$

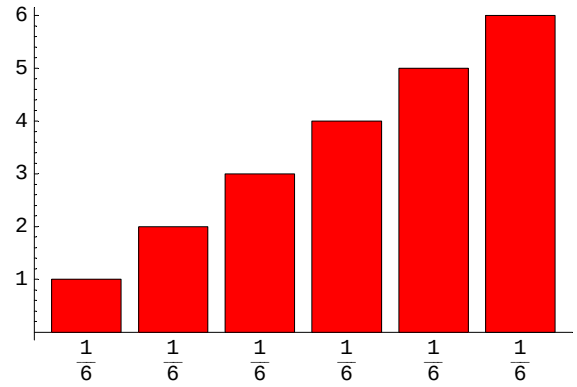
```
ListPlot[t1];
```




```
ListPlot[t1, PlotStyle → PointSize[0.02]];
```

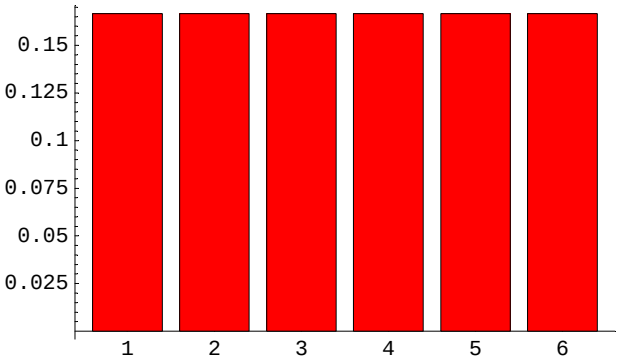


```
BarChart[t1];
```



Falsch !/ Faux!

```
BarChart[t11];
```

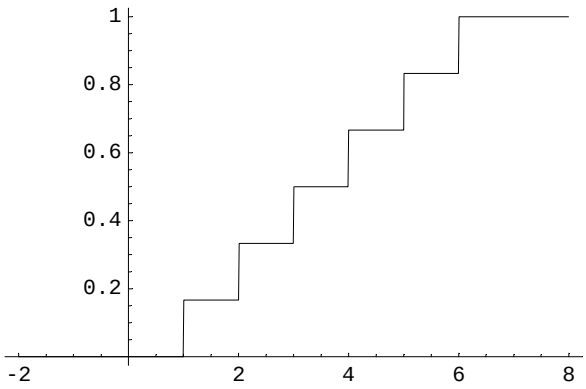



```
sum1[x_] := Sum[t1[[Floor[x]]][[2]], {n, 1, Floor[x]}] /; x ≤ 6;
sum1[x_] := 1 /; x > 6;

{sum1[-2.5], sum1[-1], sum1[0], sum1[0.5],
 sum1[1], sum1[1.5], sum1[2], sum1[6], sum1[7]}
```

$$\left\{0, 0, 0, 0, \frac{1}{6}, \frac{1}{6}, \frac{1}{3}, 1, 1\right\}$$

```
Plot[sum1[x], {x, -2, 8}];
```



2.

```
t2 = Table[a + b, {a, 1, 6}, {b, 1, 6}] // Flatten
```

```
{2, 3, 4, 5, 6, 7, 3, 4, 5, 6, 7, 8, 4, 5, 6, 7, 8,
 9, 5, 6, 7, 8, 9, 10, 6, 7, 8, 9, 10, 11, 7, 8, 9, 10, 11, 12}
```

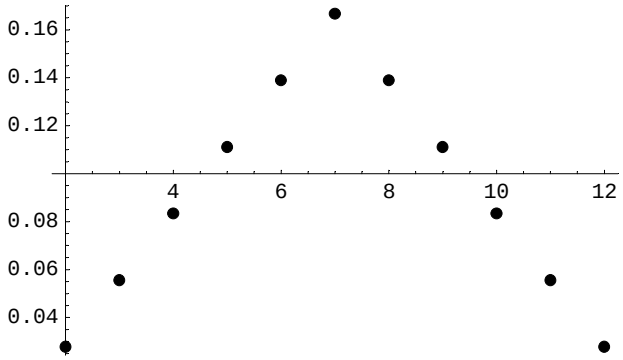
```
t21 = Frequencies[t2]
```

```
{{1, 2}, {2, 3}, {3, 4}, {4, 5}, {5, 6}, {6, 7}, {5, 8}, {4, 9}, {3, 10}, {2, 11}, {1, 12}}
```

```
t22 = t21 /. {x1_, x2_} → {x2, x1 / (6^2)}
```

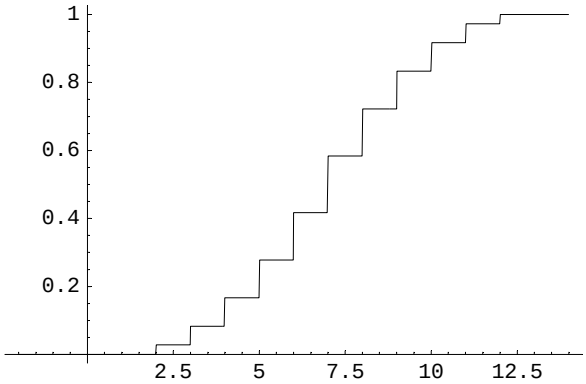
$$\left\{\left\{2, \frac{1}{36}\right\}, \left\{3, \frac{1}{18}\right\}, \left\{4, \frac{1}{12}\right\}, \left\{5, \frac{1}{9}\right\}, \left\{6, \frac{5}{36}\right\}, \left\{7, \frac{1}{6}\right\}, \left\{8, \frac{5}{36}\right\}, \left\{9, \frac{1}{9}\right\}, \left\{10, \frac{1}{12}\right\}, \left\{11, \frac{1}{18}\right\}, \left\{12, \frac{1}{36}\right\}\right\}$$

```
ListPlot[t22, PlotStyle → PointSize[0.02]];
```




```
sum2[x_] := Sum[t22[[Floor[n - 1]]][[2]], {n, 2, Floor[x]}] /; x ≤ 12;
sum2[x_] := 1 /; x > 12;
```

```
Plot[sum2[x], {x, -2, 14}];
```



3.

```
t3 = Table[a + b + c, {a, 1, 6}, {b, 1, 6}, {c, 1, 6}] // Flatten
```

```
{3, 4, 5, 6, 7, 8, 4, 5, 6, 7, 8, 9, 5, 6, 7, 8, 9, 10, 6, 7, 8, 9, 10, 11, 7, 8, 9, 10, 11,
 12, 8, 9, 10, 11, 12, 13, 4, 5, 6, 7, 8, 9, 5, 6, 7, 8, 9, 10, 6, 7, 8, 9, 10, 11, 7, 8,
 9, 10, 11, 12, 8, 9, 10, 11, 12, 13, 9, 10, 11, 12, 13, 14, 5, 6, 7, 8, 9, 10, 6, 7, 8,
 9, 10, 11, 7, 8, 9, 10, 11, 12, 8, 9, 10, 11, 12, 13, 9, 10, 11, 12, 13, 14, 10, 11,
 12, 13, 14, 15, 6, 7, 8, 9, 10, 11, 7, 8, 9, 10, 11, 12, 8, 9, 10, 11, 12, 13, 9, 10,
 11, 12, 13, 14, 10, 11, 12, 13, 14, 15, 11, 12, 13, 14, 15, 16, 7, 8, 9, 10, 11, 12, 8,
 9, 10, 11, 12, 13, 9, 10, 11, 12, 13, 14, 10, 11, 12, 13, 14, 15, 11, 12, 13, 14, 15,
 16, 12, 13, 14, 15, 16, 17, 8, 9, 10, 11, 12, 13, 9, 10, 11, 12, 13, 14, 10, 11, 12,
 13, 14, 15, 11, 12, 13, 14, 15, 16, 12, 13, 14, 15, 16, 17, 13, 14, 15, 16, 17, 18}
```

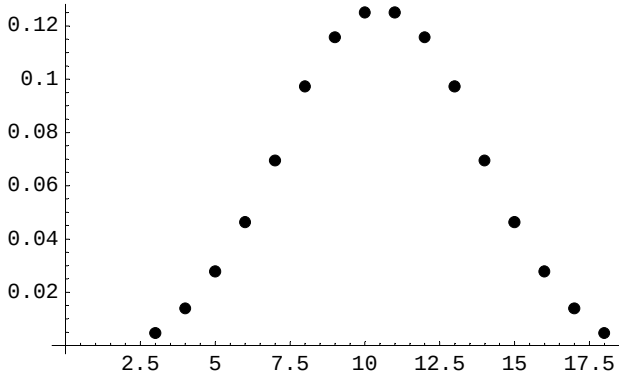
```
t31 = Frequencies[t3]
```

```
{{1, 3}, {3, 4}, {6, 5}, {10, 6}, {15, 7}, {21, 8}, {25, 9}, {27, 10},
 {27, 11}, {25, 12}, {21, 13}, {15, 14}, {10, 15}, {6, 16}, {3, 17}, {1, 18}}
```

```
t32 = t31 /. {x1_, x2_} → {x2, x1 / (6^3)}
```

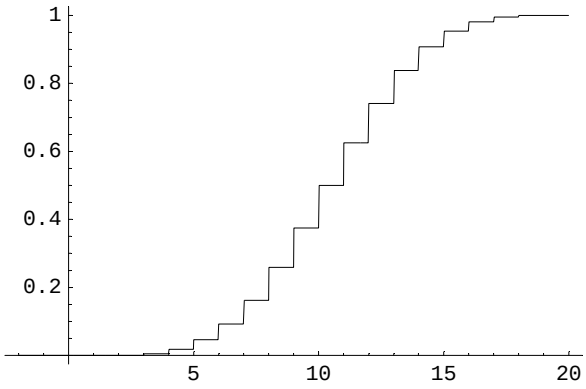
$$\left\{\left\{3, \frac{1}{216}\right\}, \left\{4, \frac{1}{72}\right\}, \left\{5, \frac{1}{36}\right\}, \left\{6, \frac{5}{108}\right\}, \left\{7, \frac{5}{72}\right\}, \left\{8, \frac{7}{72}\right\}, \left\{9, \frac{25}{216}\right\}, \left\{10, \frac{1}{8}\right\}, \left\{11, \frac{1}{8}\right\}, \left\{12, \frac{25}{216}\right\}, \left\{13, \frac{7}{72}\right\}, \left\{14, \frac{5}{72}\right\}, \left\{15, \frac{5}{108}\right\}, \left\{16, \frac{1}{36}\right\}, \left\{17, \frac{1}{72}\right\}, \left\{18, \frac{1}{216}\right\}\right\}$$

```
ListPlot[t32, PlotStyle → PointSize[0.02]];
```




```
sum3[x_] := Sum[t32[[Floor[n - 2]]][[2]], {n, 3, Floor[x]}] /; x ≤ 18;
sum3[x_] := 1 /; x > 18;
```

```
Plot[sum3[x], {x, -2, 20}];
```



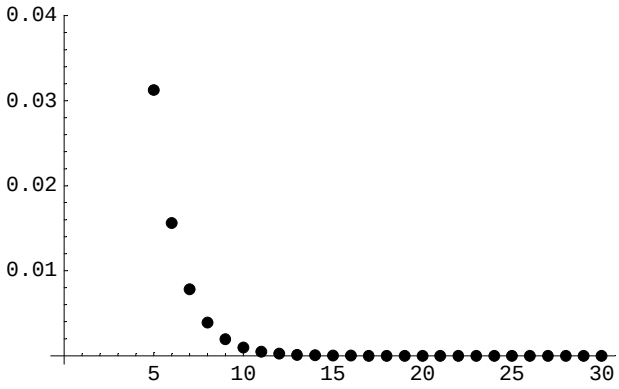
4.

```
max = 30;
```

```
t4 = Table[1 / 2^k, {k, 1, max}]
```

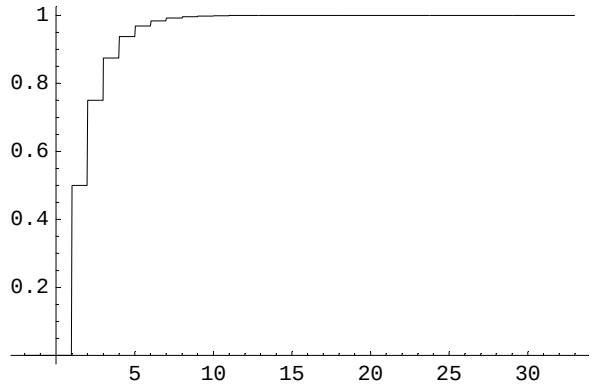
$$\left\{\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \frac{1}{64}, \frac{1}{128}, \frac{1}{256}, \frac{1}{512}, \frac{1}{1024}, \frac{1}{2048}, \frac{1}{4096}, \frac{1}{8192}, \frac{1}{16384}, \frac{1}{32768}, \frac{1}{65536}, \frac{1}{131072}, \frac{1}{262144}, \frac{1}{524288}, \frac{1}{1048576}, \frac{1}{2097152}, \frac{1}{4194304}, \frac{1}{8388608}, \frac{1}{16777216}, \frac{1}{33554432}, \frac{1}{67108864}, \frac{1}{134217728}, \frac{1}{268435456}, \frac{1}{536870912}, \frac{1}{1073741824}\right\}$$

```
ListPlot[t4, PlotStyle → PointSize[0.02]];
```




```
sum4[x_] := Sum[t4[[n]], {n, 1, Floor[x]}] /; x ≤ max;
sum4[x_] := 1.000 /; x > max;
```

```
Plot[sum4[x], {x, -2, max + 3}];
```



5.

```
t5 = Table[a + b + c + d, {a, 1, 2}, {b, 1, 2}, {c, 1, 2}, {d, 1, 2}] // Flatten
```

```
{4, 5, 5, 6, 5, 6, 6, 7, 5, 6, 6, 7, 6, 7, 7, 8}
```

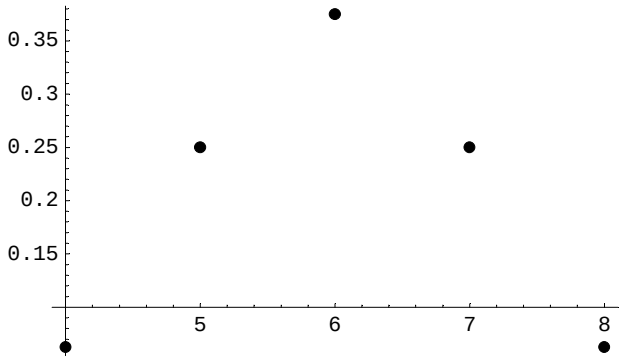
```
t51 = Frequencies[t5]
```

```
{{1, 4}, {4, 5}, {6, 6}, {4, 7}, {1, 8}}
```

```
t52 = t51 /. {x1_, x2_} → {x2, x1 / (2^4)}
```

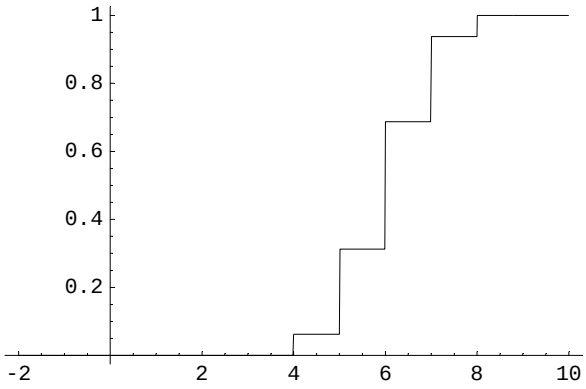
$$\left\{\left\{4, \frac{1}{16}\right\}, \left\{5, \frac{1}{4}\right\}, \left\{6, \frac{3}{8}\right\}, \left\{7, \frac{1}{4}\right\}, \left\{8, \frac{1}{16}\right\}\right\}$$

```
ListPlot[t52, PlotStyle → PointSize[0.02]];
```




```
sum5[x_] := Sum[t52[[Floor[n - 3]]][[2]], {n, 4, Floor[x]}] /; x ≤ 8;
sum5[x_] := 1 /; x > 8;
```

```
Plot[sum5[x], {x, -2, 10}];
```



6.

```
d = 4; o = 6; t = d + o;

p1d = d / t;
p1o = o / t;
p2dd = p1d * (d - 1) / (t - 1);
p2od = p1o * d / (t - 1);
p2do = p1d * o / (t - 1);
p2oo = p1o * (o - 1) / (t - 1);

p1d + p1o
```

1

```
p2dd + p2od + p2do + p2oo
```

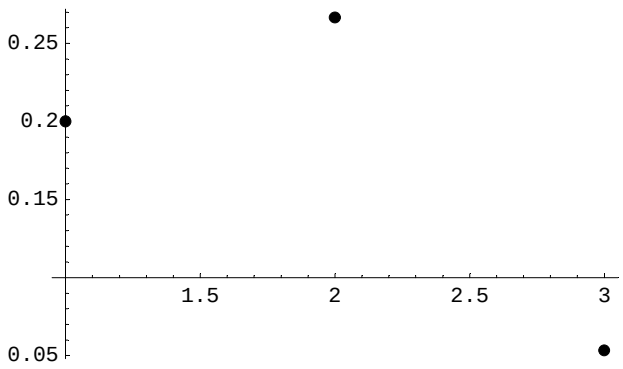
1

```
X[0] = p1o * p2oo;
X[1] = p1o * p2od + p1d * p2do;
X[2] = p1d * p2dd;

t6 = {X[0], X[1], X[2]}
```

$$\left\{\frac{1}{5}, \frac{4}{15}, \frac{4}{75}\right\}$$

```
ListPlot[t6, PlotStyle → PointSize[0.02]];
```



```
sum6[x_] := Sum[t6[[Floor[n + 1]]], {n, 0, Floor[x]}] /; x ≤ 2;
sum6[x_] := t6.{1, 1, 1} /; x > 2;

Plot[sum6[x], {x, -2, 4}];
```