

Banner number _____

QUESTIONS

Your Difficulty Rating
 Please rate each question 1-4 on how difficult it was for you to solve.

The data table at the end of the article contains headings that use two key words: *median*, and *poverty rate*. The first two questions below explain these terms and ask you to apply them. For these questions, you'll need only the population data on the fourteen towns where household income decreased by 8% or more over the past 10 years. The populations of those towns are shown below.

<i>town</i>	<i>population</i>
120. Bloomfield	19, 587
127. Enfield	42, 212
142. Windsor Locks	12,043
145. Vernon	28,063
152. Meriden	58,244
153. Sprague	2,971
157. West Haven	52,360

<i>town</i>	<i>population</i>
158. Torrington	35,202
159. East Hartford	49,575
162. North Canaan	3,350
165. Waterbury	107,271
166. New Britain	71,538
167. New Haven	123,626
169. Hartford	121,578

- 1) The *median* of a set of numerical data is a measure of where the data is centered. The first step in finding the median is to arrange the data in ascending order. If the number of data is odd, the median is in the middle position. If the number of data is even, a pair of data is in the middle; the median is the average of that pair. Use the above data to find the maximum, minimum, and median populations of the fourteen towns.

Maximum:
Minimum:
Median:

Solution:

- 2) The *poverty rate* is calculated by counting the number of people living below a federally established poverty line and dividing that head count by the total population, expressing the result as a percentage. You can see in the data table that Waterbury and New Britain both have a poverty rate of 16%. Do they have the same number of people living in poverty? Why or why not?

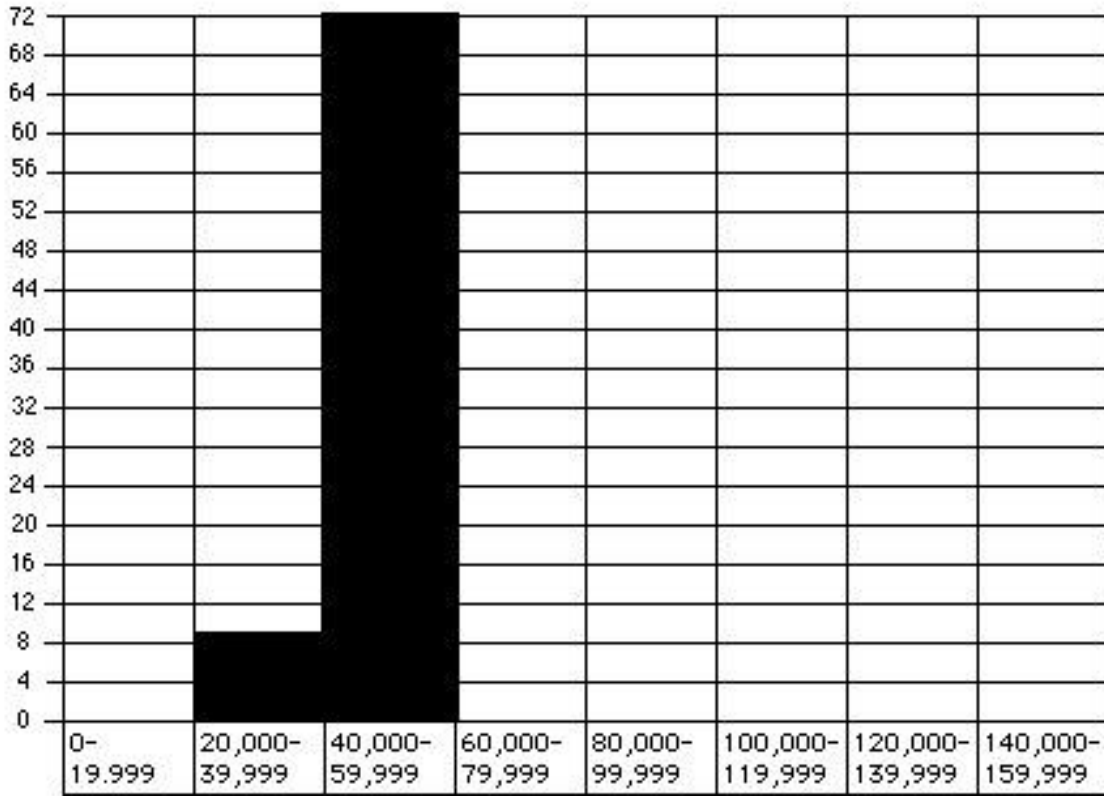
Answer:

Supporting reasons:

- 3) The map on the first page of the article shows visually *where* income rose and fell over the past ten years. A histogram (a bar graph where the bars are right next to each other, and the height of a bar represents the number of data in an interval) would be a way of showing visually *how many* towns were at various median income levels in 1999. Complete the histogram below to show the number of towns with median

household incomes in each of the twenty-thousand dollar intervals shown in the bottom row. (The first two intervals are done for you).

Your
Difficulty
Rating



Think about it: Observation along the way What does this histogram say about incomes across Connecticut? As you consider these Observations, you don't have to write answers, but if you keep a few notes on them, they'll help you when you get to Question 11.

4) If the median household income in Hartford (#169) is X, in which of the following towns is the median income closest to 2X?

- a) Farmington (#53)
- b) South Windsor (#37)
- c) New Britain (#166)
- d) Bloomfield (#120)
- e) Manchester (#139)

On the left, please circle the letter of the correct town.

Then show your solution here:

5a) What was the median household income for Darien (#1) in 1999? What was it in 1989?

Answers : Median household income in 1999 = _____
 Median household income in 1989 = _____

Solution:

Question 5b
Difficulty
Rating

1 2 3 4

5b) How much (in dollars) did the household income for Darien change during the decade 1989-1999?

Answer: _____

Solution:

Questions 6 and 7 are concerned with predicting the future based on patterns established in the past. The data table shows that the median household income in Hartford decreased by 14% in the decade from 1989 to 1999. This implies that the household income decreased by approximately \$4,000 during the decade. It also implies that at the end of the decade the median income was 86% of its value at the beginning.

If you imagine this pattern continuing over the next few decades, you could predict future household income on the basis of two different assumptions:

Assumption A: median household income changes at a constant rate of - \$4,000 per decade.

Assumption B: median household income at the end of each decade is 86% of its value at the beginning of the decade.

6a) Use **Assumption A** to complete the following table predicting the income for each number of future decades. After you have completed the first four rows, you will see a pattern that suggests a way of expressing the household income in terms of any number, x , when x is considered to be the number of decades. This definition of x will be valid even when x is a fraction of a decade. Show that expression in the fifth row.

Number of decades since 1999 (x)	Predicted median household income in Hartford (y)
1	$24,820 - 4,000 = 20,820$
2	$24,820 - 2(4,000) = 16,820$
3	
3.5	
x	

6b) When would the median household income in Hartford be \$15,000 using **Assumption A**? (Give your answer in decades, and round it to the nearest tenth of a decade.)

Answer: _____

Solution:

Question 7a
Difficulty
Rating

1 2 3 4

7a) Use **Assumption B** to complete the following table predicting the income for each number of future decades. As in the previous table, your completion of the first four rows will suggest a pattern that will help you to express the household income in terms of any number, x , of decades, even when x is a fraction of a decade. Show that expression in the fifth row. *Note: the caret, ^, denotes exponentiation or “raised to the power.”*

Number of decades since 1999 (x)	Predicted median household income in Hartford (y)
1	$24,820 (0.86) = 21,345.20$
2	$24,820 (0.86)^2 = 18,356.87$
3	
3.5	
x	

7b) When would the median household income in Hartford be \$15,000 using **Assumption B**? (Give your answer in decades, and round it to the nearest tenth of a decade.)

Answer: _____

Solution:

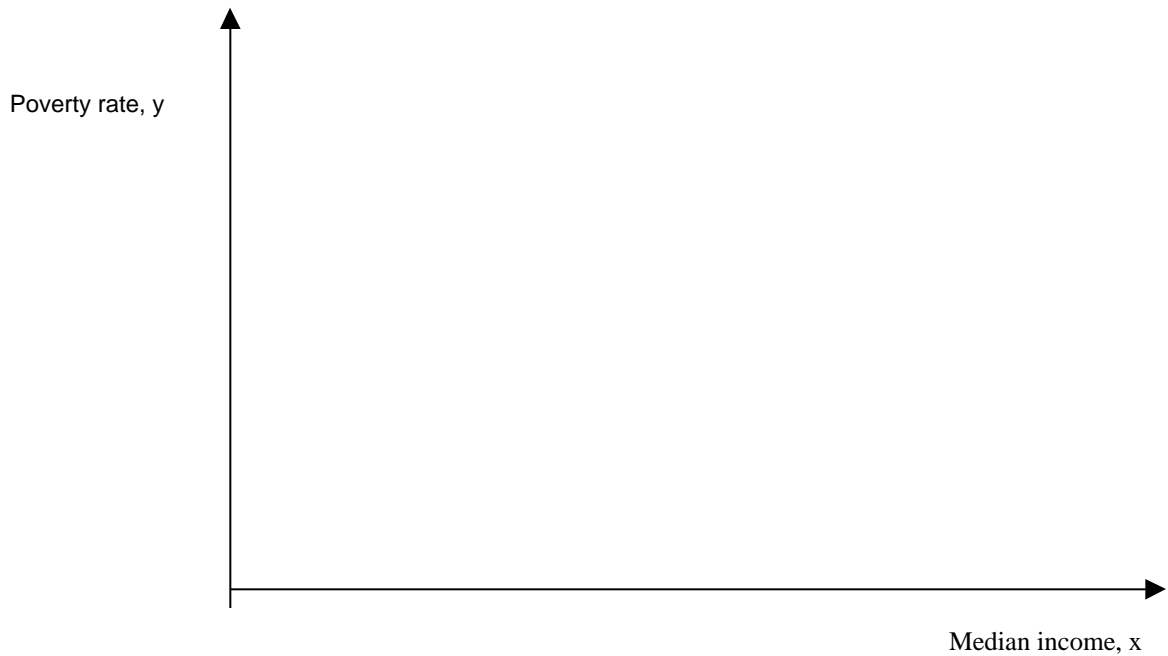
Think about it: *Observation along the way* What do the calculations in questions 4-7 imply about income changes in different towns? How would these calculations apply to the town where you live?

8) Another way of displaying information visually is by using Cartesian coordinates. This kind of graph shows the relationships between two different variables. On the coordinate system below, show the relationship between *median income* and *poverty rate* for the six towns indicated. First, complete the table showing the median income of each town as x (in thousands, rounded to the nearest thousand) and the poverty rate of each town as y (as a percent).

Town	x	y
35. Hebron	75	1
97. Branford	58	4
126. Sharon	53	
159. East Hartford		
163. Windham		
168. New Haven		

Now plot the data on the graph below. Do not connect the points. Be sure to set up a scale for the x and y axes.

Your
Difficulty
Rating



9) Based on the six items of data in Question 8, the equation, $y = -0.48x + 34.3$, provides a good description of the relationship between median income and poverty rate. Graph this equation above on the same coordinate system on which you plotted the data for Question 8.

Solution:

10) According to the equation in Question 9, how much does the poverty rate change when the median income increases by one thousand dollars?

Answer:

Solution:

Think about it: *Observation along the way* As you examined the relationship between changes in median incomes and poverty rates, did it raise any questions in your mind? What other factors might be involved in these changes?

Question 11
Difficulty
Rating

1 2 3 4

11) Based on your work throughout this assignment and your observations along the way, what have you learned about poverty in Connecticut? Do you feel that the data you have studied support the article's title, "Poverty's Web Widens"? Why or why not? In your response, use mathematical evidence to support your conclusion.

Response:

12) Your teacher will assign one more question related to this project. Please copy that question below:

Now type your answer to the question on a separate page, and be sure to staple it to this packet.