Agenda

Homework (reg)
Pg.75 #1.29, 1.31
Pg.84 #1.37
Pg.89 #1.43

- Warm Up
- Window/Door, shape — 10 min
- Checkup — 10 min
  - ~~*Check, copies*~~
- Lecture, center and spread — 30 min
  - Spread, s.d. vs. 5# summary
  - ~~*Update data w/ salary expectations*~~
- How long is a minute — 20 min
  - ~~*Set up*~~
- Exit Pass — 10 min
  - ~~*Update*~~

Warm Up

Sign up for our *Remind:*
Text to 81010,
message: @602reg2020

1. Which of the following are true statements?

I. Stemplots are useful both for quantitative and categorical data sets.

II. Stemplots are equally useful for small and very large data sets.

III. Stemplots can show symmetry, gaps, clusters, and outliers.

A) I only *B) II only* *C) III only* *D) I and II* *E) I and III*

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2. If 10 executives have salaries of $80,000, 6 have salaries of $75,000, and 3 have salaries of $70,000, what is the median salary?

A) $75,000 *B) $76,842* *C)$77,500* *D) $80,000* *E) none of these*

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3. Which of the following statements are true?

I. Two students working with the same data may come up with histograms that look different.

II. Displaying outliers is less problematic when using histograms than when using stemplots.

III. Histograms are more widely used than stemplots or dotplots because histograms display the values of individual observations.

A.) I only *B.) II only* *C.) III only* *D.) I and II* *E.) II and III*

Back-to-School night

5:30-6:15	Music/food/shopping
6:15-6:25	AFROTC Flag Presentation
6:30-6:40	Period 1
6:50-7:00	Period 2
7:10-7:20	Period 3
7:30-7:40	Period 4

Window/Door – "What's the Shape"?

Consider the following variables on which you could gather data from students at RCHS. For each, describe the shape of the distribution. Skewed right/left, or symmetric? Justify.

1. *EXAMPLE:* Number of pairs of shoes owned
2. Number of siblings
3. Price paid for most recent haircut
4. Number of T-shirts owned
5. Distance from place of birth
6. Age
7. Amount paid on the student's last visit to a grocery store
8. Last digits of cell phone number
9. Duration of most recent phone conversation

Checkup time

Describing Distributions with Numbers

SO**CS**

"Center" and "Spread"

Measures of Center

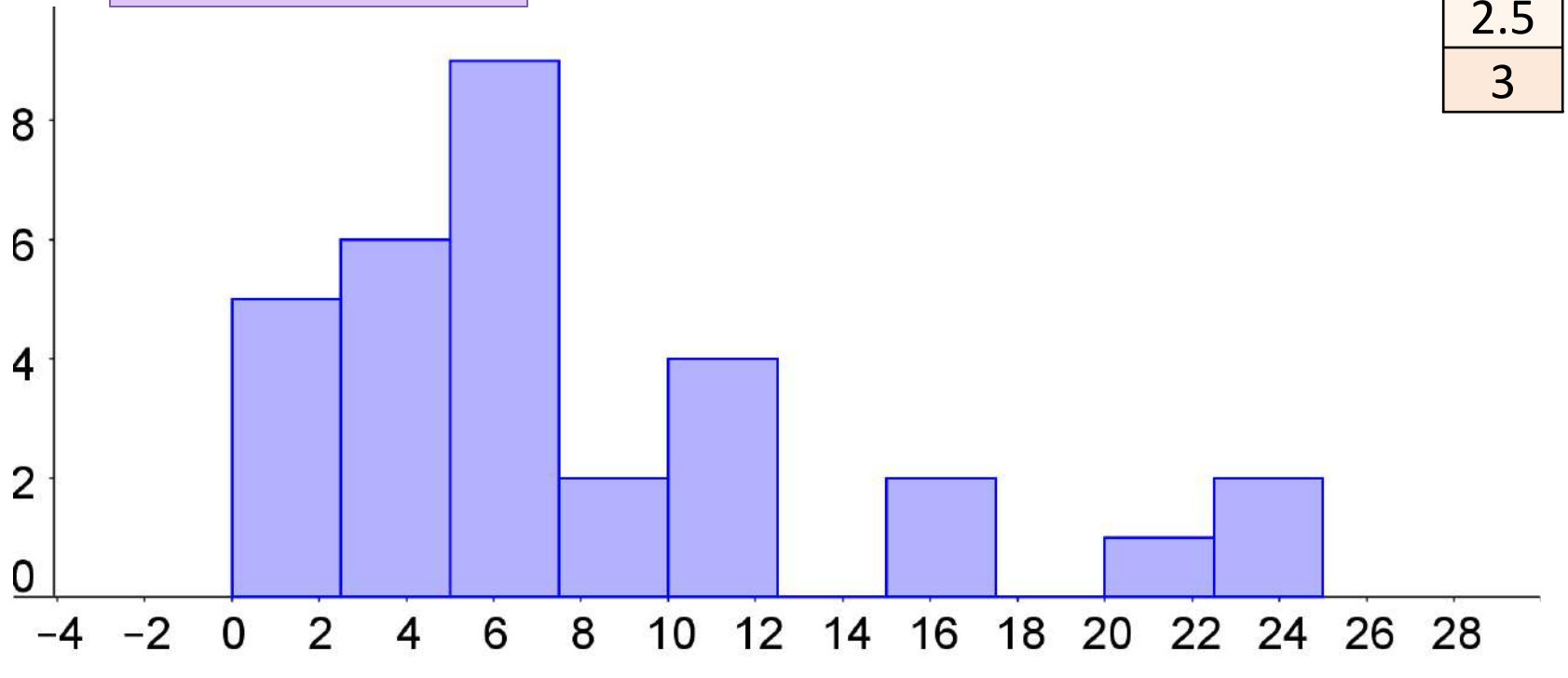
Mean
4.761 hours

vs.

Median
3.5 hours

Only when data is ~symmetric!

0
0
0
0.75
1
2
2
2
2.5
2.5
3
4
4
4
5
5
10
10
10
10
10
17



Poverty Thresholds for 2016									
	Related children under 18 years								
	0	1	2	3	4	5	6	7	8+
Size of family unit									
One person	12,331								
Two people	15,871	16,337							
Three people	18,540	19,078	19,096						
Four people	24,447	24,847	24,036	24,120					
Five people	29,482	29,911	28,995	28,286	27,853				
Six people	33,909	34,044	33,342	32,670	31,670	31,078			
Seven people	39,017	39,260	38,421	37,835	36,745	35,473	34,077		
Eight people	43,637	44,023	43,230	42,536	41,551	40,300	38,999	38,668	
Nine people or more	52,493	52,747	52,046	51,457	50,490	49,159	47,956	47,658	45,822
Source: U.S. Census Bureau.									

Salary expectations (P.2)

How much do you expect to make for your annual salary in your first year of full-time employment?

1. Calculate the mean and median.

2. Suppose a new student expects to earn $1 billion(!) as the leader of a world-wide empire. Which is affected more, the mean or median?

3. Not including the new student, suppose all your estimates are increased by $5000. How might this affect the mean and median?

Period 2
$10,000
$20,000
$22,500
$25,000
$30,000
$30,000
$36,000
$40,000
$40,000
$45,000
$53,000
$70,000
$70,000
$77,500
$80,000
$80,000
$80,000
$100,000
$150,000

Everything is on the calculator!

- Type data into List at STAT→1:Edit

Period 2
$10,000
$20,000
$22,500
$25,000
$30,000
$30,000
$36,000
$40,000
$40,000
$45,000
$53,000
$70,000
$70,000
$77,500
$80,000
$80,000
$80,000
$100,000
$150,000

Everything is on the calculator!

- Type data into List at STAT→1:Edit
- Numerical summary
  - Mean, standard deviation, 5# summary….
  - STAT→CALC→1:1-Var Stats

Period 2
$10,000
$20,000
$22,500
$25,000
$30,000
$30,000
$36,000
$40,000
$40,000
$45,000
$53,000
$70,000
$70,000
$77,500
$80,000
$80,000
$80,000
$100,000
$150,000

5-number summary

- Minimum
- First quartile
  (25th percentile)
- Median
- Third quartile
  (75th percentile)
- Maximum

"Interquartile range"

"Range"

1.5 x IQR Rule for Outliers

An observation is an outlier if it falls more than (1.5xIQR) above Q_3 or below Q_1.

Q_1 – (1.5xIQR)

Q_3 + (1.5xIQR)

Min	**0**
Q_1	**0**
Med	**2**
Q_3	**3**
Max	**9**

n = 30

P.2
0
0
0
0
0
0
0
0
0
1
1
1
2
2
2

n = 28

2
2
2
2
3
3
3
3
3
3.5
4
5
5
8
9

Window/Door

Identify any outliers in the data sets:

1. 0, 3, 8, 13, 19, 40

No outliers, 19+24=43

2. 0, 3, 8, 13, 19, 44

44 is outlier, 19+24=43

3. 0, 5, 15, 25, 35, 75

No outliers, 35+45=80

4. -15, -15, -7, 0, ~~35~~, 100, 120, 150, 355

355 is an outliers,
135+219=354

Standard Deviation

- Average distance from mean.
  - *Average of the squares of the "deviations" from the mean*
- Only use when the mean is chosen as the measure of center
- Sensitive to outliers

2.25

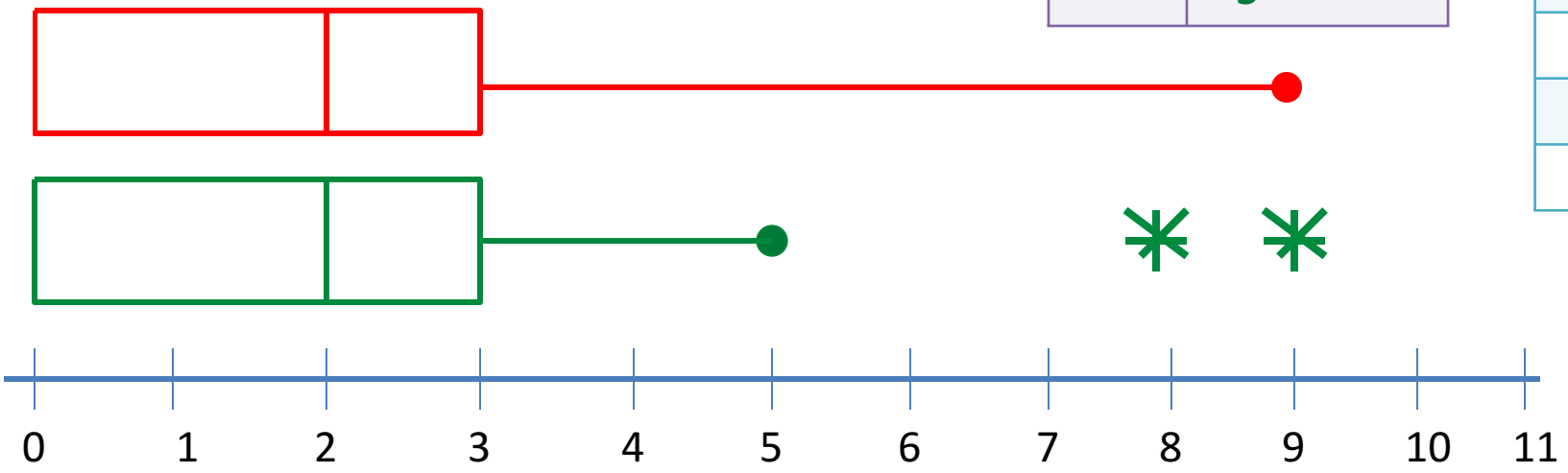
or 1.54

P.2	
0	2
0	2
0	2
0	2
0	3
0	3
0	3
0	3
0	3
1	3.5
1	4
1	5
2	5
2	8
2	9

Boxplot

- Represent 5-number summary on # line
- “Modified boxplot” = outliers shown

Min	0
Q_1	0
Med	2
Q_3	3
Max	9



P.2
0
0
0
0
0
0
0
0
0
1
1
1
2
2
2

2
2
2
2
3
3
3
3
3
3.5
4
5
5
8
9

Everything is on the calculator!

- Type data into List at STAT→1:Edit
- Numerical summary
  - Mean, standard deviation, 5# summary….
  - STAT→CALC→1:1-Var Stats
- Histograms and boxplots
  - 2nd→STAT PLOT→Enter (Turn Plot ON)
    - Histogram is graph type #3
    - Modified boxplot (shows outliers) is graph type #4
    - Boxplot is graph type #5
  - Can't see graph? Try ZOOM→9:ZoomStat

Period 2
$10,000
$20,000
$22,500
$25,000
$30,000
$30,000
$36,000
$40,000
$40,000
$45,000
$53,000
$70,000
$70,000
$77,500
$80,000
$80,000
$80,000
$100,000
$150,000

How long is a minute?

- You and your partner will need 1 watch/timer
- Door → Tell Window to start counting 1 minute
- Window → When you think it's been a minute, say "Stop" quietly.
- Door → Write down time in seconds
  - Do NOT tell partner how much time passed
- **Two trials**, then switch roles.
- Do not reveal your data to anyone else, including your partner.

How long is a minute?

Give me your estimates.

In L_1, enter the *first estimates* of the class*:*

1. Both partners. Use your calculator to make a modified boxplot of the class' *first estimates*. Compare calculators.
2. Both partners. Use your calculator to make a histogram. Compare calculators.
3. DOOR. Describe the distribution to your partner.

In L_2, enter the *averages* of the class:

1. Both partners. Use your calculator to make 2 simultaneous modified boxplots of both the first estimates *and* average estimates. Compare calculators.
2. Both partners. Use your calculator to 2 simultaneous histograms of both the first estimates *and* average estimates. . Compare calculators.
3. WINDOW. Compare these two distributions.

How long is a minute?

I will ask you to read all three of your own estimates.

Using the ***first estimates*** of the class*:*

1. Both partners. Use your calculator to make a **modified boxplot** of the class' *first estimates*. Compare your calculators.
2. DOOR. Describe the distribution to your partner.

Using the ***averages*** of the class:

1. Both partners. Use your calculator to make a **histogram** of the class' average estimates. Compare your calculators.
2. WINDOW. Describe the distribution to your partner.

Exit Pass (P.2)

Homework (reg)
Pg.75 #1.29, 1.31
Pg.84 #1.37
Pg.89 #1.43

1. Create a 5-number summary of the data.
2. Sketch a modified boxplot of the data.

Period 2
$10,000
$20,000
$22,500
$25,000
$30,000
$30,000
$36,000
$40,000
$40,000
$45,000
$53,000
$70,000
$70,000
$77,500
$80,000
$80,000
$80,000
$100,000
$150,000