M9L9.3 Histograms and Box Plots

Objective: We will be able to represent and interpret data with plots on the real number line, using:

- Dot Plots
- Histograms

and compare two sets of data on the same graph to make a decision.

Vocabulary

Histogram- is a bar graph that is used to display the frequency of data divided into equal intervals. The bars must be of equal width and should touch but not overlap. The height of the bars indicate the frequency of data values within each interval.

How to find # Interval?

$$\text{\# of intervals} = \sqrt{\text{(how many \#'s in the data set)}}$$

(Round the answer up)

How to find the Interval width ?

$$\text{Interval width} = \frac{\overset{Max\# - Min\#}{Range}}{\text{\# of intervals}}$$

(Round the answer up)

C How is the horizontal axis organized? It is organized in groups of _____10_____ .

Test Scores (histogram with Frequency axis 0–12; bars labeled 3, 9, 12, 7 for intervals 60–69, 70–79, 80–89, 90–99)

D How many had scores in the interval 60–69?

3 people

E How many had scores in the interval 70–79?

9 people

F How many had scores in the interval 80–89?

12 people

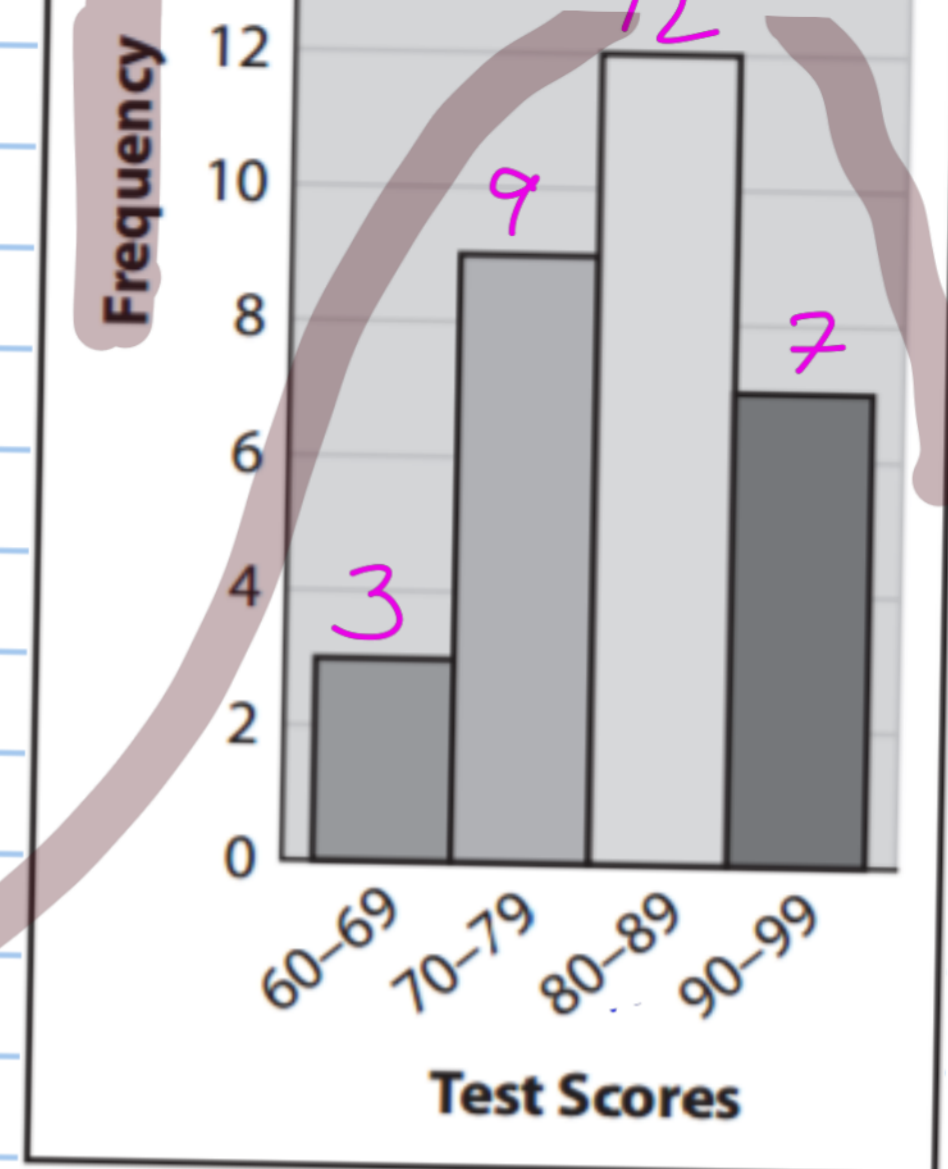**G** How many had scores in the interval 90–99?

7 people

H What statistical information can you tell about a data set by looking at a histogram? What statistical information cannot be determined by looking at a histogram?

We can tell the shape and distribution of data (AKA skewness) We cannot determine their specific test score.

I How many test scores were collected? How do you know?

3 + 9 + 12 + 7 = 31, we add all the #'s.

Create a frequency table from the data. Then use the frequency table to create a histogram.
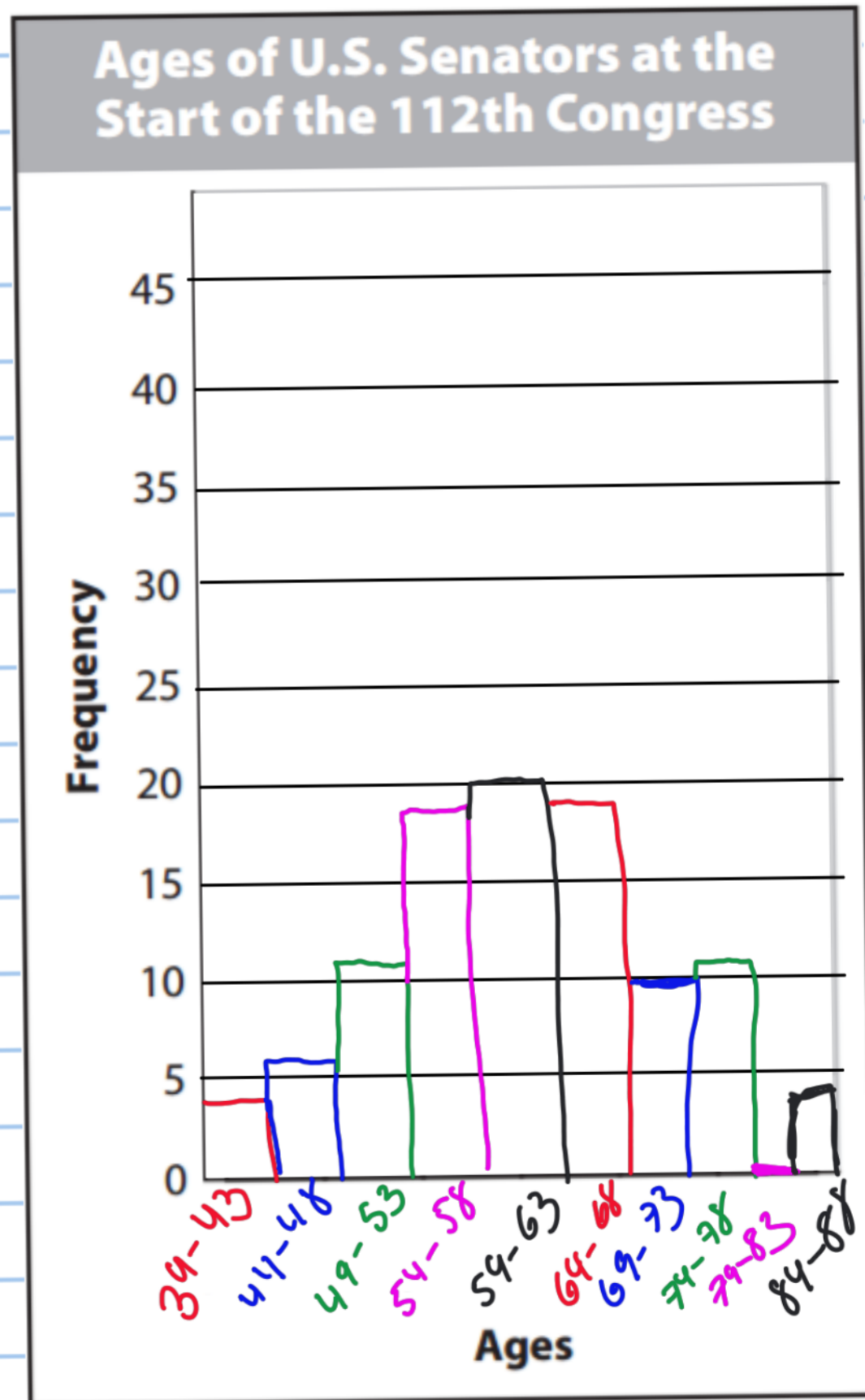
Listed are the ages of the 100 U.S. senators at the start of the 112th Congress on January 3, 2011. 39, 39, 42, 44, 46, 47, 47, 47, 48, 49, 49, 49, 50, 50, 51, 51, 52, 52, 53, 53, 54, 54, 55, 55, 55, 55, 55, 55, 56, 56, 57, 57, 57, 58, 58, 58, 58, 58, 59, 59, 59, 59, 60, 60, 60, 60, 60, 60, 60, 61, 61, 62, 62, 62, 63, 63, 63, 63, 64, 64, 64, 64, 66, 66, 66, 67, 67, 67, 67, 67, 67, 67, 68, 68, 68, 68, 69, 69, 69, 70, 70, 70, 71, 71, 73, 73, 74, 74, 74, 75, 76, 76, 76, 76, 77, 77, 78, 86, 86, 86

Age Interval	Frequency
39 – 43	3
44 – 48	6
49 – 53	11
54 – 58	18
59 – 63	20
64 – 68	18
69 – 73	10
74 – 78	11
79 – 83	0
84 – 88	3

total = 100 ✓

# of Intervals = $\sqrt{100}$
Row / Bars
= 10

Interval width

Range = $\frac{max - min}{\# \; of \; inter.}$ = $\frac{86 - 39}{10}$

= $\frac{47}{10}$

= 4.7 ↑

= 5

Ages of U.S. Senators at the Start of the 112th Congress
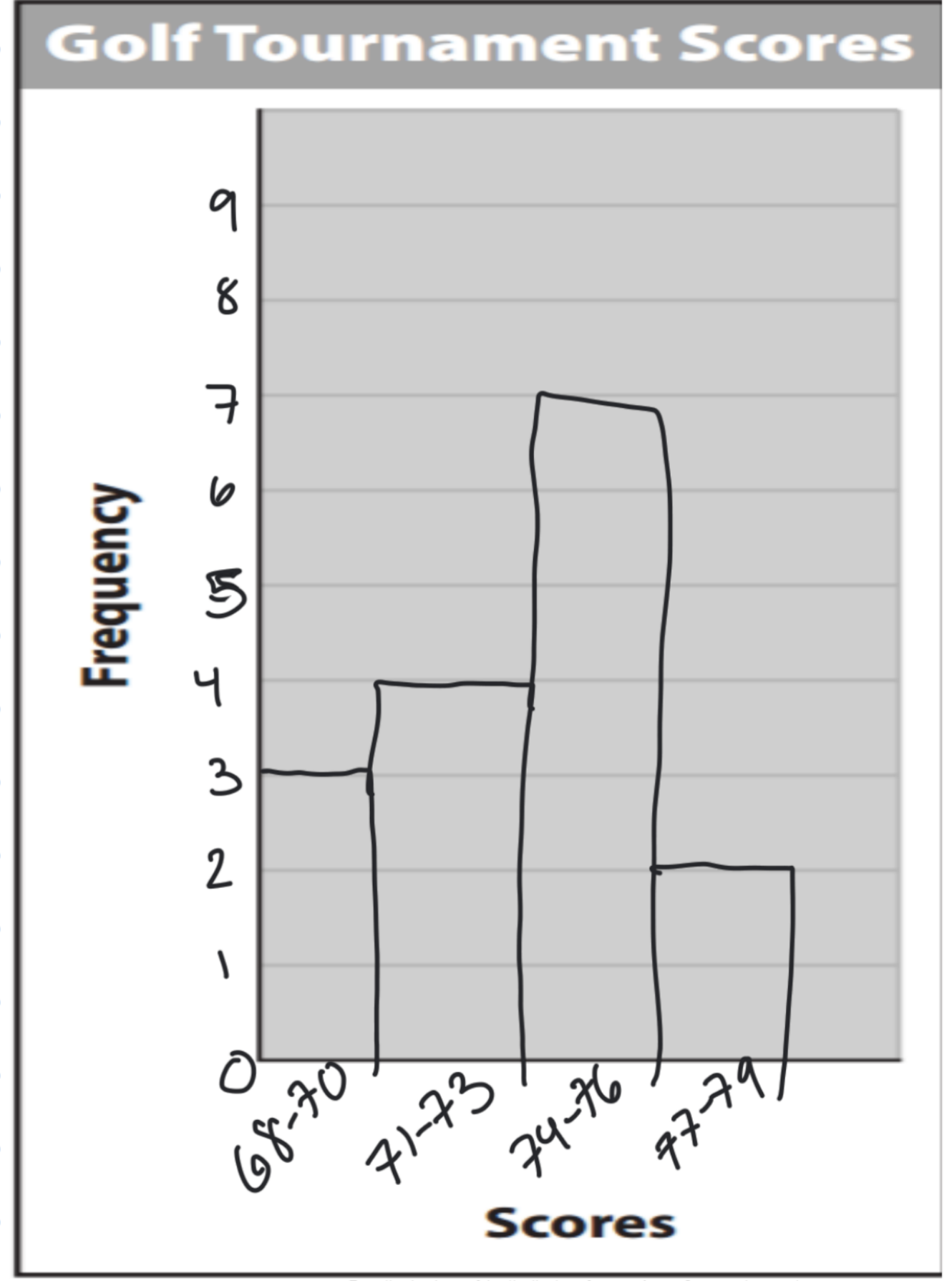
Listed are the scores from a golf tournament. 68, 78, 76, 71,
69, 73, 72, 74, 76, 70, 77, 74, 75, 76, 73, 74

Score Interval	Frequency
68 - 70	3
71 - 73	4
74 - 76	7
77 - 79	2

total = 16 ✓

min   max

$\frac{\#\ of}{Inter} = \sqrt{16}$

$= 4$

$\frac{width}{of\ Inter.} = \frac{78 - 68}{4}$

$= \frac{10}{4}$

$\approx 2.5 \uparrow$

≈ 3

Golf Tournament Scores

Frequency (y-axis): 0 1 2 3 4 5 6 7 8 9
Scores (x-axis): 68-70, 71-73, 74-76, 97-79

Describe the shape of the distribution of senators' ages. Interpret the meaning