

HW: SET C # 1, 2, 3, 4.
P41-44

SET D # 1, 2

Solution. The total area is 200%, and should only be 100%. The area can be calculated as follows. The histogram is almost a triangle, whose height is 4% per pound and whose base is 200 lb - 100 lb = 100 lb. The area is

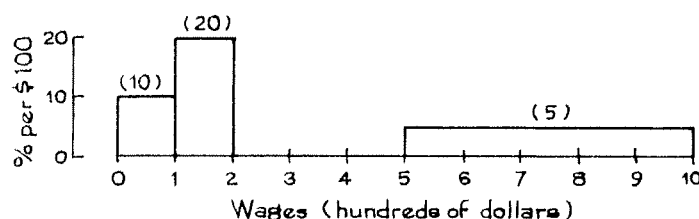
$$\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 100 \text{ lb} \times 4\% \text{ per lb} = 200\%.$$

With the density scale on the vertical axis, the areas of the blocks come out in percent. The area under the histogram over an interval equals the percentage of cases in that interval.⁶ The total area under the histogram is 100%.

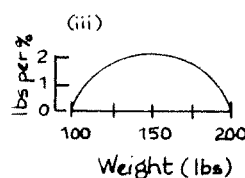
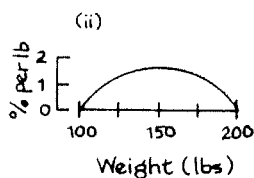
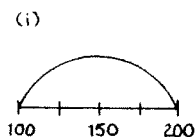
Since 1991, the educational level in the U.S. has continued to increase. Then, 21% of the population had a bachelor's degree or better (the "population" means people age 25 and over). In 2005, the corresponding figure was 28%.

Exercise Set C

- ✓ 1. A histogram of monthly wages for part-time employees is shown below (densities are marked in parentheses). Nobody earned more than \$1,000 a month. The block over the class interval from \$200 to \$500 is missing. How tall must it be?



- ✓ 2. Three people plot histograms for the weights of subjects in a study, using the density scale. Only one is right. Which one, and why?



- ✓ 3. An investigator draws a histogram for some height data, using the metric system. She is working in centimeters (cm). The vertical axis shows density, and the top of the vertical axis is 10 percent per cm. Now she wants to convert to millimeters (mm). There are 10 millimeters to the centimeter. On the horizontal axis, she has to change 175 cm to _____ mm, and 200 cm to _____ mm. On the vertical axis, she has to change 10 percent per cm to _____ percent per mm, and 5 percent per cm to _____ percent per mm.

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4. In a Public Health Service study, a histogram was plotted showing the number of cigarettes per day smoked by each subject (male current smokers). The density is marked in parentheses. The class interval is 10 cigarettes. The class endpoint, not the left.

(a) The percentage who smoked 10 cigarettes or less per day is around
1.5% 15% 30% 50%

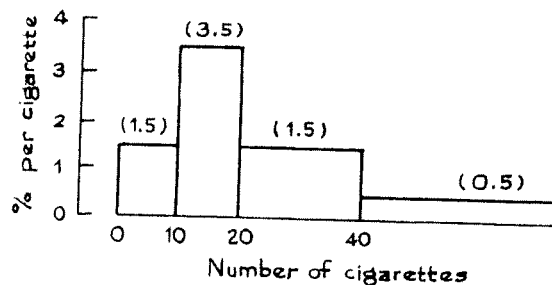
(b) The percentage who smoked more than a pack a day, that is, more than 20 cigarettes, is around
1.5% 15% 30% 50%

(There are 20 cigarettes in a pack.)

(c) The percent who smoked more than a pack a day is around
1.5% 15% 30% 50%

(d) The percent who smoked more than 3 packs a day is around
0.25 of 1% 0.5 of 1% 10%

(e) The percent who smoked 15 cigarettes per day is around
0.35 of 1% 0.5 of 1% 1.5% 3.5%



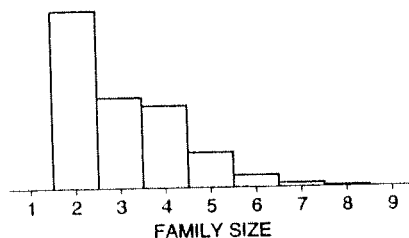
The answers to these exercises are on p. A46.

4. VARIABLES

The Current Population Survey covers many other variables. A *variable* is a characteristic which changes from person to person. Interviewers for the survey use a battery of questions: How old are you? How many people are there in your family? What is your family's total income? Are you married? Do you have a job? The corresponding variables would be age, family size, family income, marital status, and employment status. Quantitative variables are answered by giving a number: the corresponding variables are age, family size, and family income. Qualitative variables are answered with a descriptive word or phrase, and the corresponding variables are marital status (single, married) and employment status (employed, unemployed).

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Figure 6. Histogram showing distribution of families by family size. With a discrete variable, the class intervals are centered values.



Source: March 2005 Current Population Survey; CD-ROM supplied by the Bureau of the Census.

Exercise Set D

1. Classify each of the following variables as qualitative or quantitative, as discrete or continuous.
 - (a) occupation
 - (b) region of residence
 - (c) weight
 - (d) height
 - (e) number of automobiles owned
2. In the March Current Population Survey, women are asked how many children they have. Results are shown below for women age 25–39, by educational attainment.
 - (a) Is the number of children discrete or continuous?
 - (b) Draw histograms for these data. (You may take “5 or more” as the maximum number of children.)
 - (c) What do you conclude?

Distribution of women age 25–39 by educational attainment and number of children (percent).

Number of children	Women who are high-school graduates	Women with college degree
0	30.2	47.1
1	21.8	19.2
2	28.4	22.3
3	13.7	8.4
4	4.4	1.5
5 or more	1.5	0.3

Note: High-school graduates with no further education. College level of a B.A. or B.Sc. Own, never-married children under the age of 18. Percents may not add to 100%, due to rounding.

Source: March 2005 Current Population Survey; CD-ROM supplied by the Bureau of the Census.

The answers to these exercises are on p. A47.

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