The National Retail Federation collects information throughout the year about the holiday spending of American consumers. Each October they report on planned spending of consumers on winter holiday gifts for family. In 2013 consumers planned to spend an average of $432 on family gifts while in 2018 the planned spending on family gifts per consumer was $506.

1. Find the percent relative change in planned spending by American consumers on family gifts for the winter holidays between 2013 and 2018. Use two significant digits.
2. Find the rate of inflation between 2013 and 2018. Use two significant digits.
3. **Meaningfully** compare the percent increase in planned spending on winter holiday family gifts **to** the rate of inflation between 2013 and 2018. Use a well-written sentence directed at a general audience (include the term rate of inflation).
4. If the planned spending on winter holiday family gifts had risen at the rate of inflation what would it have been in 2018?
5. Over the 2019 Thanksgiving holiday 189.6 million consumers went shopping. 95% of them used the weekend to make some holiday purchases, spending $361.90 on average. What was the total spending by consumers on holiday items over Thanksgiving weekend? Express your answer to the nearest .1 billion dollars.

A survey of 752 registered voters in Pennsylvania was conducted from September 23 – October 15, 2019 by the Kaiser Family Foundation and Cook Political Report. Participants were asked for the most important issue in deciding their presidential preference in the 2020 election; 17% chose gun policy.

Describe the components of this Kaiser Family Foundation and Cook Political Report study below:

Population:

Population parameter:

Sample:

Sample statistic:

* 1. Find the margin of error for this study. Use two significant digits.
  2. Find the 95% confidence interval for the population parameter. Report your interval in a well written contextual sentence. Do not round your interval values.

A September report from Gallup suggested that 27% of registered voters nationwide considered gun policy as their most important issue for the 2020 election. Assuming that Pennsylvania mirrors the nation the chance of a sample result of 17% is .009.

* 1. What are the appropriate null and alternative hypotheses for the Pennsylvania study?
  2. What can you conclude about registered voters in Pennsylvania? Express your conclusion in a well written contextual sentence for a general audience.

In October the National Survey of Children’s Health (NSCH) released the obesity levels for children aged 10 – 17 by state for 2018. Below, for nine randomly chosen states, you see: the obesity level from NSCH and the median household income (from the Current Population Survey (CPS)) also for 2018.

|  |  |  |
| --- | --- | --- |
| State | Median Household  Income ($) | Obesity Rate for Children  Aged 10-17 (%) |
| Arkansas | 50,000 | 16.2 |
| Colorado | 73,000 | 10.7 |
| Georgia | 56,000 | 16.0 |
| Illinois | 70,000 | 14.2 |
| Indiana | 60,000 | 16.6 |
| Kansas | 64,000 | 12.2 |
| New Mexico | 48,500 | 16.9 |
| Oklahoma | 54,500 | 18.0 |
| Wisconsin | 62,500 | 14.2 |

1. Use this data to create a scatterplot **on the graph paper provided**.
2. Is there correlation in the data? If so, is it a positive or negative correlation? Is the correlation strong, moderate, or weak?
3. Using complete sentences, clearly explain any conclusions you can draw about the relationship between these two variables **based on the scatterplot**. Make sure to discuss the **variables**, not the graph.
4. How many different random samples of 9 states are possible?

**Use the “Obesity Rate for Children Aged 10-17 (%)” data column ONLY to complete parts e) – i) of this problem. You should have 9 data values with which to answer parts e) – i).**

1. Find the Five Number Summary for this data.
2. Draw the boxplot for this data **on the graph paper provided**.
3. Is this data symmetric, left-skewed, or right-skewed? Explain your choice **based on your boxplot**.
4. **Based on your answer to part g)**, would you expect the mean of this data set to be less than, greater than, or approximately equal to the median?
5. What is the range of this data set?

You are purchasing carpet for a rectangular room in your house, but first you need to calculate the exact area of the room. You measure the length of one wall with a measuring tape that reads to the nearest quarter inch, and find that the wall is 180.50 inches. Your roommate measures the wall with her measuring tape, which reads to the nearest tenth of an inch, and finds the wall is 179.8 inches. Blueprints of your house reveal that the true length of the wall is 180.0 inches.

1. Which measurement is more precise? Justify your answer clearly using quantitative evidence.
2. Which measurement is more accurate? Justify your answer clearly using quantitative evidence.
3. The true width of the room is 18 ft. What is the area of the floor in square feet?
4. Home Depot will charge $10/ft2 for the carpet you want, and Lowe’s will charge $80/yd2 for the same carpet. Which store offers the better bargain?

The test for a certain disease is 88% accurate. A hospital tests a sample of 7000 patients for this disease and the incidence rate of the disease is 15%.

1. Fill in the following table showing the results of this disease testing.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Disease | No Disease | Total |
| Test Positive |  |  |  |
| Test Negative |  |  |  |
| Total |  |  |  |

1. What percent of these patients tests positive? Round to the nearest 0.1%.
2. If a patient tests negative, what is the percent chance they have the disease? Round to the nearest 0.1%
3. Suppose you select a patient at random from this sample, what is the probability the patient has the disease or tests positive? Use three significant digits.
4. What is the probability that two patients randomly chosen from this sample who have the disease both test positive? Use three significant digits.

**Recall that the test for this disease is 88% accurate, for probabilities use 3 significant digits**:

1. What is the probability of at least one wrong result in 5 **future** uses of the test?
2. What is the probability that the **next** three uses of the test give the wrong result? Put your answer in scientific notation.
3. What are the **odds** the next result is wrong?