

# HSD SUMMATIVE ASSESSMENT

**COURSE:** Algebra 1 (8<sup>th</sup>)  
**UNIT 5:** Descriptive Statistics

ANSWER KEY  
 PG 1 OF 6

Student Name: \_\_\_\_\_

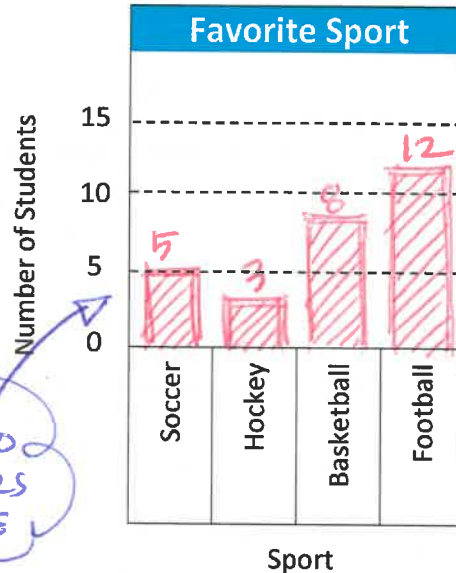
Class Period: \_\_\_\_\_

Date: \_\_\_\_\_

**Question 1** Standard: A1.DS.A.1 Blooms: Apply DOK: 1 Total Points: 4

Using the given data table, create a bar graph to display the data in the space provided below:

Sport:	Tally:	Frequency:
Soccer	IIII	5
Hockey	III	3
Basketball	IIII III	8
Football	IIII IIII II	12



Student Scoring Guide:

Each bar graphed accurately (1 point)

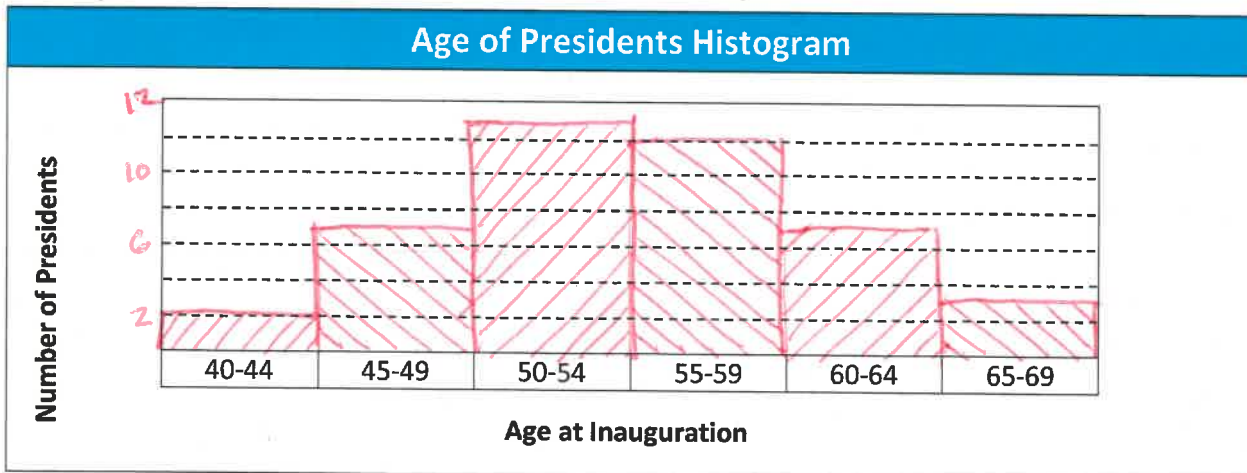
TEACHER NOTE

IT IS BETTER PRACTICE TO HAVE SPACES BETWEEN BARS SO IT DOES NOT LOOK LIKE A HISTOGRAM

**Question 2** Standard: A1.DS.A.1 Blooms: Apply DOK: 1 Total Points: 7

Using the given data table, create a histogram to display the data in the space provided below:

Age at Inauguration	40-44	45-49	50-54	55-59	60-64	65-69
U.S. Presidents	2	7	13	12	7	3



Student Scoring Guide:

Each bar graphed accurately (1 point each)

Vertical Axis scale appropriate (1 point)

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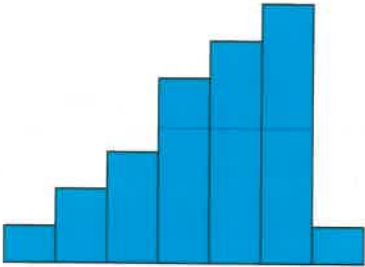
Student Name: \_\_\_\_\_

Class Period: \_\_\_\_\_

Date: \_\_\_\_\_

**Question 3**      Standard: A1.DS.A.2      Blooms: Analyze      DOK: 2      Total Points: 3

Analyze the data distributions below and categorize them appropriately:

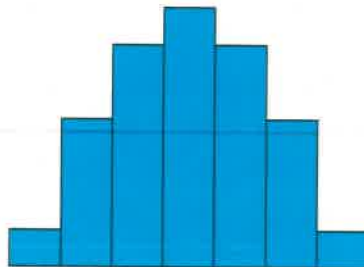


Circle one (1 point):

Negatively Skewed

Symmetrical

Positively Skewed

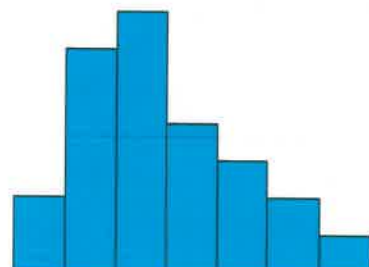


Circle one (1 point):

Negatively Skewed

Symmetrical

Positively Skewed



Circle one (1 point):

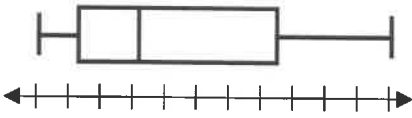
Negatively Skewed

Symmetrical

Positively Skewed

**Question 4**      Standard: A1.DS.A.2      Blooms: Analyze      DOK: 2      Total Points: 3

Analyze the Box and Whisker plots below and categorize them appropriately:

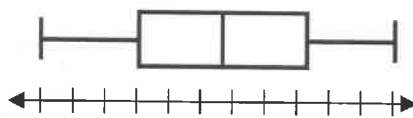


Circle one (1 point):

Negatively Skewed

Symmetrical

Positively Skewed

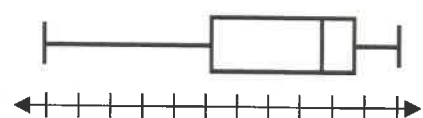


Circle one (1 point):

Negatively Skewed

Symmetrical

Positively Skewed



Circle one (1 point):

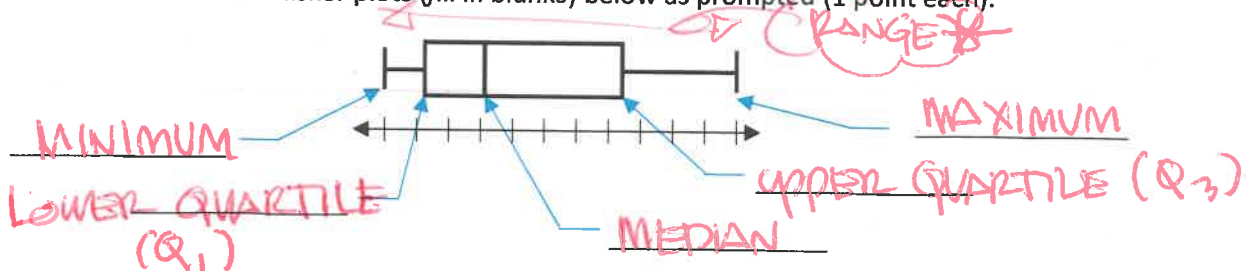
Negatively Skewed

Symmetrical

Positively Skewed

**Question 5**      Standard: A1.DS.A.1      Blooms: Remember      DOK: 1      Total Points: 5

Annotate the Box and Whisker plots (*fill in blanks*) below as prompted (1 point each):



Total Points for this Page: \_\_\_\_\_

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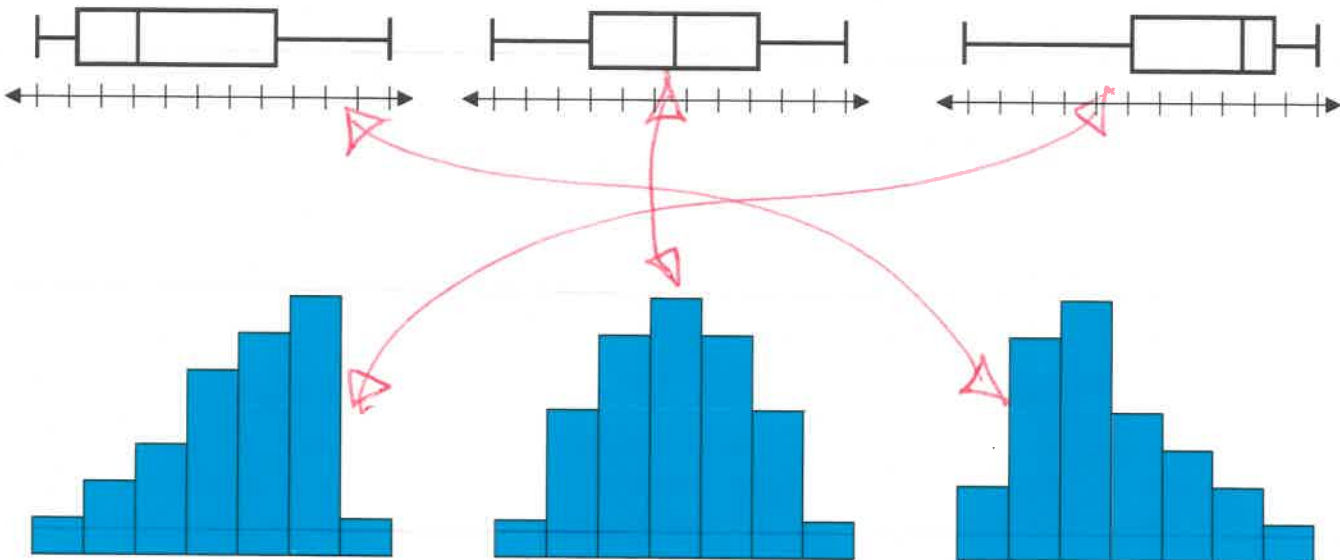
Student Name: \_\_\_\_\_

Class Period: \_\_\_\_\_

Date: \_\_\_\_\_

**Question 6** Standard: A1.DS.A.3 Blooms: Analyze DOK: 2 Total Points: 3

Analyze the graphics below and draw a line between them to indicate which box and whisker plot corresponds to which histogram:



**Question 7** Standard: A1.DS.A.3 Blooms: Apply DOK: 1 Total Points: 4

Given the following data set, find the "Mean", "Median", "Mode", and "Range" of the data as listed:

Data Set = 13, 5, 8, 12, 7, 4, 5, 8, 14, 11, 13, 8

Show ALL work here:  $4, 5, 5, 7, 8, 8, 8, 11, 12, 13, 13, 14$  ;  $n = 12$

$$\frac{\sum n}{n} = \frac{108}{12}$$

Answers: Mean = 9 Median = 8 Mode = 8 Range = 10

**Question 8** Standard: A1.DS.A.3 Blooms: Apply DOK: 1 Total Points: 2

Continuing our analysis of the above Data Set, find the "Standard Deviation" of the data as listed:

Show ALL work here:

$$\sum (\bar{x} - x_n)^2 = 25 + 16 + 16 + 9 + 1 + 1 + 1 + 1 + 9 + 16 + 16 + 25 = 134$$

$$\sigma = \sqrt{\frac{\sum (\bar{x} - x_n)^2}{n}} = \sqrt{\frac{134}{12}} = 3.34$$

Answer: Standard deviation = 3.34

$$(\bar{x} - x_n)^2$$

TEACHER NOTE  
 STUDENTS WILL MOST LIKELY USE THE CALCULATORS TO GET  $\sigma$

Total Points for this Page: \_\_\_\_\_

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**Question 9**      Standard: A1.DS.A.2      Blooms: Analyze      DOK: 2      Total Points: 6

Staying with our previously analyzed data set, if ALL members of the set were increased by 7, list the new values for "Mean", "Median", "Mode", "Range", and "Standard Deviation".

Original Data Set = 13, 5, 8, 12, 7, 4, 5, 8, 14, 11, 13, 8

New Data Set (1 point) = 11, 12, 12, 14, 15, 15, 15, 18, 19, 20, 20, 21

STUDENTS WILL PROBABLY USE CALCULATOR FOR THIS PART

$\sum (x - \bar{x})^2$   
 $(16-11)^2 = 5$   
 $(16-12)^2 = 4$   
 $(16-12)^2 = 4$   
 $(16-14)^2 = 2$   
 $(16-15)^2 = 1$   
 $(16-15)^2 = 1$   
 $(16-15)^2 = 1$   
 $(16-18)^2 = 2$   
 $(16-19)^2 = 3$   
 $(16-20)^2 = 4$   
 $(16-20)^2 = 4$   
 $(16-21)^2 = 5$   
134

Show ALL work here:

$\frac{\sum n}{n} = \frac{192}{12}$

$21 - 11 = 10$   
 $\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n}}$   
 $= \sqrt{\frac{134}{12}}$   
 $= \sqrt{11.16}$

Answers: Mean = 16    Median = 15    Mode = 15    Range = 10    Standard deviation = 3.34

**Question 10**      Standard: A1.DS.A.3      Blooms: Analyze      DOK: 2      Total Points: 5

Looking again at our original Data Set (listed below), if an outlier of 550 were added to the list, which is more significantly impacted by its addition, the "mean" or the "median"? Explain your reasoning

Original Data Set = 13, 5, 8, 12, 7, 4, 5, 8, 14, 11, 13, 8, 550

Show ALL work here: 4, 5, 5, 7, 8, 8, 8, 11, 12, 13, 13, 14, 550

Show ALL work and rationale here (2 points):

$\frac{\sum n}{n} = \frac{108 + 550}{13} = \frac{658}{13} = 50.6$

Answer: (one point) Circle your choice:    Mean    Median

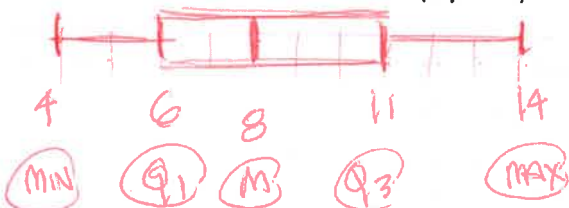
**Question 11**      Standard: A1.DS.A.3      Blooms: Analyze      DOK: 3      Total Points: 7

Calculate the "5 Number Summary" of the "Original Data Set" as shown in the previous question...

Create the statistically appropriate graphic to display your answers below.

$\frac{8+8}{2} = 8$   
4, 5, 5, 7, 8, 8, 8, 11, 12, 13, 13, 14

Create graphic with annotations here (1 point):



Answers: (one point each)

- Value 1: 4
- Value 2: 6
- Value 3: 8
- Value 4: 11
- Value 5: 14

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**Question 12** Standard: A1.DS.A.3 Blooms: Apply DOK: 2 Total Points: 11

Janelle conducted a survey for the Prom Committee regarding possible student attendance. She found that sixty-six juniors replied to the survey, with 32 saying they would be attending. Of the 86 seniors she surveyed 46 said they would be attending. Organize the GIVEN data into the table given below:

a) Fill in the "joint frequencies" (1 point each)

Class	Attending	Not Attending	Totals
Juniors	32	34	66
Seniors	46	38	84
<b>Totals</b>	<b>78</b>	<b>72</b>	<b>150</b>

$66 - 32 = 34$   
 $88 - 46 = 38$

b) Fill in the "marginal frequencies" with ALL of the calculated data (1 point each)

Show ALL work here (2 points):

$$\begin{array}{r} 32 \\ +64 \\ \hline 78 \end{array}$$

$$\begin{array}{r} 34 \\ +38 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 46 \\ +38 \\ \hline 84 \end{array}$$

$$\begin{array}{r} 32 \\ +34 \\ \hline 66 \end{array}$$

$$\begin{array}{r} 66 \\ +84 \\ \hline 150 \end{array}$$

$$\begin{array}{r} 78 \\ +72 \\ \hline 150 \end{array}$$

THIS BEING HOW IN THE ABOVE CHART IS SUFFICIENT FOR ALL POINTS

c) Calculate the "sum of marginal frequencies", being the lower right corner field (1 point)

150 ← THIS BEING HOW IN THE ABOVE CHART IS SUFFICIENT FOR ALL POINTS

**Question 13** Standard: A1.DS.A.3 Blooms: Analyze DOK: 2 Total Points: 6

Analyzing the completed Two-Way Data Table above, answer the following questions (1 point each):

- a) How many students responded to the survey? Answer: 150
- b) How many students surveyed are attending Prom? Answer: 78
- c) How many juniors surveyed are not attending Prom? Answer: 34
- d) How many seniors surveyed are attending Prom? Answer: 38
- e) What does each of the "joint frequencies" represent?

Answer: THE COMBINATION OF SUBCATEGORIES ( $R_2C_2, R_3C_2, R_2C_3, R_3C_3$ )

f) What does each of the "marginal frequencies" represent? IF TEST NOT IN COLOR

Answer: THE RESPECTIVE TOTALS OF EACH SUBCATEGORY

g) Why is the yellow field "sum of the marginal frequencies" the same for both the row sum and the column sum?

Answer: BECAUSE THEY SHOULD BOTH REPRESENT THE "SUM" OF ALL STUDENTS POLLED.

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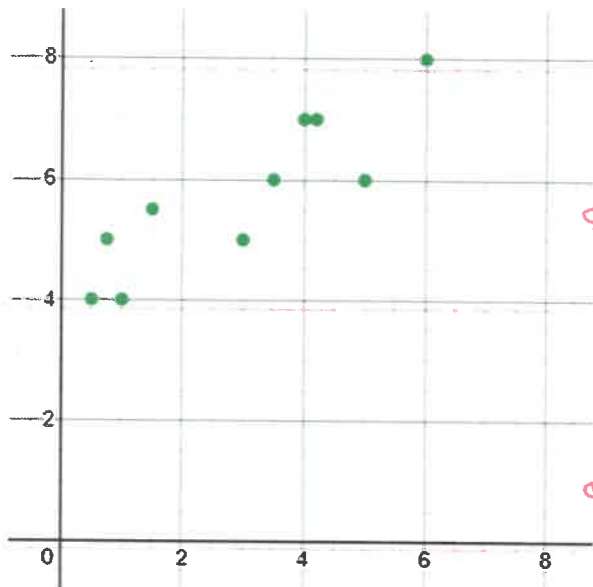
Student Name: \_\_\_\_\_

Class Period: \_\_\_\_\_

Date: \_\_\_\_\_

**Question 14**      Standard: 8.DSP.A.2      Blooms: Analyze      DOK: 2      Total Points: 2

Which Regression best describes the given Scatter Plot below:



Circle one (1 point):

- a) Cubic
- b) Quartic
- c) Quadratic
- d) Logistic
- e) Linear

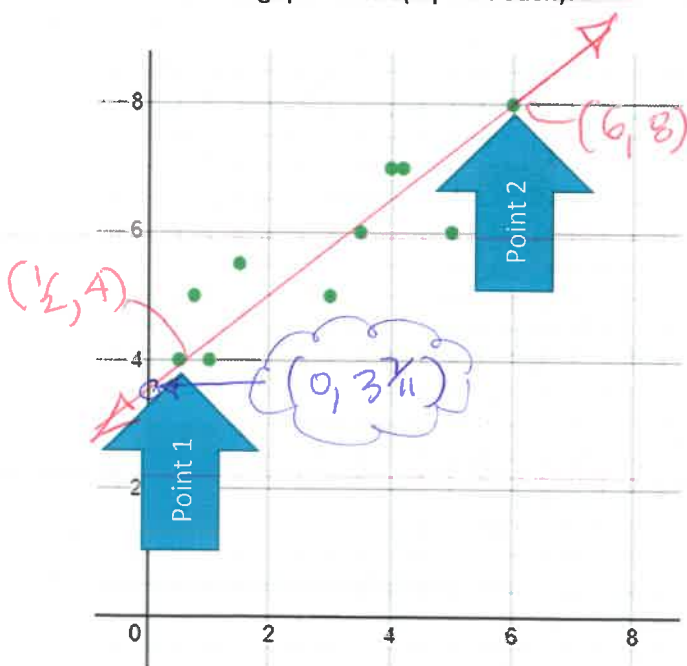
Does this line have a positive correlation or a negative correlation?

Circle one (1 point):

- a) Negative
- b) Positive
- a) Horizontal
- b) Linear

**Question 14**      Standard: 8.DSP.A.3      Blooms: Apply      DOK: 2      Total Points: 3

Assuming the bivariate data shown below has a "Best Fit" line that goes through points 1 and 2, answer the following questions (1 point each):



a) What is the "slope" of the line of best fit?

Answer (1 point):  $m = \frac{8}{11}$

Show ALL work here:

$$\frac{8-4}{6-\frac{1}{2}} = \frac{4}{5\frac{1}{2}} = \frac{4}{\frac{11}{2}} = \left(\frac{4}{1}\right) \left(\frac{2}{11}\right) = \frac{8}{11}$$

ACCEPTABLE ANSWERS:  
 $y = \frac{8}{11}x + 3\frac{7}{11}$   
 $y = \frac{8}{11}x + 3.63$

b) What is the "equation" of the line of best fit?

Answer (1 point):  $y = \frac{8}{11}x + \frac{40}{11}$

Show ALL work here:

$$y - y_1 = m(x - x_1) \therefore y - 4 = \frac{8}{11}(x - 1) \rightarrow y = \frac{8}{11}x - \frac{40}{11} + \frac{8}{11} = \frac{8}{11}x - \frac{40}{11}$$

c) Graph the line of best fit onto the scatter plot: (1 point)

Total Points for this Page: \_\_\_\_\_