1.  

### 7

\[ \sum f(x) = (-1) \frac{125}{216} + (1) \frac{75}{216} + (2) \frac{15}{216} + (3) \frac{1}{216} = -\frac{17}{216} \]

\[ X = \text{people} \]

### 14

(a) Average class size = \((16 \cdot 25 + 3 \cdot 100 + 1 \cdot 300) / 20 = 50 \)

(b) 

[Diagram showing a distribution with X(grade) and X(student) = size of class to which they belong]

(c) \[ \mu = E[X] = 25 \left( \frac{4}{10} \right) + 100 \left( \frac{3}{10} \right) + 300 \left( \frac{3}{10} \right) = 130 \]

You might think it would be the same as in part (a)

### 15

(a) 

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
<th>( x^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/5</td>
<td>1/125</td>
<td>1/625</td>
</tr>
<tr>
<td>2/5</td>
<td>1/125</td>
<td>4/625</td>
</tr>
<tr>
<td>3/5</td>
<td>1/125</td>
<td>9/625</td>
</tr>
<tr>
<td>4/5</td>
<td>1/125</td>
<td>16/625</td>
</tr>
</tbody>
</table>

\[ \mu = \sum x \cdot f(x) = 15 \]

\[ \sigma^2 = \sum (x^2 \cdot f(x)) - \mu^2 = 50 \]

### 21

(a) 

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
<th>( x^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>1/8</td>
<td>1/4</td>
</tr>
<tr>
<td>3/4</td>
<td>1/8</td>
<td>9/16</td>
</tr>
<tr>
<td>1/4</td>
<td>1/8</td>
<td>1/16</td>
</tr>
</tbody>
</table>

\[ \mu = \frac{25}{8} \]

\[ \sigma^2 = \frac{55}{8} \]

\[ \sigma = \frac{\sqrt{5}}{2} \approx 2.236 \]

### 139

\[ *5 \text{ (a) } X \text{ Binomially distributed } n = 25, p = 0.7 \]

\[ \mu = np = 17.5, \sigma^2 = npq = 5.25 \]

\[ \sigma \approx 2.2913 \]

\[ *9 \text{ (a) Must assume } X \text{ Binomially distributed with } n = 9, p = 0.1 \]

\[ \mu = E[X] = np = 0.9, \sigma^2 = npq = 0.91, \sigma = 0.9 \]

\[ *13 \text{ Use } n = 6 \Rightarrow np = 3.6 \Rightarrow p = 0.4 \]

\[ npq = 3.6 \Rightarrow n = \frac{6}{4} = 15 \]

\[ P(X = 4) = \left( \frac{4}{4} \right) \left( 0.6 \right)^4 \left( 0.4 \right)^4 \approx 0.1288 \]