

Probleme mit Frequenztabellen

```
In[11]:= Remove["Global`*"]
```

1 Aus einer Zählstatistik

Total der Klassen

```
In[12]:= (* m1 = Klassenmittenmenge; m2= Klassenfrequenzen; *)
```

```
    m1 = {145, 155, 165, 175, 185, 195, 205, 215, 225};  
    m2 = {1, 4, 6, 10, 16, 14, 10, 7, 2};  
    klassenTotal = m1 m2
```

```
Out[14]= {145, 620, 990, 1750, 2960, 2730, 2050, 1505, 450}
```

a Stichprobenumfang

```
In[15]:= tot = Apply[Plus, m2]
```

```
Out[15]= 70
```

b Histogramme, BarCharts, Plots

```
In[16]:= << Graphics`Graphics`
```

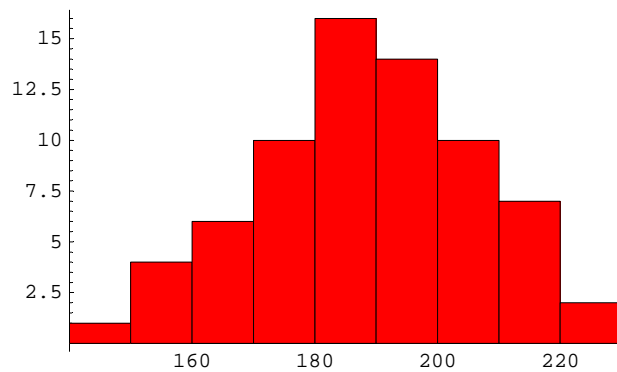
```
In[17]:= tab1 = Table[m1[[k]], {k, 1, Length[m2]}, {j, 1, m2[[k]]}]
```

```
Out[17]= {{145}, {155, 155, 155, 155}, {165, 165, 165, 165, 165, 165},  
          {175, 175, 175, 175, 175, 175, 175, 175, 175, 175},  
          {185, 185, 185, 185, 185, 185, 185, 185, 185, 185, 185, 185, 185, 185, 185, 185},  
          {195, 195, 195, 195, 195, 195, 195, 195, 195, 195, 195, 195, 195, 195, 195},  
          {205, 205, 205, 205, 205, 205, 205, 205, 205},  
          {215, 215, 215, 215, 215, 215, 215}, {225, 225}}
```

```
In[18]:= tab2 = tab1 // Flatten
```

```
Out[18]= {145, 155, 155, 155, 155, 165, 165, 165, 165, 165, 165, 175, 175, 175,  
          175, 175, 175, 175, 175, 175, 175, 185, 185, 185, 185, 185, 185, 185,  
          185, 185, 185, 185, 185, 185, 185, 185, 185, 195, 195, 195, 195, 195,  
          195, 195, 195, 195, 195, 195, 195, 195, 195, 205, 205, 205, 205, 205,  
          205, 205, 205, 205, 205, 215, 215, 215, 215, 215, 215, 215, 215, 225, 225}
```

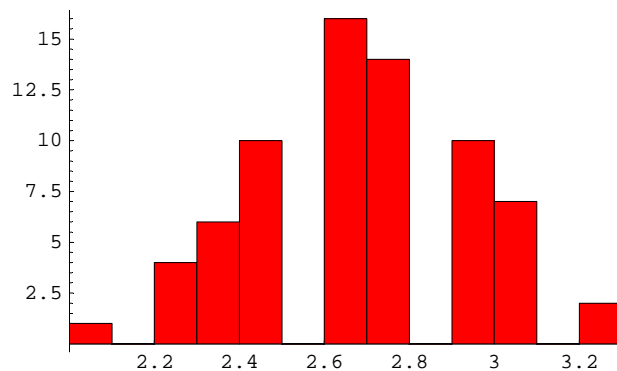
```
In[19]:= Histogram[tab2 // Flatten];
```



```
In[20]:= tab3 = tab2 / tot // N // Flatten
```

```
Out[20]= {2.07143, 2.21429, 2.21429, 2.21429, 2.21429, 2.35714, 2.35714, 2.35714, 2.35714,
  2.35714, 2.35714, 2.5, 2.5, 2.5, 2.5, 2.5, 2.5, 2.5, 2.5, 2.5, 2.5, 2.5, 2.5, 2.64286,
  2.64286, 2.64286, 2.64286, 2.64286, 2.64286, 2.64286, 2.64286, 2.64286,
  2.64286, 2.64286, 2.64286, 2.64286, 2.78571, 2.78571, 2.78571, 2.78571, 2.78571, 2.78571, 2.78571, 2.78571,
  2.78571, 2.78571, 2.78571, 2.78571, 2.78571, 2.92857, 2.92857, 2.92857,
  2.92857, 2.92857, 2.92857, 2.92857, 2.92857, 3.07143, 3.07143, 3.07143, 3.07143, 3.07143, 3.07143, 3.21429, 3.21429}
```

```
In[21]:= Histogram[tab3];
```

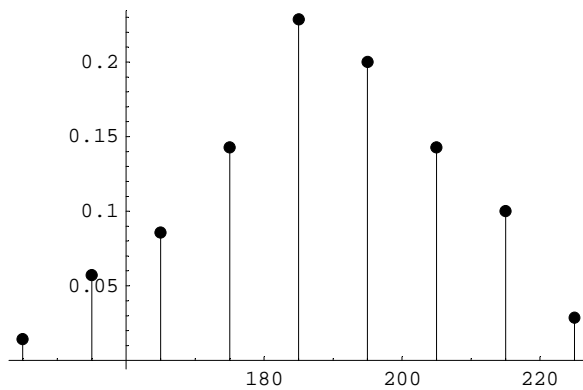


```
In[22]:= << Graphics`MultipleListPlot`
```

```
In[23]:= m3 = Transpose[{m1, m2 / tot}]
```

```
Out[23]= {{145,  $\frac{1}{70}$ }, {155,  $\frac{2}{35}$ }, {165,  $\frac{3}{35}$ }, {175,  $\frac{1}{7}$ },
  {185,  $\frac{8}{35}$ }, {195,  $\frac{1}{5}$ }, {205,  $\frac{1}{7}$ }, {215,  $\frac{1}{10}$ }, {225,  $\frac{1}{35}$ }}
```

```
In[24]:= MultipleListPlot[m3, SymbolShape -> Stem];
```



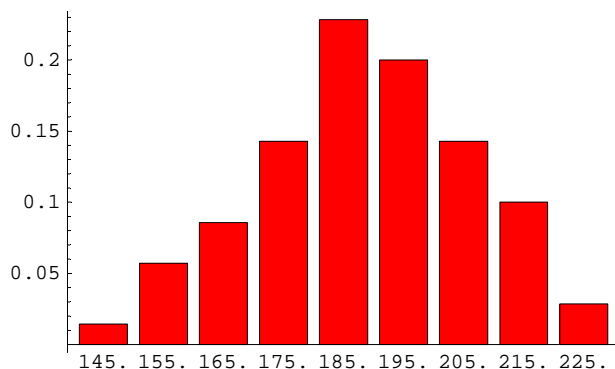
```
In[25]:= m4 = Transpose[{m2 / tot, m1}]
```

```
Out[25]= {{1/70, 145}, {2/35, 155}, {3/35, 165}, {1/7, 175},
           {8/35, 185}, {1/5, 195}, {1/7, 205}, {1/10, 215}, {1/35, 225}}
```

```
In[26]:= m4 = Transpose[{m2 / tot, m1}] // N
```

```
Out[26]= {{0.0142857, 145.}, {0.0571429, 155.}, {0.0857143, 165.}, {0.142857, 175.},
           {0.228571, 185.}, {0.2, 195.}, {0.142857, 205.}, {0.1, 215.}, {0.0285714, 225.}}
```

```
In[27]:= BarChart[m4];
```



c Summenhäufigkeit verbunden dargestellt

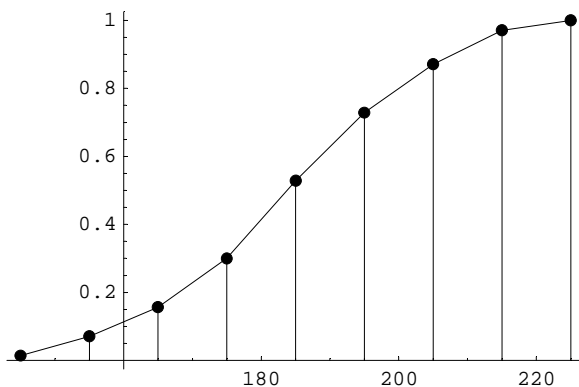
```
In[28]:= sumh = Table[{m1[[k]], Sum[m2[[j]] / tot, {j, 1, k}], {k, 1, Length[m2]}}
```

```
Out[28]= {{145, 1/70}, {155, 1/14}, {165, 11/70}, {175, 3/10},
           {185, 37/70}, {195, 51/70}, {205, 61/70}, {215, 34/35}, {225, 1}}
```

```
In[29]:= sumh // N
```

```
Out[29]= {{145., 0.0142857}, {155., 0.0714286}, {165., 0.157143}, {175., 0.3},
           {185., 0.528571}, {195., 0.728571}, {205., 0.871429}, {215., 0.971429}, {225., 1.}}
```

```
In[30]:= MultipleListPlot[sumh // N, SymbolShape -> Stem, PlotJoined -> {True}];
```



{185., 0.528571} bedeutet, dass z.B. 52.8...% im Mittel einen Wert grösser als 180 und kleiner als 190 besitzen.

d Kenngrössen

```
In[31]:= << Statistics`DescriptiveStatistics`
```

```
In[32]:= Mean[tab2] // N
```

```
Out[32]= 188.571
```

```
In[33]:= LocationReport[tab2]
```

```
Out[33]= {Mean ->  $\frac{1320}{7}$ , HarmonicMean ->  $\frac{462272829393375}{2474601739304}$ , Median -> 185}
```

```
In[34]:= LocationReport[tab2] // N
```

```
Out[34]= {Mean -> 188.571, HarmonicMean -> 186.807, Median -> 185.}
```

```
In[35]:= DispersionReport[tab2]
```

```
Out[35]= {Variance ->  $\frac{52750}{161}$ , StandardDeviation ->  $5\sqrt{\frac{2110}{161}}$ , SampleRange -> 80,  
MeanDeviation ->  $\frac{717}{49}$ , MedianDeviation -> 10, QuartileDeviation -> 15}
```

```
In[36]:= DispersionReport[tab2] // N
```

```
Out[36]= {Variance -> 327.64, StandardDeviation -> 18.1008, SampleRange -> 80.,  
MeanDeviation -> 14.6327, MedianDeviation -> 10., QuartileDeviation -> 15.}
```

```
In[37]:= ShapeReport[tab2]
```

```
Out[37]= {Skewness ->  $-\frac{4208}{1055\sqrt{633}}$ , QuartileSkewness ->  $\frac{1}{3}$ , KurtosisExcess ->  $-\frac{305038}{667815}$ }
```

```
In[38]:= ShapeReport[tab2] // N
```

```
Out[38]= {Skewness -> -0.158534, QuartileSkewness -> 0.333333, KurtosisExcess -> -0.45677}
```