Secondary Math 1
Chapter 7 Practice Test

Name_____
Period_____ Date_____

average | middle # (in order) | number that occurs most (can have no mode, one mode, or more than one mode) | difference between greatest & least values

Find the mean, median, mode, and range for the following sets of data (problems 1-4):

1. Hours spent listening to music in one week:
22, 5, 22, 25, 9, 18, 26

in order: 5, 9, 18, 22, 22, 25, 26

Mean: 18.14 $\frac{5+9+18+22+22+25+26}{7} = \frac{127}{7}$

Median: 22

Mode: 22

Range: 21 $26-5=21$

2. Ages of people in a beginner swimming class:
6, 3, 8, 17, 19, 5, 13

in order: 3, 5, 6, 8, 13, 17, 19

Mean: 10.14 $\frac{3+5+6+8+13+17+19}{7} = \frac{71}{7}$

Median: 8

Mode: no mode

Range: 16 $19-3=16$

3. Car speeds in miles per hour observed by a highway patrol officer:
60, 53, 53, 52, 53, 55, 55, 57

in order: 52, 53, 53, 53, 55, 55, 57, 60

$\frac{53+55}{2} = 54$

Mean: 54.75 $\frac{52+53+53+53+55+55+57+60}{8}$ $\frac{438}{8}$

Median: 54

Mode: 53

Range: 8 $60-52=8$

4. The cost of 8 different pairs of pants at a department store:
$40, $32, $20, $15, $20, $24, $37, $27

in order: 15, 20, 20, 24, 27, 32, 37, 40

$\frac{24+27}{2} = 25.5$

Mean: 26.875 $\frac{215}{8}$

Median: 25.5

Mode: 20

Range: 25 $40-15=25$

5. The mean salary of all the employees at two different insurance companies is the same. Given the following standard deviation of each company, which company has a greater spread of salaries?

Company A: $15,000 | Company B: $20,000

(greater standard deviation → greater spread)

Use the table below and find the sample size, mean, and standard deviation for the data set.

6. 1, 6, 7, 4, 2

sample size (how many data values) $n = 5$

$\bar{x} = 4$

mean $\frac{1+6+7+4+2}{5}$

Standard Deviation:
2.28

x (the data values)	$(x-\bar{x})$	$(x-\bar{x})^2$	Sum of $(x-\bar{x})^2$	$\frac{sum}{n}$	$\sqrt{\frac{sum}{n}}$
1	$1-4$ -3	$(-3)^2$ 9	$9+4+9+0+4$	$\frac{26}{5}$	$\sqrt{5.2}$
6	$6-4$ 2	$(2)^2$ 4	26	5.2	≈ 2.28
7	$7-4$ 3	$(3)^2$ 9			
4	$4-4$ 0	$(0)^2$ 0			
2	$2-4$ -2	$(-2)^2$ 4			

remember, these are always positive (no matter what your calculator tells you)

standard deviation

7. 3, 10, 4, 4, 7

$n = 5$

$\bar{X} = 5.6$

$\frac{3+10+4+4+7}{5}$

Standard Deviation:

2.58

x	$(x-\bar{x})$	$(x-\bar{x})^2$	Sum of $(x-\bar{x})^2$	$\frac{sum}{n}$	$\sqrt{\frac{sum}{n}}$
3	$3-5.6 = -2.6$	$(-2.6)^2 = 6.76$	$+$	$\frac{33.2}{5}$	$\sqrt{6.64}$
10	$10-5.6 = 4.4$	$(4.4)^2 = 19.36$	$+$		
4	$4-5.6 = -1.6$	$(-1.6)^2 = 2.56$	$+$	6.64	$\approx 2.5768\ldots$
4	$4-5.6 = -1.6$	$(-1.6)^2 = 2.56$	$+$		
7	$7-5.6 = 1.4$	$(1.4)^2 = 1.96$	33.2		

$Q_3 - Q_1$; min, Q_1, median (Q_2), Q_3, max

Find the range, interquartile range, and 5-number summary for each of the following sets of data, then draw a Box-and-Whisker plot.

8. Hours of television watched last weekend: 6, 1, 3, 8, 5, 11, 1, 5

in order: 1 | 1 3 | 5 5 | 6 8 | 11

min; Q_1; med (Q_2) = 5; Q_3; max

$\frac{1+3}{2}$; $\frac{6+8}{2}$

5 number summary: Range: $11-1 = 10$ Interquartile Range (IQR): $7-2 = 5$

minimum = 1

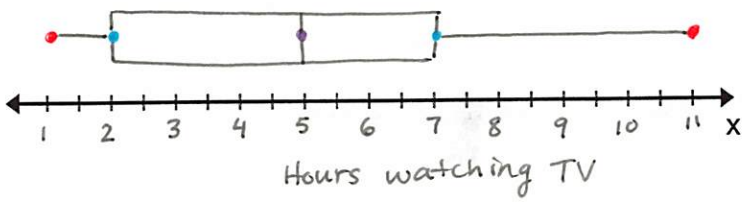
$Q_1 = 2$

median = 5

$Q_3 = 7$

maximum = 11

(extra line - oops)



Hours watching TV

9. Minutes it takes to get to school: 1, 3, 5, 3, 8, 7, 6, 8, 4, 6

in order: 1 | 3 | 3 | 4 | 5 6 | 6 | 7 | 8 | 8

min; Q_1; med = $\frac{5+6}{2}$; Q_3; max

5 number summary: Range: $8-1 = 7$ Interquartile Range (IQR): $7-3 = 4$

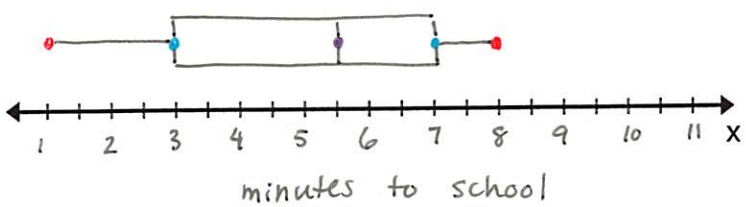
min = 1

$Q_1 = 3$

median = 5.5

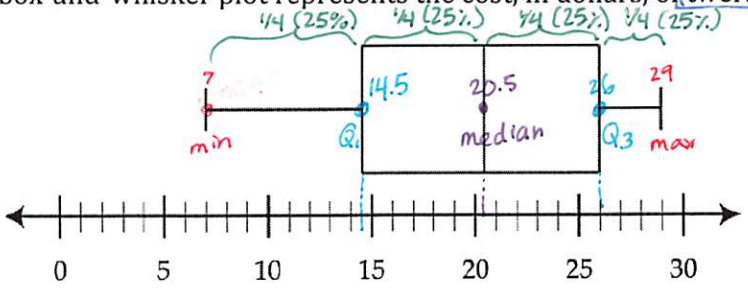
$Q_3 = 7$

max = 8



minutes to school

10. The accompanying box-and-whisker plot represents the cost, in dollars, of twelve different CD's.



*remember, each section represents 1/4 or 25% of the data

a) What is the sample size? 12

b) Which cost is the upper quartile(Q_3)? $26

c) What is the range of the costs of the CD's? $22
29-7 = 22

d) What is the median? $20.50

e) What percent of CD's cost between $14.50 and $26.00? 50% (2 of the 25% pieces)

f) How many CD's cost less than $14.50? 3 (25% of the 12 CDs)

g) What is the interquartile range(IQR)? $11.50
26 - 14.5

For 11 and 12, Calculate if the data sets have any outliers. (Show your work!!)
less than $Q_1 - 1.5 \times IQR$ or greater than $Q_3 + 1.5 \times IQR$

11. $Q_1 = 54$, $Q_2 = 69$, $Q_3 = 78$

IQR = 78 - 54 = 24
1.5(IQR) = 1.5(24) = 36

Lower Boundary: 18
54 - 36 (so less than 18 would be an outlier)

Upper Boundary: 114
78 + 36 (more than 114 is an outlier)

According to your results, would 194 be an outlier?
yes

12. 44, 67, 52, 72, 82, 55, 70, 200, 55, 57, 6

6 (less than 22) 44 52 (Q_1) 55 55 57 (Q_2) 67 70 72 (Q_3) 82 200 (greater than 102)

IQR = 72 - 52 = 20
1.5(IQR) = 1.5(20) = 30

Lower Boundary: 22 (less than 22 → outlier)
- 30 = 22

Upper Boundary: 102 (greater than 102 → outlier)
+ 30 = 102

Outliers?
6 and 200

13. 86, 75, 72, 78, 81, 78, 88, 74, 74, 78, 77, 70, 77

70 72 74 74 75 77 77 78 78 78 81 86 88
min Q_1: 74 Q_2 Q_3 = (78+81)/2 = 79.5 max (greater than 87.75)

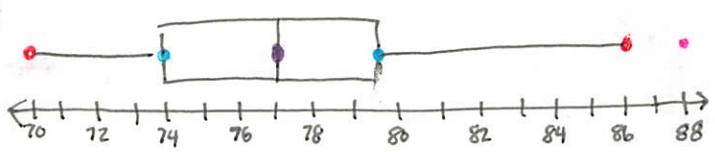
IQR = 79.5 - 74 = 5.5
1.5(IQR) = 1.5(5.5) = 8.25

Lower Boundary: 65.75
74 - 8.25

Upper Boundary: 87.75
79.5 + 8.25

Outliers? 88

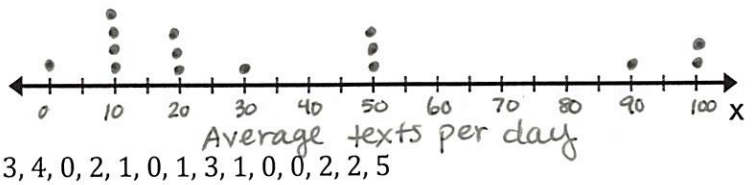
14. Create a box plot (or **modified** box plot if there are outliers) using the data from #13.
shows outlier as separate point



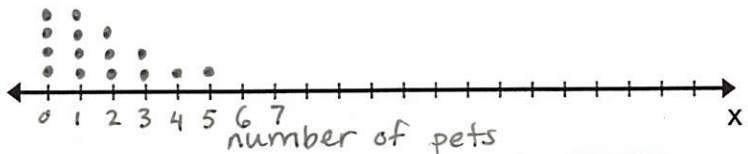
one dot per data value

For each of the following draw a dot plot of the given data. Be sure to label your axes well.

15. Average text messages sent per day: 0,10,10,10,10,20,20,20,30,50,50,50,90,100,100



16. Number of pets: 1, 3, 4, 0, 2, 1, 0, 1, 3, 1, 0, 0, 2, 2, 5



histogram reminders
- consistent intervals (same amount in each, no skipping #s, etc.)
- no extra space between bars (unless it's an interval with no #s in the data)

For each of the following, graph a histogram for the given data. Be sure to label your axes well.

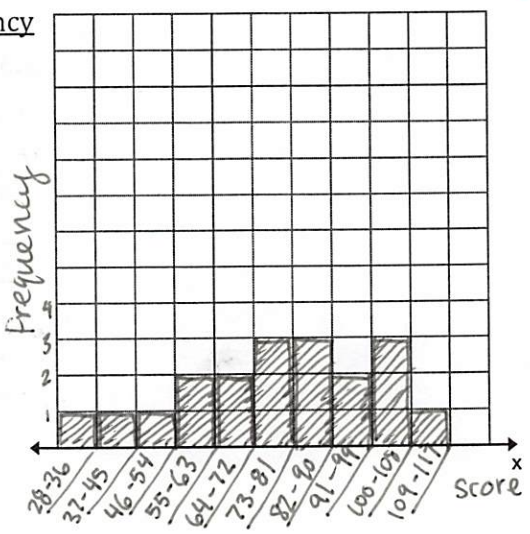
17. Test scores:
46, 90, 28, 56, 80, 78, 100, 100, 66, 86, 66, 70, 96, 76, 62, 44, 102, 82, 80, 109, 99

(Use intervals of 9 numbers, starting with 28-36)

each containing 9 numbers, say them out loud and count if you need to!

in order: 28/44/46/56/62/66/70/76/78 80/82/86/90/96/99/100/100/102/109

Intervals	Frequency
28-36	1
37-45	1
46-54	1
55-63	2
64-72	2
73-81	3
82-90	3
91-99	2
100-108	3
109-117	1



a) What type of distribution does this data have?

Skewed left (really close to symmetric though)

b) What measure of center should you use for the data?

median

symmetric: mean & s.d.
skewed: median & IQR

c) What measure of center should you use for the data?

IQR

d) Fill in the blank below with <, >, or =

Mean __<__ Median

skewed left: mean < med
symmetric: mean = med
skewed right: mean > med

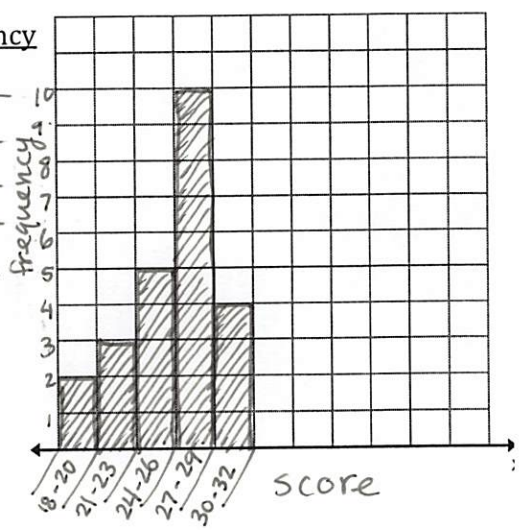
18. Scores on a 30 point quiz:
25, 29, 29, 26, 30, 28, 25, 18, 28, 22, 29, 30, 28, 20, 30, 22, 21, 28, 29, 30, 27, 25, 28, 26

(Use intervals of 3 numbers)

28 29 30 31 32 33 34 35 36 } 9 #s

in order: 18 20/21 22 22/25 25 25 26 26/27 28 28 28 28 28 29 29 29 29/30 30 30 30

Intervals	Frequency
18-20	2
21-23	3
24-26	5
27-29	10
30-32	4



a) Distribution?

skewed left

b) Measure of center to use?

median

c) Measure of spread to use?

IQR

d) Fill in the blank below with <, >, or =

Mean __<__ Median

Answer questions 19-22 based on the following data set:

5, 8, 9, 7, 10, 6, 25 — 5 6 7 [8] 9 10 25 (obvious) outlier

19. Find the mean and median of the data set. Then find the mean and median of the data excluding the outlier.

Mean: 10 — $\frac{5+6+7+8+9+10+25}{7}$

Mean without outlier: because we took out 25 → 6 — $\frac{5+6+7+8+9+10}{6} = 7.5$

Median: 8

Median without outlier: 7.5 — 5 6 [7 8] 9 10 → 7.5

20. Which is more affected by the outlier: the mean or the median? the mean

21. Which number better represents the data: the mean or the median? (before removing the outlier) Explain.

I would say the median because the mean is too high to be a good representation

22. What would the shape of this data be? Explain.

Skewed right. The outlier is on the right and the mean is greater than the median.

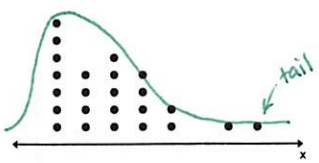
For each of the following graphs:

a) Determine the shape of the data (symmetrical, skewed left, or skewed right) — tail on the left; tail on the right

b) Determine which measurements of center and spread (mean and standard deviation **OR** median and 5-number summary/IQR) should be used to represent the data. — mean ≈ med; mean < med; mean > med; symmetric; skewed

c) Determine if the mean is greater than (>), less than (<) , or about the same as (=) the median.

23.

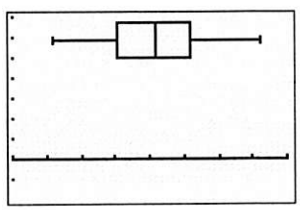


a) Shape: Skewed right

b) Center: median Spread: IQR

c) Mean > Median

24.

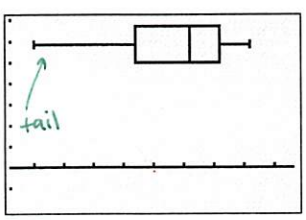


a) Shape: Symmetric

b) Center: mean Spread: standard deviation

c) Mean = Median

25.



a) Shape: Skewed left

b) Center: median Spread: IQR

c) Mean < Median

26.

a) Shape: Symmetric

b) Center: mean Spread: standard deviation

c) Mean = Median

27. A student has the following scores throughout the term, calculate the mean for each category:

Homework = 85, 73, 92, 95, 86, 92, 100, 89, 93, 80 $\frac{885}{10}$ ★ mean = 88.5

Classwork = 87, 95, 84, 100, 100, 91 $\frac{557}{6}$ ★ mean = 92.83

Tests = 92, 86, 97 $\frac{275}{3}$ ★ mean = 91.67

Term grades in this class are calculated with the following weights:

Category Weights	
Homework	30% = 0.3
Classwork	15% = 0.15
Tests	55% = 0.55

Calculate this student's term grade:

$0.3(88.5) + 0.15(92.83) + 0.55(91.67)$

90.89

28. The table shows the scores of a geometry test for 24 students. What is the average score per student?

Test scores	# Students (weight)
100	2
95	3
90	4
85	4
80	5
75	2
70	4

*multiply weight (# of students) with each test score, add them all up, and divide by # of weights (# of students) ★

total weights = 24

$$\frac{2(100) + 3(95) + 4(90) + 4(85) + 5(80) + 2(75) + 4(70)}{24}$$

$= \frac{2015}{24}$

83.96

29. You participate in robotics contest that is judged using the following criteria:

Robotics Categories	
Overall Performance	30% = 0.3
Complexity of Task	20% = 0.2
Software	15% = 0.15
Hardware	15% = 0.15
Creativity	20% = 0.2

(total = 1)

Your scores (rated on a scale of 1-5) are:
Overall performance = 5, Complexity = 4, Software = 4, Hardware = 3, Creativity = 5

Calculate your (mean) average score:

$0.3(5) + 0.2(4) + 0.15(4) + 0.15(3) + 0.2(5)$

$= 4.34$

30. Maggie recently took a road trip. She bought 11 gallons of gasoline for $1.93 per gallon and 13 gallons for $2.13. She filled her tank once on the way back with 17 gallons at $1.95 per gallon. What was the average fuel cost per gallon on Maggie's trip?

Total: 11 + 13 + 17 = 41 gallons

$$\frac{11(1.93) + 13(2.13) + 17(1.95)}{41} = \frac{82.07}{41}$$

About $2.00 per gallon