

Math 114  
Chapter 2, Practice Problems

1. (12 pts) Make a stem and leaf plot for the data provided.

2016 Tehama Crop Report Fruit and Nut Crops (in millions of dollars)	
Crop	Total Value
Almonds	\$41
Olives	\$36
Olive Oil	\$5
Pistachio	\$1
Prunes	\$18
Walnuts	\$104
Grapes	\$4

Data in order
1
4
5
18
36
41
104

Stem and Leaf Plot of Total Value of Tehama Crops, 2016	
Stem	Leaf
0	1 4 5
1	8
2	
3	6
4	1
5	
6	
7	
8	
9	
10	4

2. (10 pts) Construct a frequency distribution for the data using 4 classes.

Use the formula

$$\frac{\text{Max} - \text{Min}}{\text{number of classes}} = \frac{104 - 1}{4} = 25.75 \Rightarrow 26$$

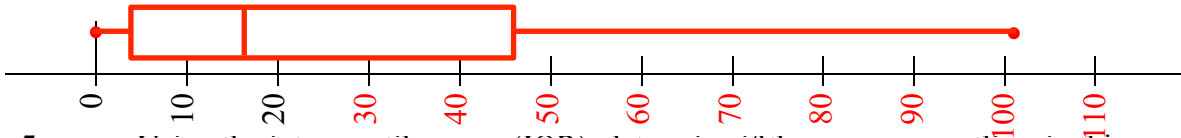
Note that class width = lower class limit - previous lower class limit

Classes	Tally	Frequency
1 - 26	x x x x	4
27 - 52	x x	2
53 - 78		0
79 - 104	x	1

3. (5 pts) What are the 5-Number Summary numbers for the 2016 Tehama Fruits and Nuts Crop Report data?

Minimum	Quartile 1	Median	Quartile 3	Maximum
1	4	18	41	104

4. (2 pts) Construct a box plot for the data. The labeling of the number line has been started for you.



5. (5 pts) Using the interquartile range (IQR), determine if there are any outliers in this data.

Find the interquartile range (IQR)	Calculate $IQR \times 1.5$	Calculate $Q_1 - (IQR \times 1.5)$	Calculate $Q_3 + (IQR \times 1.5)$	List any outliers
$41 - 4 = 37$	$37 \times 1.5 = 55.5$	$4 - 55.5 = -51.5$	$41 + 55.5 = 96.5$	104

Formulas: I.  $p = \frac{x + 0.5y}{n} \cdot 100$

II.  $i = \frac{k(n+1)}{100}$

$x$  = the number of values below the data value of interest

$n$  = the number of data values in the list

$y$  = the number of values equal to the data value of interest

$k$  = the percentile of interest

6. (4 pts.) Complete the table:

Data value (Crop) Choose integer data value just above decimal value.	Percentile Round to whole number
Olive Oil total value	$\frac{2 + .5}{7} \cdot 100 = 35.7 \Rightarrow 36^{\text{th}}$ percentile
$\frac{40(7+1)}{100} = 3.2 \Rightarrow 4 \Rightarrow$ Prunes	40 <sup>th</sup> percentile
$\frac{95(7+1)}{100} = 7.6$ Walnuts	95 <sup>th</sup> percentile
Almond total value	$\frac{5 + .5}{7} \cdot 100 = 78.57 \Rightarrow 79^{\text{th}}$ percentile

7. (6 pts) The following is a frequency distribution of the heights of 224 redwood trees in a certain forest.

Complete the table:

Height (in feet)	Midpoint	Frequency	Relative Frequency	Cumulative Relative Frequency	Midpoint $\times$ Frequency
70 – 80	75	1	$\frac{1}{224} \approx .004$	.004	75
80 – 90	85	9	$\frac{9}{224} \approx .040$	.044	765
90 – 100	95	25	$\frac{25}{224} \approx .112$	.156	2375
100 – 110	105	60	$\frac{60}{224} \approx .268$	.424	6300
110 – 120	115	74	$\frac{74}{224} \approx .330$	.754	8510
120 – 130	125	55	$\frac{55}{224} \approx .246$	1.000	6875

8. (4 pts) Complete the table using the redwood tree heights from above:

Mean (to nearest tenth)	Median	Mode	This data is:
$\frac{24900}{224} \approx 111.2$	115	115	(Circle one) <ul style="list-style-type: none"> <li>• skewed left</li> <li>• skewed right</li> <li>• symmetric</li> </ul>

9. (4 pts) Complete the table:

Data value (height)	Percentile
95	5 <sup>th</sup> percentile
115	75 <sup>th</sup> percentile

10. (2 pts) Five chicken owners randomly selected at the Red Bluff Agriculture Conference were asked how many chickens they own and five chicken owners at the Chico Agriculture Conference were asked the same. Their responses are shown below.

Number of Chickens Owned	
Red Bluff	Chico
10	10
35	30
60	80
95	105
115	115
Mean: $\frac{315}{5} = 63$	$\frac{340}{5} = 68$

11. (16 pts) Determine the population standard deviation for each by completing the following tables.

Red Bluff	$(X - \mu)^2$
10	2809
35	784
60	9
95	1024
115	2704
$\Sigma(X - \mu)^2 =$	7330
$\frac{\Sigma(X - \mu)^2}{N} =$	1466
$\sqrt{\frac{\Sigma(X - \mu)^2}{N}} =$	38.3

Chico	$(X - \mu)^2$
10	3364
30	1444
80	144
105	1369
115	2209
$\Sigma(X - \mu)^2 =$	8530
$\frac{\Sigma(X - \mu)^2}{N} =$	1706
$\sqrt{\frac{\Sigma(X - \mu)^2}{N}} =$	41.3

12. (1 pt) Which data set has a greater spread? (Circle one) Red Bluff **Chico**

**13.** (5 pts)

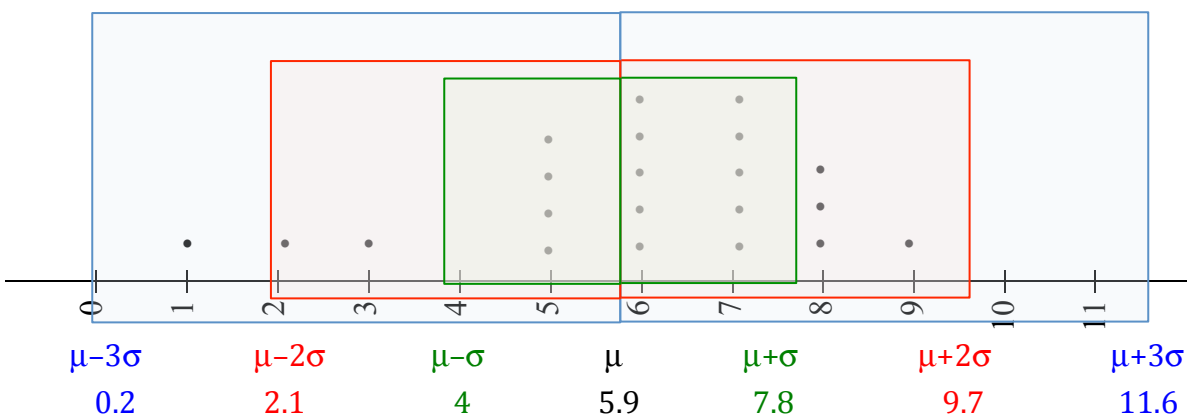
In this class, students responded to “How many hours of sleep did you get last night?” Here are the numbers given in an ordered list:

1, 2, 3, 5, 5, 5, 5, 6, 6, 6, 6, 6, 7, 7, 7, 7, 7, 8, 8, 8, 9

Use the list to complete the table below:

<p>Mean</p> $\bar{X} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$	5.9
<p>Sample Standard Deviation</p> $s = \sqrt{\frac{\sum(X - \bar{X})^2}{n - 1}}$	2.0
<p>Population Standard Deviation</p> $\sigma = \sqrt{\frac{\sum(X - \mu)^2}{N}}$	1.9

Place a point for each of the numbers above the number line below. Mark and label the position of the mean and draw boxes, using different colors around the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> (population) standard deviation from the mean.



14. (12 pts)

<b>Scholastic Aptitude Test Scores Mean and Standard Deviation</b>			
<b>Math</b>		<b>English</b>	
mean: 514		mean: 488	
standard deviation: 117		standard deviation: 114	

For each student below, determine which test score is relatively higher, the mathematics score or the writing. Plot their scores on the number line below.

Student	Math Score	Writing Score	Math z-score $\frac{X - \mu}{\sigma}$	Writing z-score $\frac{X - \mu}{\sigma}$	Relatively Higher Score
Student A	631	600	$\frac{631 - 514}{117} = 1$	$\frac{600 - 488}{114} \approx 0.98$	Math
Student B	455	435	$\frac{435 - 514}{117} \approx -0.68$	$\frac{435 - 488}{114} \approx -0.46$	English

Calculate 1, 2, and 3 standard deviations from the mean for Math and English scores, then label the number line with them. Plot both students' Math and English scores on the number line below.

