1   Histograms

Key Points about Histograms

- The **area** of each bar in the histogram represents the proportion of the total population which is found in the specific range

- Area of a rectangle = $Width * Height$ in a histogram (and for all rectangles)

- Area is in proportion, width is in a certain specified unit (e.g square inches), therefore, height (which equals $\frac{area}{width}$) has units proportion per whatever the unit is on the x-axis (e.g proportion per square inch).

- The sum of the areas should add up to 1, since they are all proportions

- Sometimes, people will use percentages instead of proportions for areas/height. In this case, everything on the y-axis would be multiplied by 100 and the areas should add up to 100 (instead of 1).

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1. We have a group of mice, each of which has a specific weight. The distributions of weights is shown in the table below:

0lb-.5lb	.5lb-1.5 lb	1.5lb-2lb	2lb-5lb	6lb-12lb
10%	15%	20%	30%	25%

(a) Draw out the histogram in terms of proportion. What are the units of the y-axis?

(b) Assume we lose the percentage of mice within the range of .5lb-1.5lb. How can we recover it?

(c) Re-draw the histogram in terms of percentages instead of proportions. What are the units of the y-axis now?

2. Different students at Cal pay different amounts of money for their textbooks. Assume we create a valid histogram displaying the distribution of money payed, relating it with how much of the student population pays within that range. Below is the range of money, and what the height of the bars of histograms is for each range.

$0-$50	$50-$75	$75-$150	$150-$300
.0075	.002	x	y

(a) Assume the units on the y-axis is in proportion of students per dollar. Moreover, assume that there are 20,000 students. Can you fill in the values for x and y? Why or why not.

(b) With the assumptions above, also assume that 8,000 of them spend $150-$300. Which values can you now fill in? Calculate everything you can fill in.

(c) Repeat the above question, but now assuming the y-axis in in percentage of students per dollar. Which one makes more intuitive sense?