Additional Exercises

1. The table below contains median household incomes (adjusted to 2022 US dollars) in the United States for the years 1997 through 2021.[29]

Median Household Income					
Year	Income ($)	Percent Change	Year	Income ($)	Percent Change
1997	37,005	–	2010	49,276	–1.0
1998	38,885	5.1	2011	50,054	1.6
1999	40,696	4.7	2012	51,017	1.9
2000	41,990	3.2	2013	53,585	5.0
2001	42,228	0.6	2014	53,657	0.1
2002	42,409	0.4	2015	56,516	5.3
2003	43,318	2.1	2016	59,039	4.5
2004	44,334	2.3	2017	61,136	3.6
2005	46,326	4.5	2018	63,179	3.3
2006	48,201	4.0	2019	68,703	8.7
2007	50,233	4.2	2020	68,010	–1.0
2008	50,303	0.1	2021	70,784	4.1
2009	49,777	–1.0			

a. What graphical methods would be useful in displaying the data?

b. Graph the data.

c. Write a short paragraph describing the data.

2. The following table displays the income of households headed by adults 25 years and older, tabulated by educational attainment.[30] The percentages shown in the table represent the proportion of households within the same level of education that fall into the given income range.

Income and Educational Attainment, 2022										
Educational Attainment	Under $10,000	$10,000–$29,999	$30,000–$49,999	$50,000–$69,999	$70,000–$89,999	$90,000–$109,999	$110,000–$129,999	$130,000–$149,999	$150,000–& Over	Median Income
Less than 9th grade	14.3%	37%	19.8%	10.6%	6.4%	4.3%	1.9%	2.0%	3.6%	28,294
9th to 12th grade, no dipoma	13.6%	34.6%	20.4%	11.7%	7.4%	4.6%	2.7%	1.5%	3.4%	31,162
High school graduate (includes equivalency)	6.9%	23.3%	19.4%	15.2%	10.8%	7.4%	5.1%	3.5%	8.5%	50,401
Some college, no degree	5.2%	18.6%	17.3%	15.0%	12.0%	8.6%	6.2%	4.8%	12.2%	60,980

Income and Educational Attainment, 2022										
Educational Attainment	Under $10,000	$10,000–$29,999	$30,000–$49,999	$50,000–$69,999	$70,000–$89,999	$90,000–$109,999	$110,000–$129,999	$130,000–$149,999	$150,000–& Over	Median Income
Associate degree	4.4%	15.0%	16.1%	14.1%	12.0%	10.5%	7.2%	6.0%	14.6%	70,450
Bachelor's degree	2.7%	6.9%	10.0%	12.0%	10.4%	10.1%	8.4%	6.9%	32.7%	105,552
Master's degree	2.2%	5.4%	7.0%	9.5%	10.1%	9.2%	8.8%	7.4%	40.4%	124,341
Doctorate or Professional degree	1.8%	5.2%	5.5%	7.2%	7.3%	6.8%	6.3%	6.6%	53.4%	235,413

a. What graphical methods would be useful in displaying the data?

b. Use a graphics program to display the data.

c. Discuss any conclusions you made from your graph(s).

3. The Paycheck Protection Plan (PPP) was a business loan program implemented by the United States government in response to the COVID-19 pandemic. Its purpose was primarily to help small businesses keep their workforce employed during the economic downturn caused by the pandemic. The following data summarizes the percentage of businesses within certain sectors that requested PPP assistance and the percentage that received PPP loans.[31] There are various reasons that businesses were denied PPP loans including ineligibility, insufficient application documentation, non-compliance, and depleted funds

COVID-19 Financial Assistance		
Business Sector	Requested PPP	Received PPP
Construction	57.1%	54.4%
Manufacturing	69.3%	65.7%
Retail trade	69.9%	66.3%
Arts, entertainment, and recreational services	58.8%	56.2%
Accommodation and food services	74.1%	67.7%

a. What graphical method(s) do you think would be most useful in summarizing this data? Explain your answer.

b. Graph the data using the method you identified in part **a.**

c. Write a short paragraph describing the data, making conclusions from the graph you constructed in part **b.**

4. The following data gives the total annual amount (in billions of dollars) of exports and imports for the United States. By examining the changes in US trade, we can gain insights into the country's economic relationship with other nations and the impact on domestic industries. Graph the data using a method that would contrast the difference between US exports and imports.[32]

Trade Balance of the United States (in billions of dollars)		
Year	**Export**	**Import**
1960	25.9	22.4
1970	56.6	54.3
1980	271.8	291.2
1990	535.2	616.1
2000	1083.0	1452.7
2010	1872.3	2375.4
2020	2160.1	2813.0

5. *Billboard* magazine, in cooperation with Arbitron, produces a national radio format rating. The following data were gathered from radio listeners 12 and older on the percentage of people listening to a specific radio format during a specified time period.

Radio Formats						
	Mon – Fri 6 AM – 10 AM	**Mon – Fri 10 AM – 3 PM**	**Mon – Fri 3 PM – 7 PM**	**Mon – Fri 7 PM – 12 AM**	**Mon – Sun 12 AM – 6 AM**	**Mon – Sun 6 AM – 12 AM**
Adult Contemporary	17.2	19.7	17.7	15.0	16.2	20.0
News/Talk	17.9	13.1	12.5	14.3	5.3	15.6
Country	13.0	13.2	13.2	10.3	11.7	14.3
Album Rock	10.0	10.4	10.9	9.8	18.7	10.2
Top 40	8.9	9.7	10.9	12.9	14.3	4.7
Urban	7.5	7.6	8.9	14.1	11.8	7.1
Oldies	6.0	6.8	6.9	6.5	4.3	10.2
Classic Rock	4.7	3.6	3.7	3.9	6.1	2.9
Spanish	4.5	4.2	3.7	2.2	4.9	4.2
Adult Standards	3.4	4.2	3.7	2.7	0.3	2.8
Religious	2.1	1.7	1.8	1.8	1.3	2.5
Classical	1.4	1.7	1.7	1.9	0.5	2.3
Easy Listening	0.9	1.1	0.9	0.8	0.2	1.2
Modern Rock	1.0	1.1	1.3	1.6	2.4	0.4
Adult Alternative	1.5	1.9	2.2	2.2	2.0	1.6

a. What kinds of graphs would be appropriate for displaying the data? Explain your choices.

b. Graph a column of the data. Briefly analyze your graph.

c. Create a graph that would be useful in visually comparing two columns of the data. Briefly analyze your graph.

6. The Caribbean has been a favorite vacation spot for affluent North Americans and Europeans, especially during the winter months. The following table lists the number of tourists during the first six months of the year for a number of Caribbean destinations.

Number of Tourists			
	U.S.	**Canada**	**Europe**
Antigua & Barbuda	53,811	10,709	18,591
Aruba	94,028	1320	4681
Barbados	105,236	51,830	34,562
Bermuda	250,390	21,241	11,715
Bonaire	12,210	352	2266
Cayman Islands	81,180	3791	3025
Curacao	15,186	572	6543
Guadeloupe	15,596	10,654	25,409
Trinidad & Tobago	29,110	12,470	11,820

a. Create a stacked bar graph that shows where tourists from the U.S., Canada, and Europe travel in the Caribbean.

b. Create three separate bar charts, one for American tourists, one for Canadian tourists, and one for European tourists, that show the number of people traveling to each Caribbean destination.

7. The following table contains a list of the top global corporations, ranked by the amount spent on research and development in 2020.[33]

Amount Spent on Research and Development (R&D) in 2020 (Millions of Dollars)					
Rank	**Company**	**R&D Spending**	**Spending as a % of Sales**	**Headquarters Location**	**Industry**
1	Amazon	42.74	11.1	N. America	Software and Internet
2	Alphabet	27.57	15.1	N. America	Software and Internet
3	Huawei	22.04	15.9	Asia	Computing and Electronics
4	Microsoft	19.27	13	N. America	Software and Internet
5	Apple	18.75	7.0	N. America	Computing and Electronics
6	Samsung	18.75	9.0	Asia	Computing and Electronics
7	Facebook	18.45	21.0	N. America	Software and Internet
8	Volkswagen	14.3	7.6	Europe	Auto

Amount Spent on Research and Development (R&D) in 2020 (Millions of Dollars)					
Rank	Company	R&D Spending	Spending as a % of Sales	Headquarters Location	Industry
9	Intel	13.56	17.4	N. America	Computing and Electronics
10	Roche	13.01	20.6	Europe	Healthcare
11	Johnson & Johnson	12.2	14.7	N. America	Healthcare

a. For comparative purposes, which of the two columns reporting R&D spending is more useful, and why?

b. What types of graphs would be useful in presenting the variable that you chose in the previous part? Create the graph and write two statements describing the data.

c. Use computer software to develop pie charts for the headquarters location and industry categories of the top global R&D spenders.

8. In 2021, the Pew Research Center conducted a poll among adult individuals in the United States to gather information about their usage of different social media sites.[34] The poll results are displayed in the table below, indicating the percentages of respondents from various demographic groups who reported using each social media platform.

Percent of US Adults Who Say They Use Various Social Media Platforms					
	YouTube	Facebook	Instagram	Snapchat	Twitter
National	81	69	40	25	23
Gender					
Male	82	61	36	22	25
Female	80	77	44	28	22
Age					
18 – 29	95	70	71	65	42
30 – 49	91	77	48	24	27
50 – 64	83	73	29	12	18
65 +	49	50	13	2	7
Income					
<$30K	75	70	35	25	12
$30K–$49,999	83	76	45	27	29
$50K–$74,999	79	61	39	29	22
$75K+	90	70	47	28	34
Community					
Urban	84	45	45	28	27
Suburban	81	41	41	25	23
Rural	74	25	25	18	18

Percent of US Adults Who Say They Use Various Social Media Platforms					
	YouTube	Facebook	Instagram	Snapchat	Twitter
Education					
HS or less	70	64	30	21	14
Some College	86	71	44	32	26
College+	89	73	49	23	33

a. Suggest two different types of graphs that might be useful in graphing the data.

b. Create two different graphs using the data.

c. Write a short paragraph describing the data.

9. The nation's political identification (Republican, Democrat, or Independent) changes over time. The data in the following table represent Pew Research Center results on political identification from 1994 to 2018/2019.[35]

US Political Identification Based on Registered Voters (% of population)							
Year	Republican	Democrat	Independent	Year	Republican	Democrat	Independent
1994	33	33	30	**2007**	28	35	32
1995	33	33	31	**2008**	28	38	29
1996	33	34	29	**2009**	26	36	33
1997	31	35	29	**2010**	29	34	33
1998	31	36	28	**2011**	28	34	34
1999	30	36	30	**2012**	29	35	33
2000	31	35	27	**2013**	27	34	35
2001	32	36	26	**2014**	27	34	35
2002	33	34	26	**2015**	28	32	36
2003	33	34	28	**2016**	29	34	33
2004	33	35	27	**2017**	26	33	37
2005	33	35	28	***2018/2019**	29	33	34
2006	31	35	29				

Notes: The percentages don't add up to 100—the remaining can be considered as other, neither, or don't know responses.

*Due to smaller sample sizes in 2018 and 2019, the data from those years has been combined.

a. What types of graphs would be useful in visualizing this data? Explain your answer.

b. Construct two different types of graphs from the data.

c. Examine the data and write a short paragraph on your conclusions.