2.1 Cumulative Frequency Activity
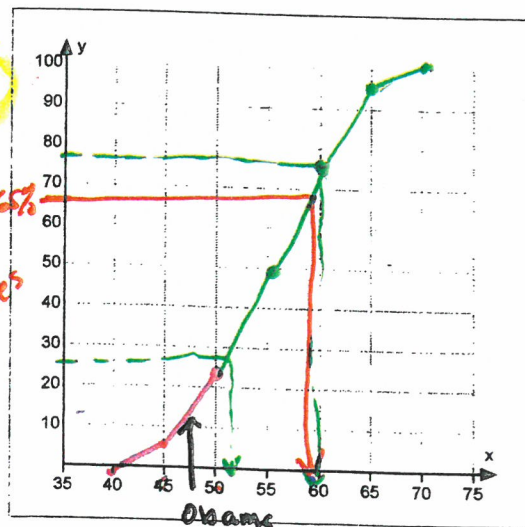
2.1A Activity   **Cumulative Relative Frequency**

Example 1) President's Age at Inauguration

Age	Frequency	Relative frequency	Cumulative frequency	Cumulative relative frequency
40–44	2	2/44 = 0.045, or 4.5%	2	2/44 = 0.045, or 4.5%
45–49	7	7/44 = 0.159, or 15.9%	9	9/44 = 0.205, or 20.5%
50–54	13	13/44 = 0.295, or 29.5%	22	22/44 = 0.500, or 50.0%
55–59	12	12/44 = 0.273, or 27.3%	34	34/44 = 0.773, or 77.3%
60–64	7	7/44 = 0.159, or 15.9%	41	41/44 = 0.932, or 93.2%
65–69	3	3/44 = 0.068, or 6.8%	44	44/44 = 1.000, or 100%

1) Use the above cumulative relative frequency table to create a cumulative relative frequency graph.

Cum. %

65%

%tiles

Obama

AGE AT INAUGURATION

* 45 GOES WITH 45-50 AGE GROUP

2) USE THE GRAPH TO ANSWER THESE QUESTIONS AND ANSWER IN CONTEXT:

A) What percent of Presidents were between 55 and 60 when they were inaugurated?   27.3%

B) Was President Obama, who was inaugurated at 47 unusually young?

YES – BECAUSE OMAMA AT 47 WAS IN ABOUT THE 20 percentile.

C) Estimate and interpret the 65 percentile of the distribution

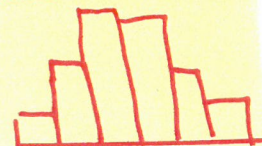About 65% of US Presidents were younger than 57 (58).

D) Estimate the IQR?
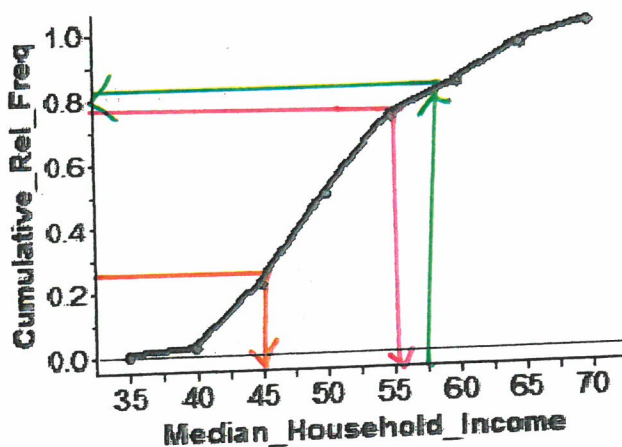
Q1 – 25% – 51/52
Q3 – 75% – 60

IQR = 60 – 51 = 9

TIP: USE HISTOGRAM TO UNDERSTAND SHAPE.

Example 2: State Median Household Incomes

Here is a cumulative relative frequency graph showing the distribution of median household incomes for the 50 states and the District of Columbia. Answer the following question (in context):

b) What is the 25th percentile for this distribution? What is another name for this value?

Q1 - 25th %tile is about $46,000

c) Estimate the IQR

$$IQR = Q3 - Q1 =$$
$$55,000 - 46,000 =$$
$$\boxed{IQR \approx \$9,000}$$

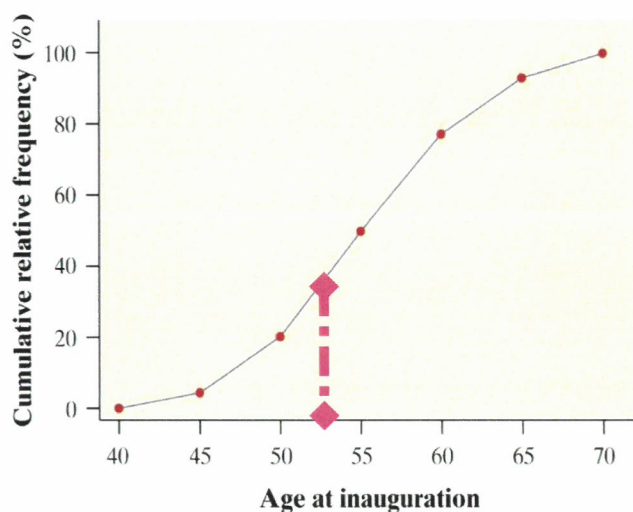**d) Where is the graph the steepest? What does this indicate about the distribution?** $45-50k

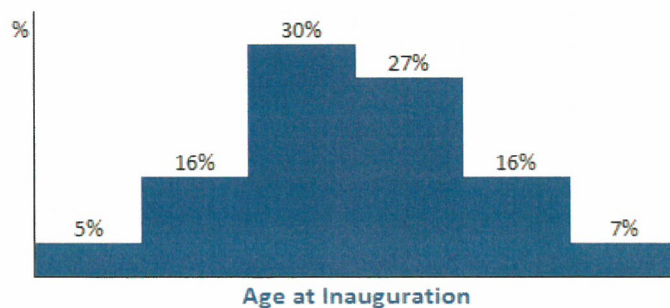The steeper the line the higher the number/% in that group.

a) California, with a median household income of $57,445 is at what percentile?

California's median HH income is about 80th Percentile.

cumulative relative frequency graph,

[1] plot a point corresponding to the cumulative relative frequency in each class at the smallest value of the next class.
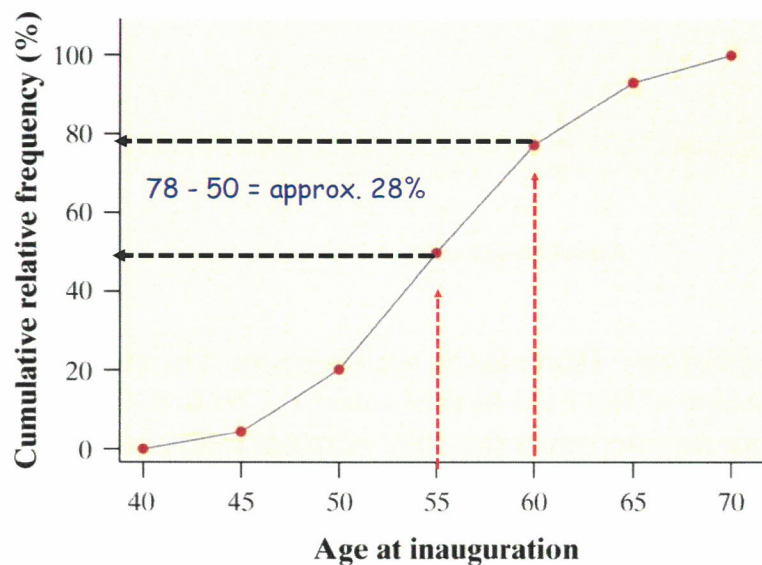

Age at inauguration

Describe the distribution: Hint sketch a histogram. The steeper the graph the larger the percentage of the data in that category. Notice, the graph is steepest between 50-55 and that accounts for 30% of the presidents ages.

Age at Inauguration

2A) What percent of Presidents were between 55 and 60 when they were inaugurated?

• ABOUT 28% of all U.S. Presidents were between 55 and 60 years old at inauguration.
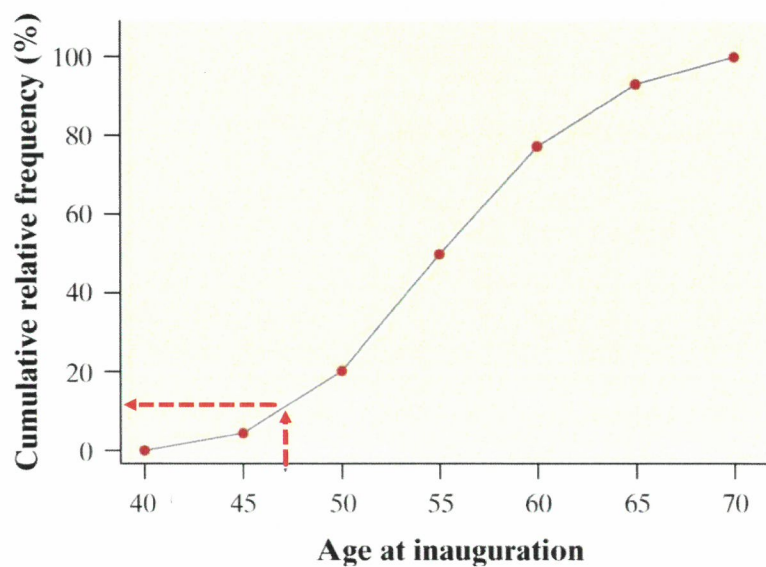
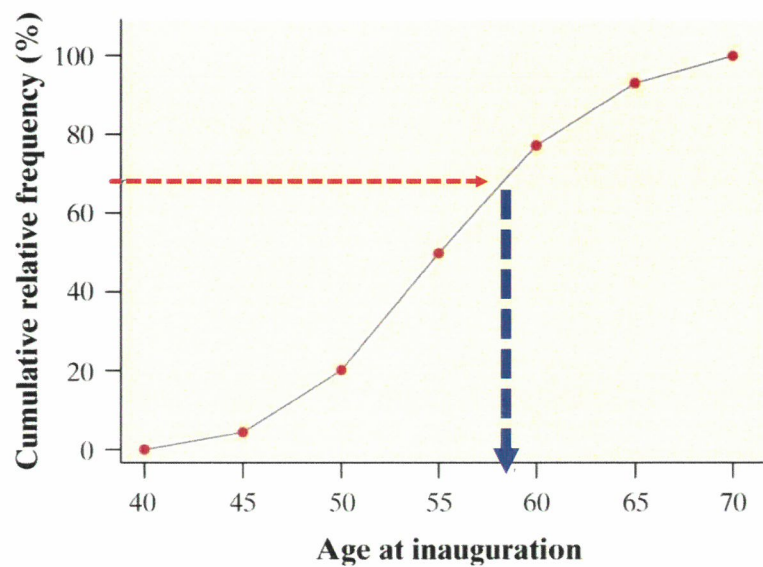2B) Was President Obama, who was inaugurated at 47, unusually young?

- ABOUT 11% percent of all U.S. Presidents were younger than 47 years o
at inauguration. Obama was unusually younger. He was younger than 89%
of all U.S. Presidents.

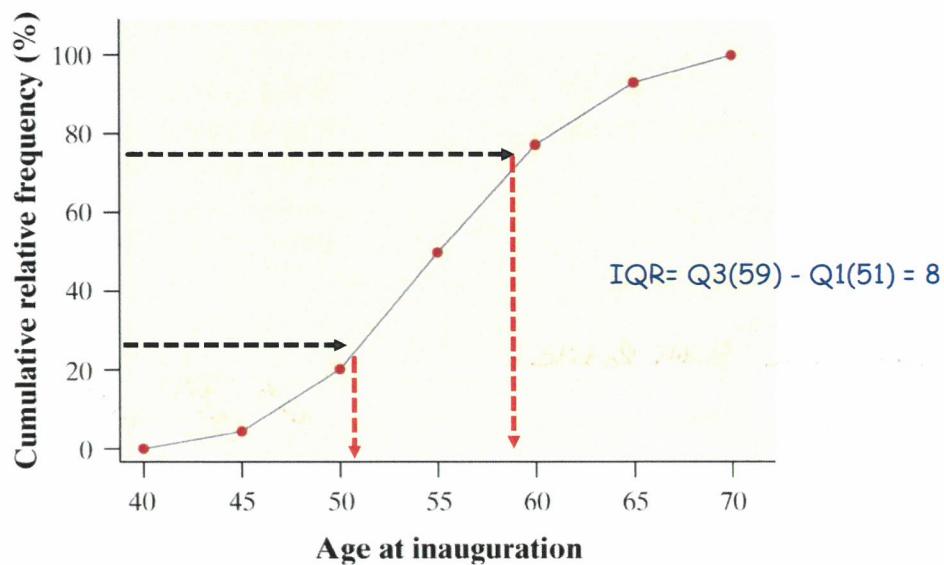2C) Estimate and interpret the 65 percentile of the distribution.

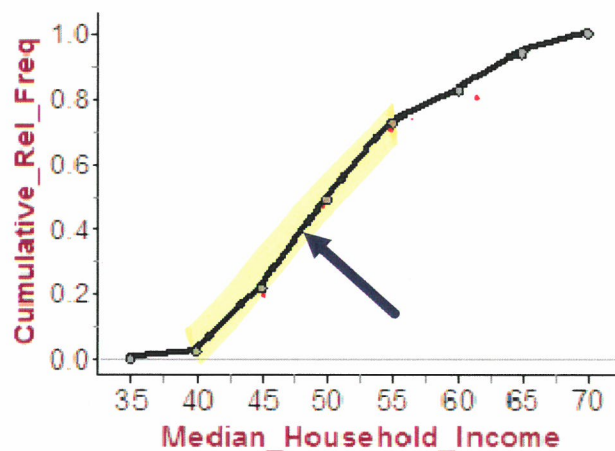- About 65% of U.S. Presidents were younger than 58 at the time of their inauguration.

2D) Estimate IQR

- The middle 50%, the IQR, of all U.S. Presidents age at the time of their inauguration was about 8 years.

IQR= Q3(59) - Q1(51) = 8

Age at inauguration

Example 2: State Median Household Incomes Here is a cumulative relative frequency graph showing the distribution of median household incomes for the 50 states and the District of Columbia. Answer the following question (in context):

c) Estimate the IQR
- **IQR = Q3=$55,000 - Q1=$46,000 = $9,000**
- **The middle 50% of HH Income by state is about $9,000.**
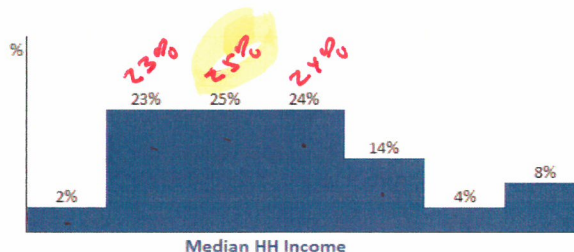
d) Where is the graph the steepest? Between 45-50

What does this indicate about the distribution? This is the largest % of the states. About 25% of the states have median income between $45,000 and $50,000.

a) California, with a median household income of $57,445 is at what percentile?
- **California's median HH income is at the 78th percentile.**
  OR About the 80th %tile.

b) What is the 25ᵗʰ percentile for this distribution? What is another name for this value?
- **The 25th percentile for median HH income is about $46,000. This is also called Quartile 1.**

23% 25% 24%

14%

2%   4%   8%

Median HH Income
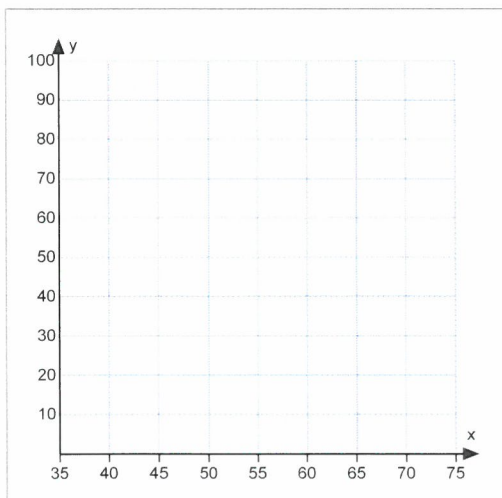
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2.1A Activity   **Cumulative Relative Frequency**

Example 1) President's Age at Inauguration

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1) Use the above cumulative relative frequency table to create a cumulative relative frequency graph.

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A) What percent of Presidents were between 55 and 60 when they were inaugurated?

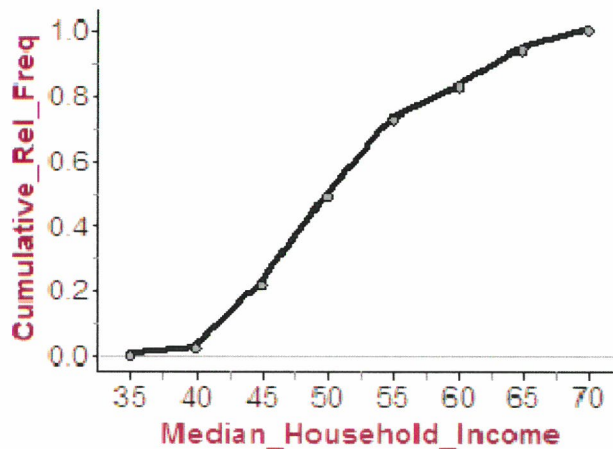**B) Was President Obama, who was inaugurated at 47 unusually young?**

C) Estimate and interpret the 65 percentile of the distribution

D) Estimate the IQR?

Example 2: State Median Household Incomes

Here is a cumulative relative frequency graph showing the distribution of median household incomes for the 50 states and the District of Columbia. Answer the following question (in context):

b) What is the 25th percentile for this distribution? What is another name for this value?

c) Estimate the IQR

d) Where is the graph the steepest? What does this indicate about the distribution?

a) California, with a median household income of $57,445 is at what percentile?