

SOLUTIONS

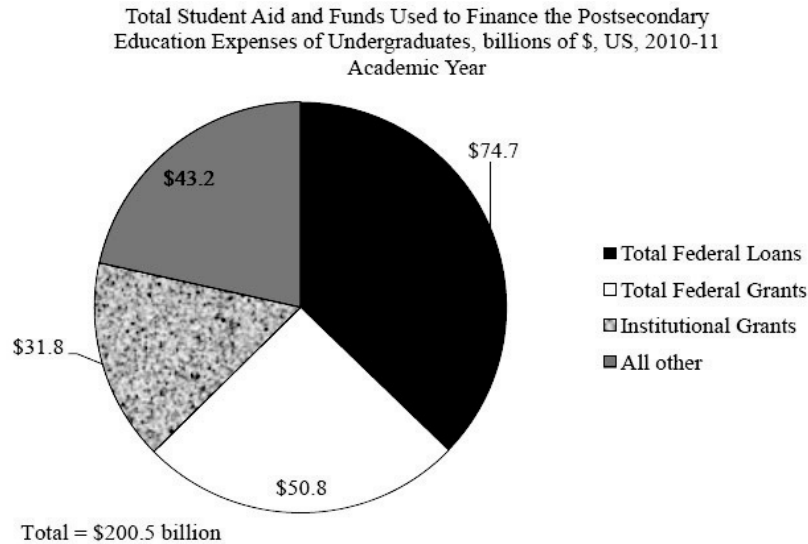
1. Figure 7A is missing a legend; 7B is missing axis titles, axis labels, and units of measurement.
3. Information on which type of chart would be most appropriate for each of the following topics, and which variables will go on each axis, or into the legend.
 - a. Multiple line chart with one line for each gender, year on the x -axis, number of persons receiving a college degree on the y -axis.
 - b. Simple bar chart, with one bar for each mode of transportation.
 - c. Pie chart with one slice for each cola brand.
 - d. Line chart (preferred with this many values) or histogram, with one data point for each 10-point score range (arranged on the x -axis), percentage of sample with each score on the y -axis.
 - e. Clustered bar chart with one cluster for each contraceptive type, a different bar color for each age group (in the legend), and the percentage of the age group using that contraceptive on the y -axis.
 - f. High/low/close chart (high and low show either standard error or 95% CI), or a bar chart with error bars added. Artifacts (named) on x -axis, age of artifact on y -axis.
 - g. Scatter chart with percentage body fat on the x -axis, systolic BP on the y -axis, and one point for the combination of values for each person in the sample.
 - h. Stacked bar chart, with one bar for each continent of origin and one slice for each educational attainment level, with percentage of the origin group on the y -axis. Each bar totals 100% of respondents of that nativity group to control for different numbers of respondents from the different continents.
 - i. Line chart with two different Y -scales, with year on the x -axis, one line for temperature (labeled on the lefthand y -axis), another line for carbon dioxide concentration (labeled on the righthand y -axis).
5. Information on number of variables, types of variables, and organizing principle for charts listed in question 3.
 - a. Annual number of people receiving college degrees by gender, from 1990 to 2010.
 - i. Three variables: number of people receiving degrees; gender; year.
 - ii. number of people receiving degrees is a continuous (ratio) variable; gender is a nominal variable; year is an ordinal variable.
 - iii. Maintain chronological order of years on the x -axis.

7

CREATING EFFECTIVE CHARTS

- b. Monthly commuting cost by mode of transportation, US, 2010.
 - i. Two variables: mode of transportation; monthly commuting cost.
 - ii. Mode of transportation is a nominal variable; monthly commuting cost is a ratio-level variable.
 - iii. Arrange mode of transportation on the x -axis in descending order of commuting cost.
- c. Current market share for Coca-Cola, Pepsi, and other cola brands.
 - i. One variable: cola brands.
 - ii. Cola brand is a nominal variable.
 - iii. Not applicable.
- d. Distribution of mathematics SAT score.
 - i. One variable: mathematics SAT score.
 - ii. Mathematics SAT score is a ratio-level variable.
 - iii. Maintain ascending numeric order of SAT scores on x -axis.
- e. Type of contraceptive (condom, diaphragm, implant/injectable, oral contraceptive [the Pill], surgical sterilization, other, none) by 10-year age groups of women aged 15 to 45 in the United States in 2010.
 - i. Two variables: type of contraceptive; 10-year age group.
 - ii. Type of contraceptive is a nominal variable; 10-year age group is an ordinal variable.
 - iii. Arrange contraceptive methods on the x -axis in conceptual groups (e.g., hormonal methods) and then descending order of prevalence within those groups. Maintain sequence of age groups in the legend.
- f. Ages of archaeological artifacts, with error bars.
 - i. Two variables: type (name) of artifact; age of artifact.
 - ii. Name of artifact is a nominal variable; age of artifact is a ratio-level variable.
 - iii. Arrange artifacts on x -axis in ascending or descending age.
- g. Relationship between systolic blood pressure (mm Hg) and percentage body fat for a sample of 150 elderly people.
 - i. Two variables: systolic blood pressure; percentage body fat.
 - ii. Both variables are continuous (ratio-level).
 - iii. Maintain ascending numeric order of percentage body fat on x -axis.
- h. Educational attainment by nativity.
 - i. Two variables: continent of origin (nativity); level of educational attainment.
 - ii. Continent of origin is a nominal variable; grouped level of educational attainment is an ordinal variable.
 - iii. Arrange continents on x -axis in ascending order of percentage with less than a high school education. Maintain ordinal sequence of educational attainment in the legend.

- i. Trends in mean annual global temperature (°F) and carbon dioxide (CO₂) concentration (ppmv.) from 1960 to 2010.
 - i. Three variables: temperature; CO₂ concentration; year.
 - ii. All three variables are continuous.
 - iii. Maintain chronological order of years on the x-axis.



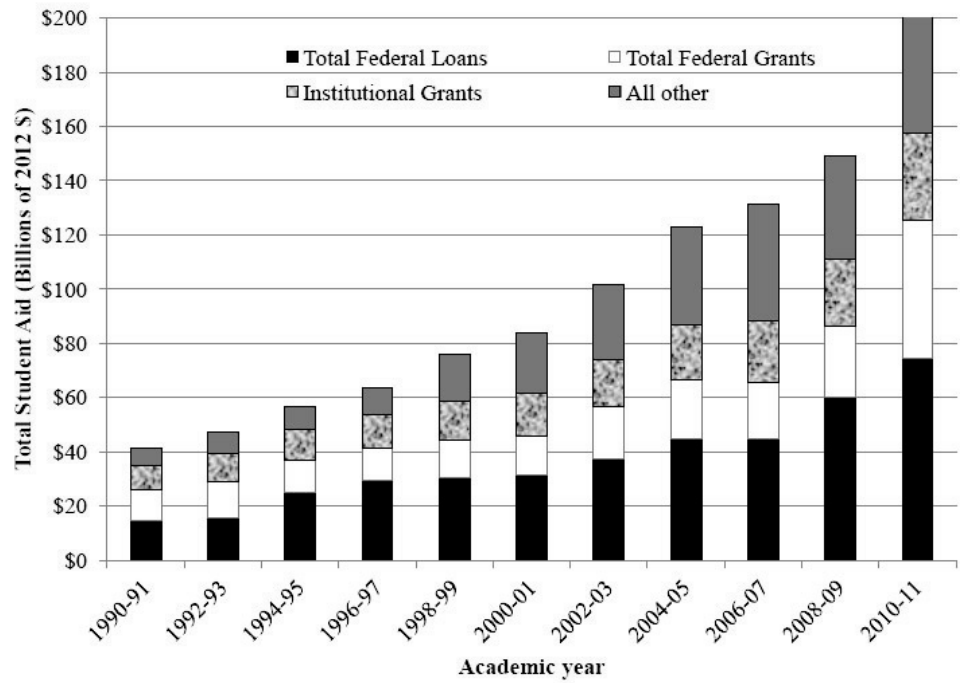
Note: "All other" includes education tax benefits, private and employer grants, state grant programs, nonfederal loans, and federal work-study.

Source: College Board Advocacy and Policy Center, 2014. Trends in Student Aid 2013. Trends in Higher Education Series. Table 1A. Available online at <https://trends.collegeboard.org/sites/default/files/student-aid-2013-full-report-140108.pdf>

Figure 7D

7. Figure 7D shows the distribution of values in 2010–11 in original units.
 - a. Figure 7D is a pie chart because the task is to present the distribution (composition) of a single nominal variable (category of funding) in one year.
 - b. Yes, data labels are included to report dollar amount from the pertinent category of undergraduate funding because that information does not appear elsewhere in the chart.
 - c. The title of the chart is drawn from the title of the table, changing the date to refer to a single academic year. The legend is needed to identify the funding sources. No axes in a pie chart.

Total Student Aid and Funds Used to Finance the Postsecondary Education Expenses of Undergraduates Academic Years 1990-91 to 2010-11



Note: "All other" includes education tax benefits, private and employer grants, state grant programs, nonfederal loans, and federal work-study.

Source: College Board Advocacy and Policy Center, 2014. Trends in Student Aid 2013. Trends in Higher Education Series. Table 1A. Available online at <https://trends.collegeboard.org/sites/default/files/student-aid-2013-full-report-140108.pdf>

Figure 7E

9. Figure 7E is a stacked bar chart to present the data shown in table 7A. Title same as source table. Axis titles, labels, and legends as shown.