

# Math 153 - Quiz 4

February 23, 2017

Name key

Score \_\_\_\_\_

Show all work to receive full credit. Supply explanations when necessary. YOU MUST WORK INDIVIDUALLY.

1. (2 points) Jenny scored 81 on a math test with mean 74.3 and standard deviation 4.2. Matt scored 33.5 on a physics test with mean 28.5 and standard deviation 3.0.

(a) Compute the corresponding z-scores. Who scored better?

Jenny:

$$Z = \frac{81 - 74.3}{4.2} \approx 1.60$$

Matt:

$$Z = \frac{33.5 - 28.5}{3.0} \approx 1.67$$

Matt's score is slightly better.

(b) Compute the coefficients of variation for the tests. Which tests (math or physics) had greater variation?

Math:

$$CV = \frac{4.2}{74.3} \approx 5.65\%$$

Physics:

$$CV = \frac{3.0}{28.5} \approx 10.53\%$$

Physics tests had greater variation.

2. (2 points) Refer to the January snowfall data on the attached sheet.

(a) At what percentile is 7.4 in?

$$\frac{18}{44} \approx 0.409$$

ABOUT THE 41<sup>ST</sup> PERCENTILE.

(b) What snowfall measurement is at the 72nd percentile?

$$\frac{L}{44} = 0.72 \Rightarrow L = 31.68$$

$\Rightarrow$  THE 32<sup>ND</sup> VALUE IS AT THE 72<sup>ND</sup> PERCENTILE.

$$32^{\text{ND}} \text{ VALUE} = 15.5 \text{ in}$$

3. (6 points) Refer to the January snowfall data on the attached sheet. Compute the five-number summary, the IQR, and the outlier cutoffs. Then construct the modified boxplot. Use the attached graph paper.

$$\text{MEDIAN} = \frac{22^{\text{ND}} + 23^{\text{RD}}}{2} = \frac{10.0 + 10.0}{2} = 10.0$$

$$Q_1 = \frac{11^{\text{TH}} + 12^{\text{TH}}}{2} = \frac{4.3 + 5.0}{2} = 4.65$$

$$Q_3 = \frac{33^{\text{RD}} + 34^{\text{TH}}}{2} = \frac{15.5 + 16.8}{2} = 16.15$$

$$\text{IQR} = 16.15 - 4.65 = 11.5$$

CUTOFFS:

$$4.65 - 1.5 \times 11.5 = -12.6$$

$$16.15 + 1.5 \times 11.5 = 33.4 \longrightarrow 34.3 \text{ IS AN OUTLIER.}$$

5-NUMBER SUMMARY:

$$\text{MIN} = 0.4$$

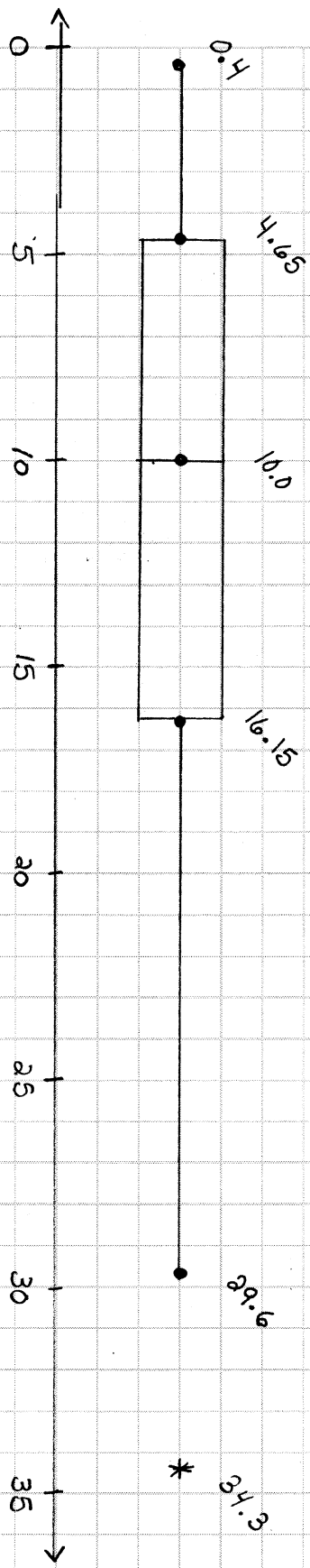
$$Q_1 = 4.65$$

$$\text{MED} = 10.0$$

$$Q_3 = 16.15$$

$$\text{MAX} = 34.3$$

SEE BOXPLOT ON ATTACHED SHEET.



JANUARY SNOWFALL (in)

January Snowfall at O'Hare Airport (Inches)

1960-2005 (Excluding 1997 and 1998)

0.4	0.5	1.5	1.6	2.0	3.0	3.2	3.5	3.5	3.7
4.3	5.0	5.4	5.6	5.9	6.2	6.9	7.2	7.4	7.6
9.5	10.0	10.0	10.4	11.1	11.7	13.1	13.6	14.2	14.6
15.2	15.5	15.5	16.8	17.2	17.3	18.6	18.9	21.9	22.9
25.1	27.8	29.6	34.3						