

1/9 Algebra - Downing

1) Find the value of x if the mean is 6.

$$2, 8, 7, 6, x \rightarrow \frac{2+8+7+6+x}{5} = 6$$

$$\cancel{(5)} \frac{23+x}{5} = 6 \cancel{(5)}$$

$$\begin{array}{r} 23+x = 30 \\ -23 \quad -23 \\ \hline x = 7 \end{array}$$

2) Find the value of x if the median is 7

$$3, 3, [4, x], 13, 14$$

$$\cancel{(2)} \frac{4+x}{2} = 7 \cancel{(2)}$$

$$\begin{array}{r} 4+x = 14 \\ -4 \quad -4 \\ \hline x = 10 \end{array}$$

Median is the best choice for center if there is an outlier

Mean is the best choice for center if there are no outliers

11.1C Transforming Data

Data Transformations Using Addition:

When a real number k is ADDED to each value in the data set then...

- * the measures of center of the new set change by adding k to each (mean, median + mode)
- * the measures of variation of the new set are the SAME as the original. (range and standard deviation)

Ex) Consider the data: 35, 32, 25, 19, 21, 40

$K = 11$ (add 11 to each)

Mean $\bar{x} = 28.67$

Median = 28.50

Mode: None

Range: $40 - 19 = 21$

$\sigma = 7.59$

46 43 36 30 32 51

New Mean $\bar{x} = 39.67 \rightarrow$ Increased by 11

New Median = 39.5 \rightarrow Increased by 11

New Mode = None \rightarrow Did not change but would increase by 11 if there was a number

New Range = $51 - 30 = 21 \rightarrow$ Did not change

New $\sigma = 7.59 \rightarrow$ Did not change

Data Transformations Using Multiplication:

When a real number K is multiplied by each value in the data set then.

* the measures of center AND variation of the original set are multiplied by K

$K = 0.5$ (multiply each)

Original data: 35, 32, 25, 19, 21, 40

New data: 17.5, 16, 12.5, 9.5, 10.5, 20

original data New data

\bar{x} : 28.67 $\xrightarrow{\times(0.5)}$ 14.34

Median: 28.5 \longrightarrow 14.25

Mode: None \longrightarrow None

Range: 21 \longrightarrow 10.5

σ : 7.59 \longrightarrow 3.8

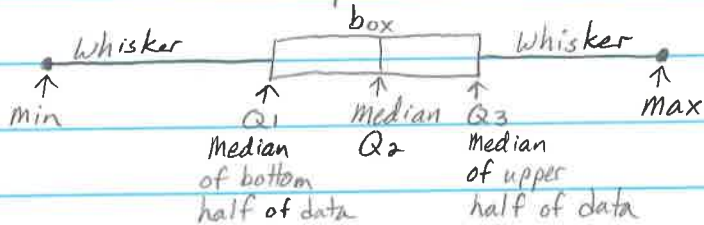
Ex) Original data	All values increased by \$0.50	All values increase by 10% (multiply by 1.10)
$\bar{x} = 9.65$	$\bar{x} = 9.65 + .50 = 10.15$	$\bar{x} = 9.65(1.1) = 10.62$
Med: 8.7	Med: $8.7 + .50 = 9.2$	Med: $8.7(1.1) = 9.75$
Mode: 8.25	Mode: $8.25 + .50 = 8.75$	Mode: $8.25(1.1) = 9.08$
Range: 8.25	Range: 8.25 (does not change)	Range: $8.25(1.1) = 9.08$
$\sigma_x = 2.61$	$\sigma_x = 2.61$ (does not change)	$\sigma_x = 2.61(1.1) = 2.87$

Classwork: Section 11.1 (11.1 C) pg. 590 #25-28

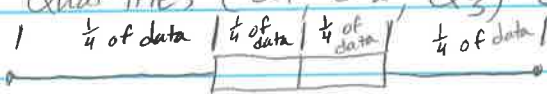
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11.2 Box and Whisker Plots

- Shows the variability of the data on a number line.



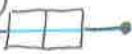
- The Quartiles (Q_1 , Q_2 , Q_3) divide your data into 4 equal parts

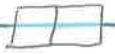



Interquartile Range: (IQR) - Difference between Q_3 and Q_1

$$IQR = Q_3 - Q_1$$

Shapes of Box and Whisker Plot

- Skewed Left 
Left whisker is long
Most data is on the right

- Skewed Right 
Right whisker is long
Most data is on left

- Symmetric 
Median is in middle of plot
whiskers are the same

Ex) Given this data set: 24, 30, 30, 22, 25, 22, 18, 25, 28, 30, 25, 27

- Make a box and whisker plot:



$$\text{min} = 18$$

$$Q_1 = 23$$

$$\text{Med} = 25$$

$$Q_3 = 29$$

$$\text{Max} = 30$$

$$IQR = 29 - 23 = 6$$

Describe the dist. = skewed left.

HW: 11.2 pg. 597 # 3-10, 14, 15, 17