Histogram Practice: Chapter 3

1. Someone has sketched one block of an age histogram for the United States. About what percentage of the U.S. population was between 35 and 41 years old? (Assume the height of the block is about 1.5.)

![Histogram](image)

2. Age (truncated) |
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Number of students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>9</td>
<td>4</td>
</tr>
</tbody>
</table>

Consider the histogram for the above group of 50 students in a math class.

For the students 24 or 25 years old:

(a) i. State the class description (or class mark) for this interval.
   ii. State the units of the horizontal scale.
   iii. Find the endpoints of this interval in the appropriate units.
   iv. Find the area of the rectangle. What does this area represent?
   v. What kind of scale is required for the vertical scale?
   vi. State the units of the vertical scale.
   vii. Find the height, in the appropriate units, over this interval.
   viii. Describe in your own words what this height in its units means.

(b) Draw the part of the histogram for the students 24 to 25 years old, labelling it with class mark, horizontal and vertical scales, endpoints, height, and area.

3. The heights of a large group of women are available for statistical analysis and categorization.

   (a) Are the data qualitative or quantitative, discrete or continuous?
   (b) The heights are now sorted into groups, each with a whole number of inches as its label. Rounding is the default method.
      i. A woman who was 64.73 inches tall should be put into which group?
      ii. What are the exact endpoints of the block on the histogram for the group labelled “67 inches?”

4. Number of children |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Percent of women</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4–5</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

Consider the histogram for the above group of women according to the number of children they had. Only part of the data set is given here.

True or false:

(a) The area of the rectangle for 3 children is 24%.
(b) The area of the rectangle for 4 or 5 children is 12%.
(c) Since the percentage for 4 or 5 children is three times the percentage for 6 children, its rectangle will be three times as high.
(d) To get endpoints for the rectangles of this histogram, in every case a correction of ±1/2 is needed.

5. A group of college students is sorted according to the number of math courses taken as an undergrad.

   (a) Are the data qualitative or quantitative, discrete or continuous?
   (b) What should be the exact values (not usually labelled) of the endpoints of the base of the block on the histogram for those who took 3 math courses?
Answers

1. 9%.

2. (a)  
   i. “24 or 25 years old.”
   ii. Years.
   iii. 24 years and 26 years.
   iv. First convert 4 students to its percent of the class.
       The total number of students is 50, \( \frac{6}{50} \times 100\% = 12\% \).
       That’s the area of the rectangle. It represents 12% of the class.
   v. A density scale.
   vi. Percent per year.
   vii. The area of the rectangle is 12%. The base is two years.
       Area equals base times height, \( A = bh \). Solve for \( h \), to get \( h = \frac{A}{b} = \frac{12\%}{2 \text{years}} = 6\% \) per year.
   viii. It means that for each of the two years 24 and 25, on average there is 6% of the class.

(b)

![Diagram of a rectangle with area 12% and 6% per year]

3. (a) The data are quantitative and continuous.
   (b) i. The group labelled “65 inches.”
   ii. Because of the rounding, the precise endpoints should be 66.5 inches and 67.5 inches.

4. (a) False.
   (b) True.
   (c) False.
   (d) True.

5. (a) The data are quantitative and discrete.
   (b) Because it is a discrete counting variable, the endpoints should be at 2.5 course and 3.5 courses.
   There will be a plus or minus 1/2 applied to the label of the interval to get the endpoints. (See pages 43 and 44.) This is important.