

Name:	Date:
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Topic:	Class:
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Main Ideas/Questions	Notes/Examples						
<b>STATISTICS</b>	<p>The process of collecting, organizing, analyzing, and interpreting data.</p>						
Measures of Center: <b>MEAN</b>	<p>A <b>measure of center</b> is a value that attempts to describe the central or "typical" value within a set of data. Common measures of center are the <b>mean</b>, <b>median</b>, and <b>mode</b>.</p> <ul style="list-style-type: none"> <li>The <b>mean</b> is the <u>average</u> of the data.</li> <li><b>To find the mean:</b> Find the sum of the data values. Then, divide the sum by the number of data values.</li> </ul> <p><b>Find the mean of each data set below.</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;">           1. {15, 7, 24, 13, 21}  <math display="block">\frac{15 + 7 + 24 + 13 + 21}{5} = \frac{80}{5} = \boxed{16}</math> </td><td style="width: 50%; padding: 5px; vertical-align: top;">           2. {5, 7, 2, 5, 12, 3, 8, 14}  <math display="block">\frac{5 + 7 + 2 + 5 + 12 + 3 + 8 + 14}{8} = \frac{56}{8} = \boxed{7}</math> </td></tr> </table>	1. {15, 7, 24, 13, 21} $\frac{15 + 7 + 24 + 13 + 21}{5} = \frac{80}{5} = \boxed{16}$	2. {5, 7, 2, 5, 12, 3, 8, 14} $\frac{5 + 7 + 2 + 5 + 12 + 3 + 8 + 14}{8} = \frac{56}{8} = \boxed{7}$				
1. {15, 7, 24, 13, 21} $\frac{15 + 7 + 24 + 13 + 21}{5} = \frac{80}{5} = \boxed{16}$	2. {5, 7, 2, 5, 12, 3, 8, 14} $\frac{5 + 7 + 2 + 5 + 12 + 3 + 8 + 14}{8} = \frac{56}{8} = \boxed{7}$						
Measures of Center: <b>MEDIAN</b>	<ul style="list-style-type: none"> <li>The <b>median</b> is the <u>middle</u> data value.</li> <li><b>To find the median:</b> Order the data from least to greatest. For a list with an odd number of data values, the median is the middle value. For a list with an even number of data values, the median is the mean of the two middle values.</li> </ul> <p><b>Find the median of each data set below.</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;">           3. {15, 7, 24, 13, 21}            7, 13, 15, 21, 24                  ↑                  = <math>\boxed{15}</math> </td><td style="width: 50%; padding: 5px; vertical-align: top;">           4. {5, 7, 2, 5, 12, 3, 8, 14}            2, 3, 5, <u>5</u>, 7, 8, 12, 14  <math display="block">\frac{5 + 7}{2} = \frac{12}{2} = \boxed{6}</math> </td></tr> </table>	3. {15, 7, 24, 13, 21} 7, 13, 15, 21, 24 ↑ = $\boxed{15}$	4. {5, 7, 2, 5, 12, 3, 8, 14} 2, 3, 5, <u>5</u> , 7, 8, 12, 14 $\frac{5 + 7}{2} = \frac{12}{2} = \boxed{6}$				
3. {15, 7, 24, 13, 21} 7, 13, 15, 21, 24 ↑ = $\boxed{15}$	4. {5, 7, 2, 5, 12, 3, 8, 14} 2, 3, 5, <u>5</u> , 7, 8, 12, 14 $\frac{5 + 7}{2} = \frac{12}{2} = \boxed{6}$						
Measures of Center: <b>MODE</b>	<ul style="list-style-type: none"> <li>The <b>mode</b> is the value (or values) that occurs <u>most often</u>.</li> </ul> <p><b>Find the mode(s) of each data set.</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;">5. {15, 7, 24, 13, 21, 18, 20}</td><td style="width: 50%; padding: 5px; vertical-align: top;">no mode</td></tr> <tr> <td style="padding: 5px; vertical-align: top;">6. {<u>5</u>, 7, 8, 2, <u>5</u>, 12, <u>5</u>, 3, 8, 14}</td><td style="padding: 5px; vertical-align: top;">5</td></tr> <tr> <td style="padding: 5px; vertical-align: top;">7. {16, <u>7</u>, 4, <u>10</u>, <u>7</u>, 13, 9, 18, <u>10</u>}</td><td style="padding: 5px; vertical-align: top;">7, 10</td></tr> </table>	5. {15, 7, 24, 13, 21, 18, 20}	no mode	6. { <u>5</u> , 7, 8, 2, <u>5</u> , 12, <u>5</u> , 3, 8, 14}	5	7. {16, <u>7</u> , 4, <u>10</u> , <u>7</u> , 13, 9, 18, <u>10</u> }	7, 10
5. {15, 7, 24, 13, 21, 18, 20}	no mode						
6. { <u>5</u> , 7, 8, 2, <u>5</u> , 12, <u>5</u> , 3, 8, 14}	5						
7. {16, <u>7</u> , 4, <u>10</u> , <u>7</u> , 13, 9, 18, <u>10</u> }	7, 10						

**Note:** A data set can have one mode, several modes, or no mode. If each value occurs the same number of times, there is no mode.

RANGE	The difference between the largest and smallest data values.	
	Find the range of each data set.	
	8. {15, 7, 24, 13, 21} $24 - 7 = \boxed{17}$	9. {5, 7, 2, 5, 12, 3, 8, 14} $14 - 2 = \boxed{12}$
MORE PRACTICE	Find the mean, median, mode(s), and range of each data set.	
	10. The length, in minutes, of 7 movies: {95, 108, 135, 124, 115, 102, 98} 95, 98, 102, 108, 115, 124, 135 ↑ Mean: $\frac{95+98+102+108+115+124+135}{7} = \frac{777}{7} = 111$ Range: $135 - 95 = 40$	
	Mean: <u>111</u> Median: <u>108</u> Mode(s): <u>None</u> Range: <u>40</u>	
	11. The scores of 9 golfers in a tournament: {72, 77, 79, 70, 73, 77, 80, 75, 72} 70, 72, 72, 73, 75, 77, 77, 79, 80 ↑ Mean: $\frac{70+72+72+73+75+77+77+79+80}{9} = \frac{675}{9} = 75$ Range: $80 - 70 = 10$	
	Mean: <u>75</u> Median: <u>75</u> Mode(s): <u>72, 77</u> Range: <u>10</u>	
	12. The grades of 10 students on a math quiz: {86, 90, 90, 92, 81, 76, 92, 90, 98, 95} 76, 81, 86, 90, 90, 90, 92, 92, 95, 98 Mean: $\frac{76+81+86+90+90+90+92+92+95+98}{10} = \frac{890}{10} = 89$ Range: $98 - 76 = 22$	
	Mean: <u>89</u> Median: <u>90</u> Mode(s): <u>90</u> Range: <u>22</u>	
	13. The cost per gallon of regular gas at 6 gas stations: {\$2.40, \$2.44, \$2.36, \$2.48, \$2.44, \$2.34} 2.34, 2.36, 2.40, 2.44, 2.44, 2.48 Mean: $\frac{2.34+2.36+2.40+2.44+2.44+2.48}{6} = \frac{14.46}{6} = 2.41$ Range: $2.48 - 2.34 = 0.14$	
	Mean: <u>\$2.41</u> Median: <u>\$2.42</u> Mode(s): <u>\$2.44</u> Range: <u>\$0.14</u>	

# WHERE ARE CARS *most likely* to get A FLAT TIRE?

**Directions:** Find the indicated measure of center for each set. After completing each set, find matching answers. One will have a letter and the other a number. Write the letter in the matching numbered box at the bottom of the page.

Set 1		Find the <b>MEAN</b> of each data set below.	Find the <b>MEDIAN</b> of each data set below.
R.	{21, 28, 24, 30, 27}	<u>26</u>	9. {21, 30, 15, 29, 27, 25, 32} <u>27</u>
A.	{25, 14, 22, 17, 19, 23, 28, 20}	<u>21</u>	2. {40, <u>31</u> , 24, <u>27</u> , 22, 35} <u>29</u>
N.	{26, 33, 16, 40, 22, 25}	<u>27</u>	13. {6, 42, <u>27</u> , 33, 12, 28, 21, <u>25</u> } <u>26</u>
K.	{12, 35, 32, 27, 22, 18, 22}	<u>24</u>	7. {27, 35, 16, 21, 29, <u>24</u> , 9, 27, 13} <u>24</u>
H.	{45, 11, 26, 38, 34, 16, 20, 42, 38}	<u>30</u>	15. {33, 10, 17, 23, 14, <u>21</u> , 28, 18, 26, 20, 25} <u>21</u>
T.	{8, 28, 12, 52, 26, 33, 48, 25}	<u>29</u>	11. {42, 20, <u>26</u> , 21, <u>34</u> , 17, 38, 23, 40, 35} <u>30</u>
Set 2		Find the <b>MEDIAN</b> of each data set below.	Find the <b>MODE</b> of each data set below.
O.	{ <u>15</u> , 21, 9, <u>13</u> , 4, 23}	<u>14</u>	16. {9, 4, 7, 14, 7, 12, 9, 7, 10} <u>7</u>
R.	{13, 2, 17, <u>9</u> , 4, 18, 7, 11, 8, 6, 15}	<u>9</u>	1. {15, 8, 14, 11, 15, 11, 11, 18, 12, 6, 10} <u>11</u>
F.	{12, 18, <u>13</u> , 22, <u>17</u> , 11, 5, 20}	<u>15</u>	6. {21, 16, 9, 5, 24, 18, 22, 9, 37, 7, 12} <u>9</u>
D.	{9, 5, 2, 11, 8, <u>6</u> , 15, 4, 17, 3}	<u>7</u>	14. {14, 13, 13, 10, 14, 9, 10, 8, 14, 17, 20} <u>14</u>
A.	{15, 7, 24, 6, 12, 18, <u>11</u> , 8, 5}	<u>11</u>	4. {20, 27, 4, 16, 10, 15, 7, 29, 15, 34} <u>15</u>
Set 3		Find the <b>MODE</b> of each data set below.	Find the <b>MEAN</b> of each data set below.
A.	{1.5, 0.8, 2.9, 3.7, 4.4, 7.2, 2.9, 5.6}	<u>2.9</u>	5. {2.3, 9.2, 4.1, 6.4, 1.5} <u>4.7</u>
E.	{5.7, 3.2, 5.7, 3.2, 1.4, 2.6, 3.2, 3.8, 4.2}	<u>3.2</u>	12. {1.5, 6.4, 1.2, 2.5, 5.7, 1.9} <u>3.2</u>
T.	{3.2, 5.4, 6.4, 7.2, 7.2, 3.2, 5.4, 2.8, 5.4}	<u>5.4</u>	3. {2.6, 5.8, 1.5, 1.7} <u>2.9</u>
I.	{5.4, 2.9, 7.1, 3.2, 4.7, 7.1, 2.6, 4.3}	<u>7.1</u>	8. {5.2, 9.3, 4.8, 8.5, 7.7} <u>7.1</u>
O.	{4.7, 2.9, 2.5, 2.9, 4.1, 4.7, 2.9, 4.7, 3.5, 4.7}	<u>4.7</u>	10. {8.2, 3.5, 10.1, 4.2, 5.2, 1.8, 4.8} <u>5.4</u>

ANSWER:															
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
A	T	A	F	O	R	K	I	N	T	H	E	R	O	A	D
!															

Name: \_\_\_\_\_

Unit 8: Data &amp; Statistics

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 1: Measures of Center &amp; Range

**Directions:** Find the mean, median, mode(s), and range of each data set.

1. Points scored by the winning teams in 8 Super Bowls: {32, 13, 41, 34, 24, 27, 43, 34}

13, 24, 27, 32, 34, 34, 41, 43

$$\text{Mean: } \frac{13 + 24 + 27 + 32 + 34 + 34 + 41 + 43}{8} = \frac{248}{8} = 31$$

Mean

31

Median

33

Mode(s)

34

Range

30

2. The number of sit-ups completed in one minute by a group of friends:

Name	Sit-Ups
Ashley	23
Jordan	30
Devon	25
Lora	33
Rylie	29

23, 25, 29, 30, 33

$$\text{Mean: } \frac{23 + 25 + 29 + 30 + 33}{5} = \frac{140}{5} = 28$$

Mean

28

Median

29

Mode(s)

None

Range

10

3. Amount of rainfall, in inches, last month recorded by several counties:

{1.4, 1.2, 2.3, 2.1, 2.4, 1.6, 2.3}

1.2, 1.4, 1.6, 2.1, 2.3, 2.3, 2.4

$$\text{Mean: } \frac{1.2 + 1.4 + 1.6 + 2.1 + 2.3 + 2.3 + 2.4}{7} = \frac{13.3}{7} = 1.9$$

Mean

1.9

Median

2.1

Mode(s)

2.3

Range

1.2

4. The height, in feet, of a group of trees:

{25, 29, 23, 27, 27, 30, 29, 25, 27, 21}

21, 23, 25, 25, 27, 27, 27, 29, 29, 30

$$\text{Mean: } \frac{21 + 23 + 25 + 25 + 27 + 27 + 27 + 29 + 29 + 30}{10} = \frac{263}{10} = 26.3$$

Mean

26.3

Median

27

Mode(s)

27

Range

9

5. Highest temperature recorded each month, from January to December, by a city:

{57, 60, 65, 76, 83, 86, 90, 87, 83, 72, 55, 50}

50, 55, 57, 60, 65, 72, 76, 83, 83, 86, 87, 90

$$\text{Mean: } \frac{50 + 55 + 57 + 60 + 65 + 72 + 76 + 83 + 83 + 86 + 87 + 90}{12} = \frac{864}{12} = 72$$

Mean

72

Median

74

Mode(s)

83

Range

40

6. The ages of the starting offensive players on a football team: {23, 28, 26, 30, 29, 23, 26, 28, 22, 28, 23}

22, 23, 23, 23, 26, 26, 28, 28, 28, 29, 30

$$\text{Mean: } \frac{22 + 23 + 23 + 23 + 26 + 26 + 28 + 28 + 28 + 29 + 30}{11} = \frac{286}{11} = 26$$

Mean

26

Median

26

Mode(s)

23, 28

Range

8



Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples									
<b>OUTLIER</b>	A data value that is much larger or much smaller than the other values									
	1. Find the mean, median, and mode of the data set below with and without the outlier.									
	<table><tr><td><math>\{14, 17, 16, 11, 15, 50, 17, 12, 10\}</math> <math>10, 11, 12, 14, 15, 16, 17, 17, 50</math></td><td>With Outlier</td><td>Without Outlier</td></tr><tr><td>Mean: 18</td><td>Mean: 14</td></tr><tr><td>Median: 15</td><td>Median: 14.5</td></tr><tr><td>Mode(s): 17</td><td>Mode(s): 17</td></tr></table>	$\{14, 17, 16, 11, 15, 50, 17, 12, 10\}$ $10, 11, 12, 14, 15, 16, 17, 17, 50$	With Outlier	Without Outlier	Mean: 18	Mean: 14	Median: 15	Median: 14.5	Mode(s): 17	Mode(s): 17
	$\{14, 17, 16, 11, 15, 50, 17, 12, 10\}$ $10, 11, 12, 14, 15, 16, 17, 17, 50$	With Outlier	Without Outlier							
	Mean: 18	Mean: 14								
Median: 15	Median: 14.5									
Mode(s): 17	Mode(s): 17									
Mean: $\frac{162}{9} = 18$ (w/) Mean: $\frac{112}{8} = 14$ (w/o)										
a) Which measure of center is most affected? Mean b) How is the range affected? Went from 40 to 7.										
Choosing the <b>BEST CENTER</b>	Circumstances within the data set determine which measure of central tendency would be the most appropriate.									
	<table><tr><th>Center</th><th>Most Useful When...</th></tr><tr><td>Mean</td><td>• There are no outliers.</td></tr><tr><td rowspan="2">Median</td><td>• There are outliers</td></tr><tr><td>• The middle of the data has no big gaps.</td></tr><tr><td>Mode</td><td>• The data has many repeated values.</td></tr></table>	Center	Most Useful When...	Mean	• There are no outliers.	Median	• There are outliers	• The middle of the data has no big gaps.	Mode	• The data has many repeated values.
	Center	Most Useful When...								
	Mean	• There are no outliers.								
Median	• There are outliers									
	• The middle of the data has no big gaps.									
Mode	• The data has many repeated values.									
<b>EXAMPLES</b>	Determine which measure of center best represents the data. Justify your selection, then find the measure of center.									
	2. The typing speeds, in words per minute, of 8 students in a computer class: $\{48, 42, 45, 54, 22, 56, 60, 44\}$ <div>↑ outlier</div> <div><input type="checkbox"/> Mean <input checked="" type="checkbox"/> Median <input type="checkbox"/> Mode</div> <div><math>22, 42, 44, 45, 48, 54, 56, 60</math> <div>Median = 46.5</div></div>									
	3. Fuel efficiency, in miles per gallon, of a group of vehicles: $\{19.7, 18.9, 21.3, 25.6, 23.5, 24.8\}$ <div><input checked="" type="checkbox"/> Mean - no outliers <input type="checkbox"/> Median <input type="checkbox"/> Mode</div> <div>Mean = <math>\frac{133.8}{6}</math> <div>= 22.3</div></div>									

	<p>4. The number of hours Sarah has worked each week for the past 7 weeks: {<u>36</u>, <u>36</u>, <u>27</u>, <u>36</u>, <u>36</u>, <u>38</u>, <u>36</u>}</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div> <input type="checkbox"/> Mean  <input type="checkbox"/> Median  <input checked="" type="checkbox"/> Mode - repeated         </div> <div style="border: 1px solid black; padding: 5px; margin-left: 20px;">Mode = 36</div> </div>																
<h2 style="margin: 0;">HOW CHANGES TO THE DATA</h2> <p style="margin: 5px 0;"><i>Affect the Center</i></p>	<p>An online shop sells seven different wreaths. The cost of each wreath is given in the table below. Answer the questions below using this data.</p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <th style="padding: 5px;">Wreath</th> <th style="padding: 5px;">A</th> <th style="padding: 5px;">B</th> <th style="padding: 5px;">C</th> <th style="padding: 5px;">D</th> <th style="padding: 5px;">E</th> <th style="padding: 5px;">F</th> <th style="padding: 5px;">G</th> </tr> <tr> <th style="padding: 5px;">Cost</th> <td style="padding: 5px;">\$35</td> <td style="padding: 5px;">\$18</td> <td style="padding: 5px;">\$39</td> <td style="padding: 5px;">\$48</td> <td style="padding: 5px;">\$60</td> <td style="padding: 5px;">\$55</td> <td style="padding: 5px;">\$39</td> </tr> </table>	Wreath	A	B	C	D	E	F	G	Cost	\$35	\$18	\$39	\$48	\$60	\$55	\$39
	Wreath	A	B	C	D	E	F	G									
	Cost	\$35	\$18	\$39	\$48	\$60	\$55	\$39									
	<p>5. Find the mean, median, and mode of the cost per wreath.</p> <div style="display: flex; justify-content: space-between;"> <div> <math>\text{Mean} = \frac{294}{7} = \boxed{\\$42}</math> </div> <div> <math>\text{Mode} = \boxed{\\$39}</math> </div> </div> <p> <math>\text{Median} = 18, 35, 39, 39, 48, 55, 60</math>  <span style="margin-left: 100px;">↑</span>  <math>\quad \quad \quad \boxed{= \\$39}</math> </p>																
	<p>6. If there is an outlier, how does removing it affect the mean, median, and mode cost per wreath?</p> <div style="display: flex; justify-content: space-between;"> <div> <math>\text{Mean} = \frac{276}{6} = \boxed{\\$46}</math> </div> <div> <math>\text{Mode} = \boxed{\\$39}</math> </div> </div> <p> <math>\text{Median} = 35, 39, 39, 48, 55, 60</math>  <span style="margin-left: 100px;">↑</span>  <math>\quad \quad \quad \boxed{= \\$43.50}</math> </p>																
<p>7. If the two most expensive wreaths are out of stock, how will this affect mean, median, and mode cost per wreath?</p> <div style="display: flex; justify-content: space-between;"> <div> <math>\text{Mean} = \frac{179}{5} = \boxed{\\$35.80}</math> </div> <div> <math>\text{Mode} = \boxed{\\$39}</math> </div> </div> <p> <math>\text{Median} = 18, 35, 39, 39, 48</math>  <span style="margin-left: 100px;">↑</span>  <math>\quad \quad \quad \boxed{= \\$39}</math> </p>																	
<p>8. If this shop charges \$8 to ship each wreath, how does this affect the mean, median, and mode cost per wreath?</p> <div style="display: flex; justify-content: space-between;"> <div> <math>\text{Mean} = \frac{350}{7} = \boxed{\\$50}</math> </div> <div> <math>\text{Mode} = \boxed{\\$47}</math> </div> </div> <p> <math>\text{Median} = 26, 43, 47, 47, 56, 63, 68</math>  <span style="margin-left: 100px;">↑</span>  <math>\quad \quad \quad \boxed{= \\$47}</math> </p> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin-left: 200px;">       Everything increases by \$8     </div>																	
<p>9. If the shop is offering \$5 off each wreath with free shipping, how does this affect the mean, median, and mode cost per wreath?</p> <div style="display: flex; justify-content: space-between;"> <div> <math>\text{Mean} = \frac{259}{7} = \boxed{\\$37}</math> </div> <div> <math>\text{Mode} = \boxed{\\$34}</math> </div> </div> <p> <math>\text{Median} = 13, 30, 34, 34, 43, 50, 55</math>  <span style="margin-left: 100px;">↑</span>  <math>\quad \quad \quad \boxed{= \\$34}</math> </p> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin-left: 200px;">       Everything decreases by \$5.     </div>																	

Name: \_\_\_\_\_

Unit 8: Data &amp; Statistics

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 2: Outliers; Effects on Data

1. The table below gives the wait time, in minutes, of five rides at an amusement park. How does the outlier affect the mean, median, mode, and range of the data?

Ride	Wait Time
A	20
B	28
C	77
D	36
E	24

With:

Mean:  $\frac{185}{5} = 37$

Median: 20, 24, 28, 36, 77

Mode: Nonewithout:

Mean:  $\frac{108}{4} = 27$

Median: 20, 24, 26, 36

Mode: None

Choose a measure of center that best represents the data. Justify your choice, then find the measure.

2. {7, 7, 4, 2, 7, 7, 7, 10, 7}

Mode = 7

- ☐ Mean  
☐ Median  
☒ Mode - many repeaters

3. {15, 12, 19, 22, 18, 16}

Mean =  $\frac{102}{6} = 17$

- ☒ Mean - No outliers  
☐ Median  
☐ Mode

4. {35, 38, 31, 40, 34, 37, 84, 32}

31, 32, 34, 35, 37, 38, 40, 84

Median = 36

- ☐ Mean  
☒ Median - outlier (84)  
☐ Mode

5. {6.2, 7.6, 3.5, 3.9, 5.8}

Mean =  $\frac{27}{5} = 5.4$

- ☒ Mean - No outliers  
☐ Median  
☐ Mode

6. Mrs. Matthews gave a test to her 120 science students. If she gives 5 bonus points to each test grade, how will this affect the mean, median, and mode scores?

The mean, median, & mode will each increase by 5 points.

7. A candle shop sells a variety of different candles. If they are offering a sale for 20% off, how will this affect the mean, median, and mode cost per type of candle?

The mean, median, and mode will each decrease by 20%.

8. Jaxon had 12 grades in math in the first quarter. If his teacher allows him to drop his two lowest scores, how will this affect his mean, median, and mode grades?

{98, 84, 60, 90, 94, 100, 82, 98, 52, 87, 92, 95}

With:

Mean =  $\frac{1032}{12} = 86$

Median = 91

Mode = 98

{52, 60, 82, 84, 87, 90, 92, 94, 95, 98, 98, 100}

Without:

Mean =  $\frac{920}{10} = 92$

Median = 93

Mode = 98

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Topic:

Class:

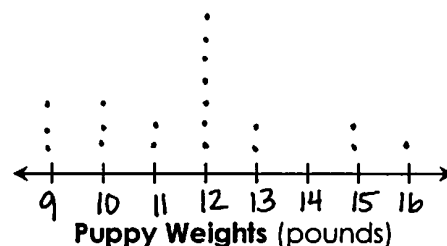
## Main Ideas/Questions

## Notes/Examples

### DOT PLOTS

- A **dot plot** uses a number line to show the number of times each value in a data set occurs. Therefore, dot plots are especially useful when there are many repeated values within a set.
- Example:** The weights of 20 puppies are given in the table below. Organize the data on the dot plot to the right.

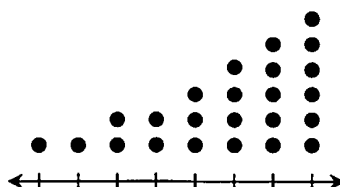
Puppy Weights (pounds)				
12	9	9	12	12
11	12	15	10	13
9	12	13	15	11
10	12	10	16	12



### SHAPE & DISTRIBUTION of Data

Dot plots are also useful in showing the clusters, peaks, and gaps in a data set. We can use them to classify different **shapes of a distribution**:

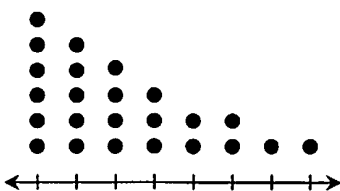
#### SKewed LEFT



A distribution is **skewed left** when most of the data values are on the right.

The left side of the plot is called the **tail**.

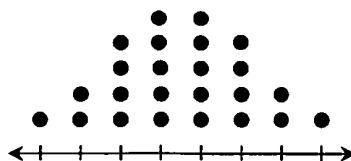
#### SKewed RIGHT



A distribution is **skewed right** when most of the data values are on the left.

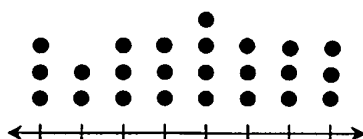
The right side of the plot is called the **tail**.

#### SYMMETRIC



A distribution is **symmetric** when the data on the left is approximately a mirror image of the data on the right.

#### UNIFORM



A distribution is **uniform** when there are approximately the same number of each data value. A uniform distribution is also symmetric.

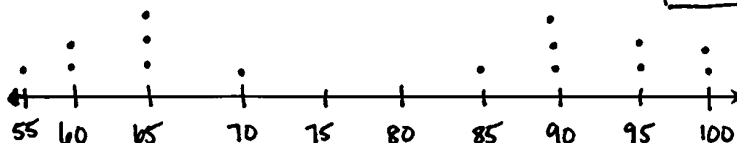
## EXAMPLES

Draw a dot plot to represent each set of data. Then describe the distribution of data.

1. Scores on a math quiz:

{65, 95, 60, 90, 85, 65, 100, 70, 90, 60, 55, 95, 90, 65, 100}

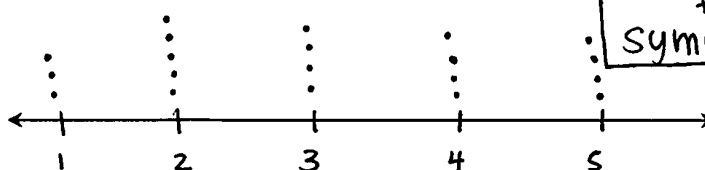
Symmetric



2. Number of goals scored by a hockey team in their first 20 games:

{2, 4, 1, 4, 3, 2, 5, 2, 3, 3, 1, 5, 2, 3, 4, 5, 5, 2, 1, 4}

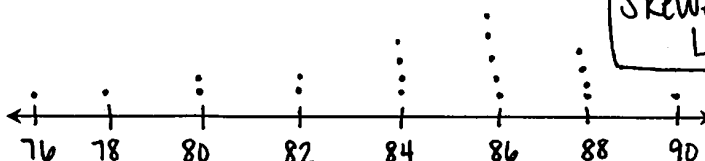
Uniform  
+  
Symmetric



3. High temperatures for the first two weeks of July:

{84, 76, 88, 88, 86, 90, 84, 78, 82, 80, 86, 88, 84, 88, 84, 86, 86, 82, 80}

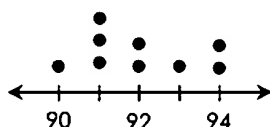
Skewed  
Left



## MEASURES OF CENTER & RANGE with Dot Plots

4. The dot plot below gives the pitching speeds of a pitcher during his warm-up. Find the mean, median, mode, and range of the data.

90, 91, 91, 91, 92, 92, 93, 94, 94



Pitch Speeds (mph)

Mean: 92

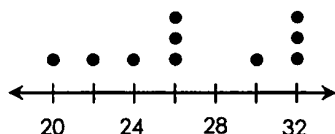
Median: 92

Mode(s): 91

Range: 4

5. Vienna recorded the number of pages she read each night in her book for the past 10 nights. Find the difference between the mean and median number of pages she reads each night.

20, 22, 24, 26, 26, 26, 30, 32, 32, 32



Number of Pages

Mean = 27

Median = 26

$$27 - 26 = \boxed{1}$$

Name:

Date:

Topic:

Class:

## Main Ideas/Questions

## Notes/Examples

## STEM-AND-LEAF PLOTS

- A **stem-and-leaf plot** is a way of organizing and displaying data using the digits of the data values and seeing how the values are distributed.
- The last digit of a data value is the **leaf**.
- The remaining digit(s) are the **stem**.
- The key will explain what the stem and leaves represent.

## Call Times

Stem	Leaf
0	9
1	0 3 6 6 8
2	1 4
3	2
4	1 7
5	3

Key: 2 | 1 = 21 minutes

## QUESTIONS

1. The stem-and-leaf plot above shows the length of a set of customer service calls.

a) What is the mean call time?

$$\frac{9 + 10 + 13 + 16 + 16 + 18 + 21 + 24 + 32 + 41 + 47 + 53}{12}$$

$$= \frac{300}{12} = \boxed{25 \text{ min}}$$

b) What is the median call time?

9, 10, 13, 16, 16, 18, 21, 24, 32, 41, 47, 53

$$\frac{18 + 21}{2} = \frac{39}{2} = \boxed{19.5 \text{ min}}$$

c) How many calls were more than 10 minutes?

10 calls

d) How many calls were at most 30 minutes?

8 calls

## Ages of Hockey Players

Stem	Leaf
1	9
2	1 2 3 3 5 7
3	0 1 2 4 6

Key: 3 | 0 = 30 years

2. The stem-and-leaf plot to the left shows the ages of the players on a hockey team.

a) What is the median age?

19, 21, 22, 23, 23, 25, 27, 30, 31, 32, 34, 36

$$\frac{25 + 27}{2} = \frac{52}{2} = \boxed{26 \text{ years}}$$

b) What is the mode age?

23 years

c) What is the range of ages?

$$36 - 19 = \boxed{17 \text{ years}}$$

d) How many players are at least 25 years old?

7 players

### House Sale Prices

Stem	Leaf
18	2
19	0 3
20	0 5 5 7 8
21	9

Key: 18 | 2 = \$182,000

3. The stem-and-leaf plot to the left shows the prices of homes that recently sold in a neighborhood.

a) Find the mean sale price.

$$\frac{182 + 190 + 193 + 200 + 205 + 205 + 207 + 208 + 219}{9}$$

$$= \frac{1809}{9} = 201$$

**\$201,000**

b) If Alexa lists her house for \$203,000, how does this compare to the median sale price?

Median = 205,000

Alexa's house would be less than the median.

c) What is the range of sale prices?

$$219 - 182 = 37$$

**\$37,000**

d) How many homes sold for no more than \$205,000?

**6 homes**

## Drawing STEM-AND-LEAF PLOTS

**Helpful Hint:**  
Order the data values  
before making the  
stem-and-leaf plot!

**Make a stem-and-leaf plot of the data.**

4. The number of confirmed cases of a virus in 15 counties: {20, 28, 34, 53, 26, 31, 35, 47, 42, 51, 59, 30, 65, 47, 22}

20, 22, 26, 28, 30, 31, 34, 35,  
42, 47, 47, 51, 53, 59, 65

Stem	Leaf
2	0 2 6 8
3	0 1 4 5
4	2 7 7
5	1 3 9
6	5

Key: 2 | 0 = 20 cases

5. The weights of a group of large breed dogs:

{138, 152, 133, 140, 172, 152, 131, 165,  
149, 156, 151, 136, 162, 140, 159, 167}

131, 133, 136, 138, 140, 140,  
149, 151, 152, 152, 156, 159,  
162, 165, 167, 172

Stem	Leaf
13	1 3 6 8
14	0 0 9
15	1 2 2 6 9
16	2 5 7
17	2

Key: 13 | 1 = 131 pounds

Brett's Runs	
5.2	4.0
3.6	4.7
7.5	2.8
4.2	5.6
3.5	3.8
6.4	4.3

6. Each time Brett goes for a run, he records the distance. The table to the left gives the distance, in miles, of his last 12 runs.

2.8, 3.5, 3.6, 3.8, 4.0,  
4.2, 4.3, 4.7, 5.2, 5.6,  
6.4, 7.5

Stem	Leaf
2	8
3	5 6 8
4	0 2 3 7
5	2 6
6	4
7	5

Key: 2 | 8 = 2.8 miles

Name: \_\_\_\_\_

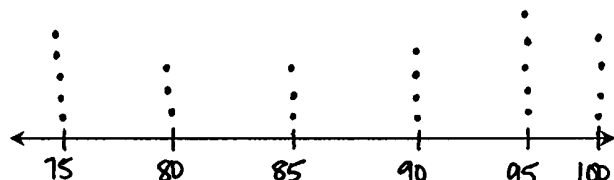
Unit 8: Data &amp; Statistics

Date: \_\_\_\_\_ Per: \_\_\_\_\_

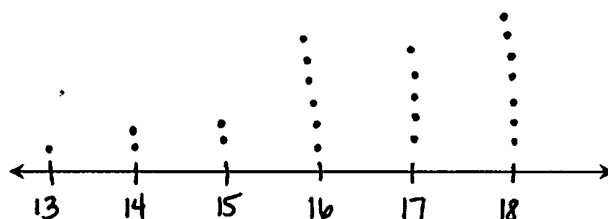
Homework 3: Dot Plots; Stem-and-Leaf Plots

**\*\* This is a 2-page document! \*\*****Draw a dot plot to represent each set of data. Then describe the distribution of data.**

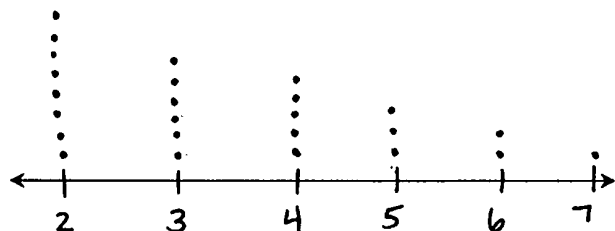
1. {100, 85, 95, 75, 100, 95, 90, 80, 75, 90, 95, 100, 75, 85, 90, 80, 75, 90, 75, 95, 80, 85, 100, 95}

Distribution: uniform, symmetric

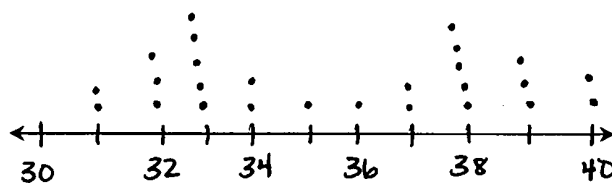
2. {18, 16, 17, 15, 18, 18, 16, 17, 17, 18, 14, 18, 13, 16, 17, 14, 16, 18, 15, 16, 18, 16, 17}

Distribution: Skewed left

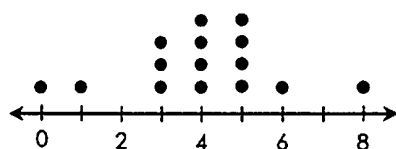
3. {6, 4, 3, 2, 5, 2, 3, 3, 2, 4, 2, 5, 6, 2, 3, 2, 2, 3, 2, 4, 3, 4, 7, 4, 5}

Distribution: Skewed right

4. {37, 34, 39, 38, 33, 35, 40, 32, 38, 38, 32, 39, 33, 31, 31, 38, 33, 36, 32, 33, 39, 40, 33, 34, 37, 38}

Distribution: symmetric

5. The dot plot below gives the number of cars sold by a group of car salesman in one week. Find the mean, median, and mode number of cars sold.



Car Sales in One Week

0, 1, 3, 3, 3, 4, 4, 4, 5, 5, 5, 5, 6, 8

Mean:  $\frac{60}{15} = 4$

Range:  $8 - 0 = 8$

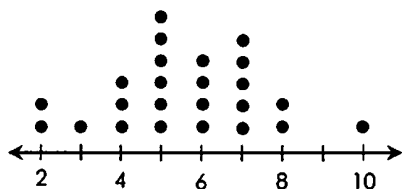
Mean: 4

Median: 4

Mode(s): 4, 5

Range: 8

6. The dot plot below shows the number of books a group of students read over the summer.



Books Read

- a) What is the mode?

5 books

- b) How many students were included in this group?

24 students

- c) How many students read at least 4 books?

21 students



Draw a stem-and-leaf plot to represent each set of data.

7. Fat grams in the sandwiches and burgers at a restaurant: {13, 20, 17, 18, 8, 5, 13, 16, 22, 29, 32, 35, 18, 15, 24, 30, 9, 21, 13, 20}

5, 8, 9, 13, 13, 13, 15, 16, 17, 18, 18, 20, 20, 21, 22, 24, 29, 30, 32, 35

Stem	Leaf
0	5 8 9
1	3 3 3 5 6 7 8 8
2	0 0 1 2 4 9
3	0 2 5

Key: 3 | 2 = 32 grams

8. Number of people in the marching bands in a competition: {98, 115, 127, 92, 87, 132, 121, 118, 105, 138, 95, 107, 129, 121, 125, 101, 98, 115, 135, 120}
- 87, 92, 95, 98, 98, 101, 105, 107, 112, 115, 118, 120, 121, 121, 125, 127, 129, 132, 135, 138

Stem	Leaf
8	7
9	2 5 8 8
10	1 5 7
11	2 5 8
12	0 1 1 5 7 9
13	2 5 8

Key: 8 | 7 = 87 people

9. The ages of a group of governors is shown in the stem-and-leaf plot below.

Ages of Governors

Stem	Leaf
4	3 6 7
5	2 4 6
6	0 1 2 4 9
7	0

Key: 4 | 3 = 43 years

- a) Find the mean and median ages of the governors.

$$\text{Mean: } \frac{43 + 46 + 47 + 52 + 54 + 56 + 60 + 61 + 62 + 64 + 69 + 70}{12}$$

$$= \frac{684}{12} = 57 \text{ years}$$

$$\text{Median: } \frac{56 + 60}{2} = 58 \text{ years}$$

- b) How many governors are at most 60 years old?

7 governors

- c) What is the range of ages?

$$70 - 43 = 27 \text{ years}$$

10. The stem-and-leaf plot below shows the amount of weight loss in one month by employees participating in a challenge.

Monthly Weight Loss

Stem	Leaf
4	1 5 8
5	2 2
6	1 3 7 7 7 9
7	0 4 8
8	2 4 5 5 8
9	1
10	2

Key: 4 | 1 = 4.1 pounds

- a) Find the median and mode weight loss.

Median: 6.9 pounds

Mode: 6.7 pounds

- b) How many employees participated in the challenge?

21 employees

- c) How many employees lost at least 7 pounds?

10 employees

Name:	Date:
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Topic:	Class:
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Main Ideas/Questions	Notes/Examples		
<b>MEAN ABSOLUTE</b> <i>Deviation</i>	A measure that gives the average distance of each data value to the mean.		
	<b>Directions:</b> Use the steps below to find the mean absolute deviation (MAD) of the data set {2, 4, 6, 7, 8, 15}.		
<b>STEPS TO FIND</b> <i>the "MAD"</i>	Step 1: Find the mean.	$\frac{2+4+6+7+8+15}{6} = \frac{42}{6} = 7$	
	Step 2: Find the distances of each data value to the mean.	5, 3, 1, 0, 1, 8	
	Step 3: Find the mean of these distances.	$\frac{5+3+1+0+1+8}{6} = \frac{18}{6} = 3$	
	What does this mean? The values average a distance of 3 units to the mean.		
	<b>Directions:</b> Find the mean absolute deviation of data sets A, B, and C.		
<b>COMPARING</b> <i>the "MAD"</i>	<b>Data Set A</b>	<b>Data Set B</b>	<b>Data Set C</b>
	{2, 4, 6, 15, 18}	{6, 7, 9, 10, 13}	{9, 9, 9, 9, 9}
	Mean: $\frac{45}{5} = 9$	Mean: $\frac{45}{5} = 9$	Mean: $\frac{45}{5} = 9$
	MAD: $\frac{7+5+3+6+9}{5} = \frac{30}{5} = 6$	MAD: $\frac{3+2+0+1+4}{5} = \frac{10}{5} = 2$	MAD: $\frac{0+0+0+0+0}{5} = \frac{0}{5} = 0$
	Mean = 9	Mean = 9	Mean = 9
	MAD = 6	MAD = 2	MAD = 0
<b>INTERPETING</b> <i>the "MAD"</i>	The closer the MAD is to zero, the less variation there is in the data.		
	How do outliers affect mean absolute deviation? They raise it.		

## EXAMPLES

**Directions:** Find the mean absolute deviation of each data set.

1. The high temperature for the past five days: {90, 81, 85, 92, 82}

$$\begin{aligned}\text{Mean: } & \frac{430}{5} \\ & = 86\end{aligned}$$

$$\begin{aligned}\text{MAD: } & \frac{4+5+1+6+4}{5} \\ & = \frac{20}{5} = 4\end{aligned}$$

$$\text{MAD} = 4$$

2. The years of experience of six employees at a company: {1, 5, 9, 12, 16, 29}

$$\begin{aligned}\text{Mean: } & \frac{72}{6} \\ & = 12\end{aligned}$$

$$\begin{aligned}\text{MAD: } & \frac{11+7+3+0+4+17}{6} \\ & = \frac{42}{6} = 7\end{aligned}$$

$$\text{MAD} = 7$$

3. The heights, in feet, of five rollercoasters: {174, 180, 160, 121, 150}

$$\begin{aligned}\text{Mean: } & \frac{785}{5} \\ & = 157\end{aligned}$$

$$\begin{aligned}\text{MAD: } & \frac{17+23+3+36+7}{5} \\ & = \frac{86}{5} = 17.2\end{aligned}$$

$$\text{MAD} = 17.2$$

4. The number of wins a football team has had in the past six seasons: {8, 10, 9, 14, 4, 12}

$$\begin{aligned}\text{Mean: } & \frac{57}{6} \\ & = 9.5\end{aligned}$$

$$\begin{aligned}\text{MAD: } & \frac{1.5+0.5+0.5+4.5+5.5+2.5}{6} \\ & = \frac{15}{6} = 2.5\end{aligned}$$

$$\text{MAD} = 2.5$$

5. The prices of the trees sold by a farm during the holiday season: {\$25, \$32, \$36, \$45, \$48, \$55, \$64, \$75}

$$\begin{aligned}\text{Mean: } & \frac{380}{8} \\ & = 47.5\end{aligned}$$

$$\begin{aligned}\text{MAD: } & \frac{22.5+15.5+11.5+2.5+0.5+7.5+16.5+27.5}{8} \\ & = \frac{104}{8} = 13\end{aligned}$$

$$\text{MAD} = 13$$

6. Weights, in pounds, of five babies born on a single day at a hospital: {5.7, 6.5, 7.2, 7.5, 9.1}

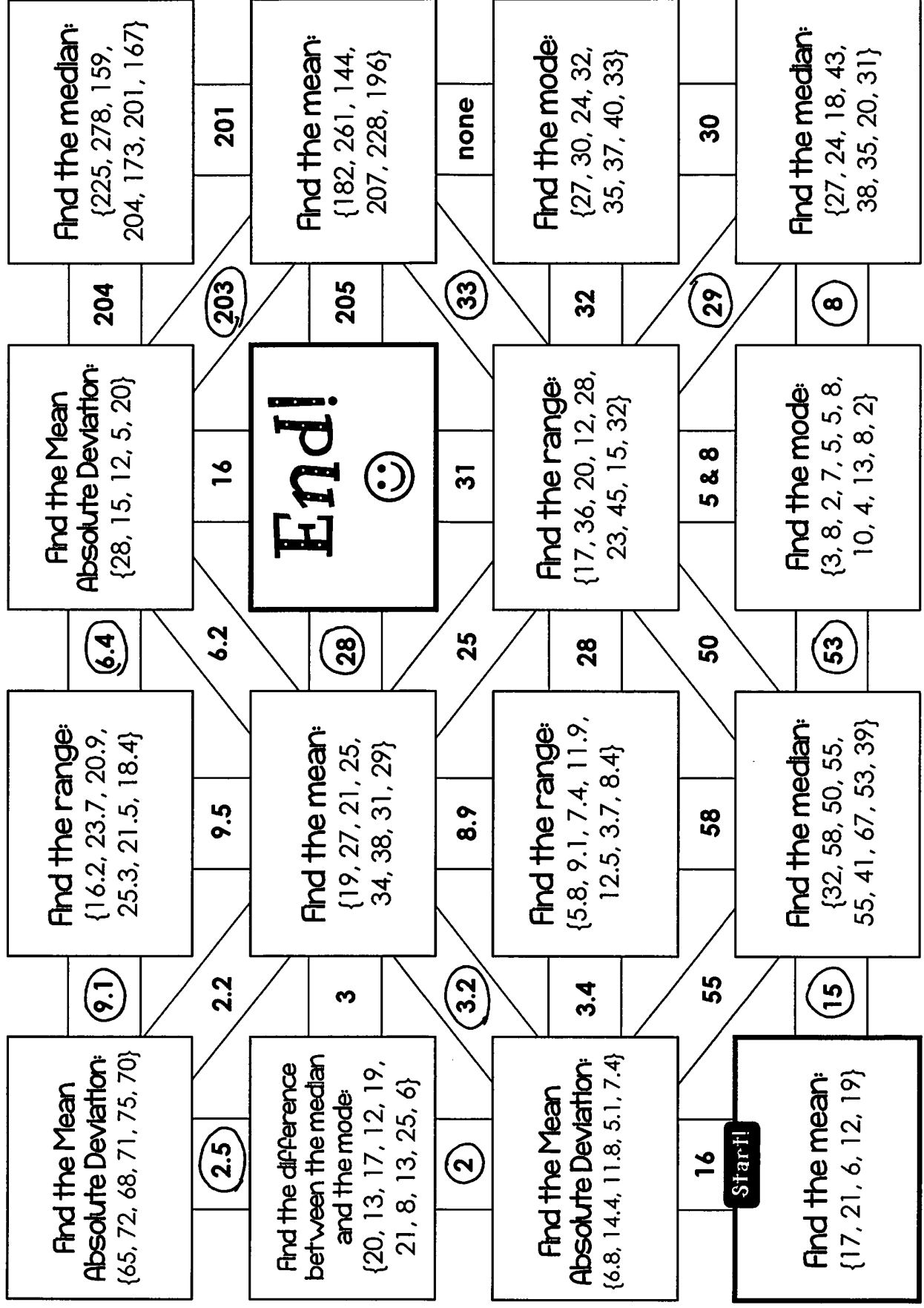
$$\begin{aligned}\text{Mean: } & \frac{36}{5} \\ & = 7.2\end{aligned}$$

$$\begin{aligned}\text{MAD: } & \frac{1.5+0.7+0+0.3+1.9}{5} \\ & = \frac{4.4}{5} = 0.88\end{aligned}$$

$$\text{MAD} = 0.88$$

# Statistical Measures Maze!

**Directions:** Find the indicated measure using the data. Use your solutions to navigate through the maze. **Staple all work to this paper!**



Name: \_\_\_\_\_

Unit 8: Data &amp; Statistics

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 4: Mean Absolute Deviation

**Directions:** Find the mean absolute deviation of each data set.

1. The weights, in ounces, of five bottles of ketchup: {14, 20, 36, 30, 25}

$$\text{mean} = \frac{125}{5} = 25$$

$$\text{MAD} = \frac{11 + 5 + 11 + 5 + 0}{5} = \frac{32}{5} = \boxed{6.4}$$

2. The weights of the starting five offensive linemen on a football team: {320, 330, 311, 325, 329}

$$\text{mean} = \frac{1615}{5} = 323$$

$$\text{MAD} = \frac{3 + 7 + 12 + 2 + 6}{5} = \frac{30}{5} = \boxed{6}$$

3. Alyssa's grades on six math quizzes: {58, 100, 85, 98, 71, 92}

$$\text{mean} = \frac{504}{6} = 84$$

$$\text{MAD} = \frac{26 + 16 + 1 + 14 + 13 + 8}{6} = \frac{78}{6} = \boxed{13}$$

4. The number of push-ups completed in one minute by six people: {37, 35, 26, 42, 30, 58}

$$\text{mean} = \frac{228}{6} = 38$$

$$\text{MAD} = \frac{1 + 3 + 12 + 4 + 8 + 20}{6} = \frac{48}{6} = \boxed{8}$$

5. The price, per square foot, of five recently sold homes: {\$98, \$120, \$156, \$90, \$136}

$$\text{mean} = \frac{600}{5} = 120$$

$$\text{MAD} = \frac{22 + 0 + 36 + 30 + 16}{5} = \frac{104}{5} = \boxed{20.8}$$

6. The speeds picked up by radar by five cars on the highway: {76, 82, 65, 68, 73, 71}

$$\text{mean} = \frac{435}{6} = 72.5$$

$$\text{MAD} = \frac{3.5 + 9.5 + 7.5 + 4.5 + 0.5 + 1.5}{6} = \frac{27}{6} = \boxed{4.5}$$

7. The times of five runners, in seconds, in the 100-meter dash at a track meet: {11.3, 12.1, 10.8, 11.5, 11.8}

$$\text{mean} = \frac{57.5}{5} = 11.5$$

$$\text{MAD} = \frac{0.2 + 0.6 + 0.7 + 0 + 0.3}{5} = \frac{1.8}{5} = \boxed{0.36}$$

8. The amount of snowfall, inches reported by five towns after a storm: {8.2, 12.2, 9.8, 7.4, 10.4}

$$\text{mean} = \frac{48}{5} = 9.6$$

$$\text{MAD} = \frac{1.4 + 2.6 + 0.2 + 2.2 + 0.8}{5} = \frac{7.2}{5} = \boxed{1.44}$$



The stem-and-leaf plot below shows running time, in minutes, of the movies currently showing at a theater.

Stem	Leaf
8	5
9	2 5
10	2 4
11	0 2 2 8
12	0 7
13	1

Key: 8|5 = 85 minutes

85, 92, 95, 102, 104, 110, 112, 112, 118, 120, 127, 131

10. Find the mean.

$$\frac{1308}{12} = 109$$

11. How many movies have a running time less than the median time?

→ 11 min

10. 109 min

11. 6 movies

12. The number of students in sixteen classes is given below. Determine whether the mean, median, or mode would be the best measure of center. Explain your reasoning.

{28, 25, 28, 27, 28, 28, 26, 32, 30, 28, 28, 24, 28, 29, 28, 28}

Mode - The number 28 repeats itself 9 times in the set of 16 elements.

Find the mean absolute deviation of each data set.

13. Finn's math test scores: {81, 100, 90, 83, 86}

$$\text{Mean} = \frac{440}{5} = 88$$

$$\begin{aligned} \text{MAD} &= \frac{7+12+2+5+2}{5} \\ &= \frac{28}{5} = 5.6 \end{aligned}$$

13. 5.6

14. 15.2

15. 1.28

14. Sixth grade enrollment in the years given in the table below.

Year	2015	2016	2017	2018	2019
Students	332	314	368	352	339

$$\text{Mean} = \frac{1705}{5} = 341$$

$$\begin{aligned} \text{MAD} &= \frac{9+27+27+11+2}{5} \\ &= \frac{76}{5} = 15.2 \end{aligned}$$

15. The weights, in pounds, of five cats: {14.4, 11.9, 12.4, 16.2, 13.6}

$$\text{Mean} = \frac{68.5}{5} = 13.7$$

$$\begin{aligned} \text{MAD} &= \frac{0.7+1.8+1.3+2.5+0.1}{5} \\ &= \frac{6.4}{5} = 1.28 \end{aligned}$$

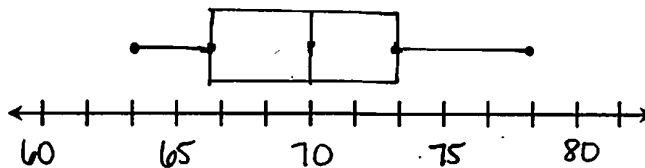




2. Speeds, in miles per hour, of eleven cars:

{67, 73, 64, 70, 75, 68, 65, 71, 78, 66, 70}

64, 65, 66, 67, 68, 70, 71, 73, 75, 78



Minimum: 64

Lower Quartile: 66

Median: 70

Upper Quartile: 73

Maximum: 78

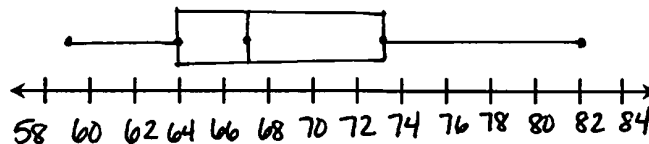
Range: 14

IQR: 7

3. Points scored by eight basketball teams:

{82, 75, 63, 68, 66, 71, 59, 65}

59, 63, 65, 66, 68, 71, 75, 82



Minimum: 59

Lower Quartile: 64

Median: 67

Upper Quartile: 73

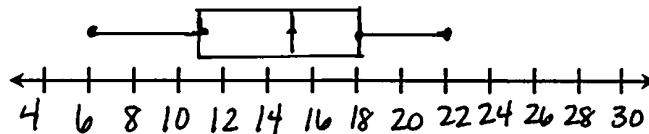
Maximum: 82

Range: 23

IQR: 9

4. The length, in inches, of fish caught on a fishing trip: {6, 20, 15, 12, 17, 8, 15, 10, 18, 13, 22, 18}

6, 8, 10, 12, 13, 15, 15, 17, 18, 18, 20, 22



Minimum: 6

Lower Quartile: 11

Median: 15

Upper Quartile: 18

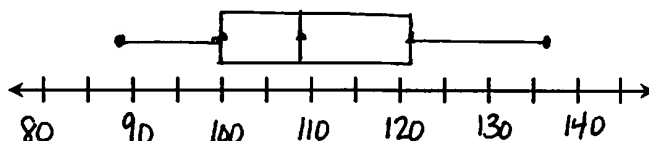
Maximum: 22

Range: 16

IQR: 7

5. The running time, in minutes, of movies showing at the theater: {95, 102, 127, 110, 108, 136, 89, 113, 121, 100}

89, 99, 100, 102, 108, 110, 113, 121, 127, 136



Minimum: 89

Lower Quartile: 100

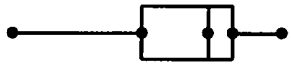
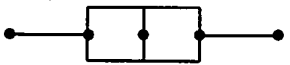
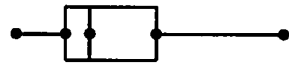
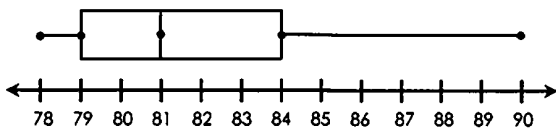
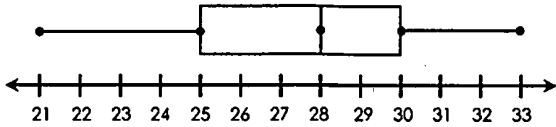
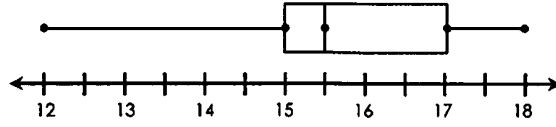
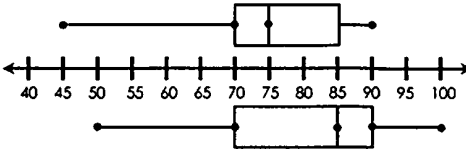
Median: 109

Upper Quartile: 121

Maximum: 136

Range: 47

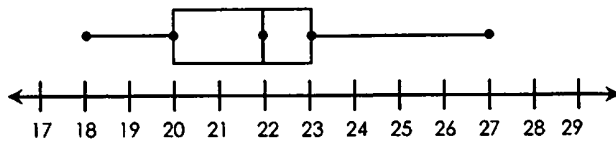
IQR: 21

<b>SHAPES</b> of Data	<b>Skewed Left</b> 	<b>Symmetric</b> 	<b>Skewed Right</b> 
	The left whisker is longer than the right whisker. Most data values are on the right.	The whiskers are about the same length. The median is in the middle of the box.	The right whisker is longer than the left whisker. Most data values are on the left.
	<b>Identify the shape of the distribution and each value to the right.</b>		
<b>Reading</b> <b>BOX-AND-WHISKER</b> <b>PLOTS</b>	6. Shape: <u>Skewed Right</u>		Minimum: <u>78</u> Lower Quartile: <u>79</u> Median: <u>81</u> Upper Quartile: <u>84</u> Maximum: <u>90</u> Range: <u>12</u> IQR: <u>5</u>
	 <p style="text-align: center;"><b>High Temperatures</b></p>		
	7. Shape: <u>Symmetric</u>		Minimum: <u>21</u> Lower Quartile: <u>25</u> Median: <u>28</u> Upper Quartile: <u>30</u> Maximum: <u>33</u> Range: <u>12</u> IQR: <u>5</u>
	 <p style="text-align: center;"><b>Class Sizes</b></p>		
	8. Shape: <u>Skewed Left</u>		Minimum: <u>12</u> Lower Quartile: <u>15</u> Median: <u>15.5</u> Upper Quartile: <u>17</u> Maximum: <u>18</u> Range: <u>6</u> IQR: <u>2</u>
 <p style="text-align: center;"><b>Long Jump Distance (Feet)</b></p>			
9. The double box-and-whisker plot below shows the test scores in two classes. Which statement could be true?		A. The range of test scores in both classes is the same. B. Both classes have the same median test score. C. Exactly half of the students in Class A scored less than the median test score in Class B. <b>D. Half of the students in Class B scored higher than three-fourths of the students in Class A.</b>	
<p style="text-align: center;"><b>Class A</b></p>  <p style="text-align: center;"><b>Class B</b></p>			



**Directions:** Give the five-number summary, range, and interquartile (IQR) for each box-and-whisker plot.

5. The body mass index of a group of gym members:



**Body Mass Index**

**Five-Number Summary:**

Minimum: 18  
Lower Quartile: 20  
Median: 22  
Upper Quartile: 23  
Maximum: 27

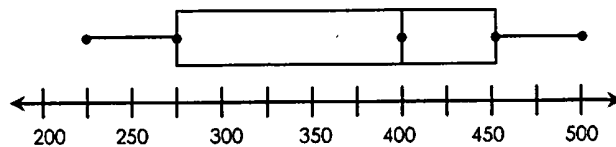
**Range:**

9

**IQR:**

3

6. The prices of bicycles at a shop:



**Prices of Bicycles**

**Five-Number Summary:**

Minimum: 225  
Lower Quartile: 275  
Median: 400  
Upper Quartile: 450  
Maximum: 500

**Range:**

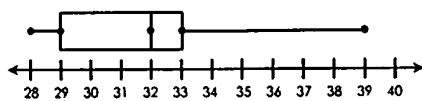
275

**IQR:**

175

**Directions:** Identify the shape of distribution in each box-and-whisker plot below.

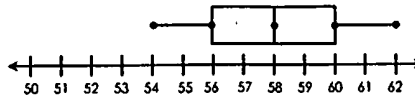
7.



**Fat Grams**

Skewed right

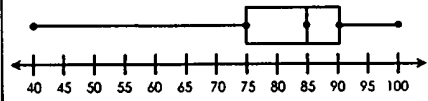
8.



**Speed (mph)**

symmetric

9.

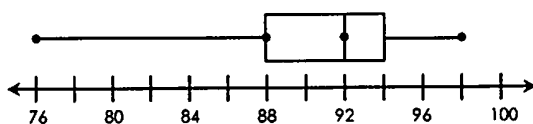


**Test Scores**

skewed left

**Use for questions 10-14:** Two running backs recorded their rushing yards per game in a season. Each running back played the same number of games in the season. The box-and-whisker plot below shows this data.

**Running Back A**



**Running Back B**



10. Which running back had the greater range of yards per game?

A

11. What is the interquartile range of yards per game for each running back?

A: 6      B: 12

12. What is the difference between median yards per game between the two running backs?

92 - 86 = 6

13. What fraction of the games did Running Back A rush for at least 88 yards?

$\frac{3}{4}$

14. If a coach had to choose one of these running backs for a game, which would you recommend? Explain your choice.

\* Answers may vary \*

I would choose A, because  $\frac{3}{4}$  of his games have rushes more than 88 yd. B only has  $\frac{1}{2}$  of his games more than 86 yd.

Name:

Date:

Topic:

Class:

## Main Ideas/Questions

## Notes/Examples

**FREQUENCY***Tables*

- A **frequency table** groups data values into intervals.
- The **frequency** is the number of values in each interval.

**Example 1:** The data below represents scores on a math test.

{81, 55, 100, 94, 61, 80, 77, 74, 92, 95,  
52, 86, 90, 78, 81, 100, 65, 81, 70, 94}

||  
|||  
|||  
+++  
+++1

Scores	Frequency
51-60	2
61-70	3
71-80	4
81-90	5
91-100	6

**Example 2:** The data below represents the number of laps around a track completed by a group of runners. Organize the data into the frequency table.

{7, 10, 1, 3, 8, 17, 12, 2, 10, 9, 15, 13, 9,  
12, 8, 4, 20, 7, 14, 2, 10, 3, 17, 6, 2, 15}

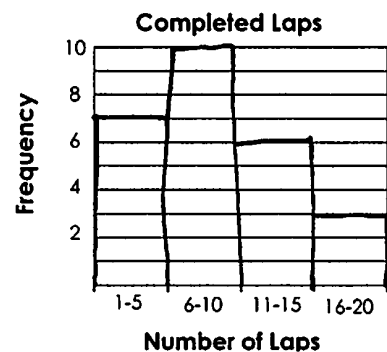
+++||  
+++  
+++1  
||

Laps	Frequency
1-5	7
6-10	10
11-15	6
16-20	3

**HISTOGRAMS**

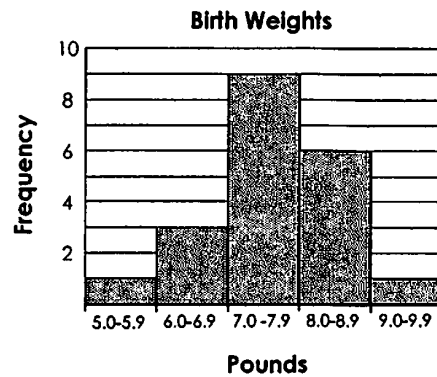
A histogram is a bar graph that shows the frequency of data values.  
Complete the histogram using your frequency table #2 from above.

- The height of the bar represents the frequency of the data.
- A histogram shows grouping of data, not individual data values. Therefore, it is not possible to find measures of center or range.

*Reading*  
**HISTOGRAMS****3.** Use the histogram above to answer the questions below.

- a) How many runners are there? 26
- b) How many runners ran a maximum of 15 laps? 23
- c) How many runners ran at least 6 laps? 19
- d) Which interval contains the least runners? 16-20 laps

4. The histogram below gives the birth weights of students in a class.



a) How many students weighed between 7 and 7.9 pounds?

9 students

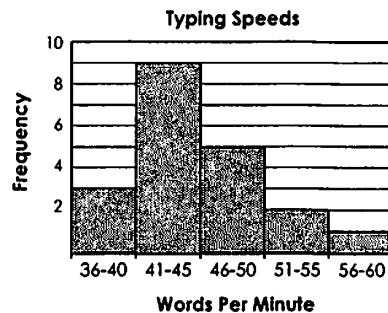
b) How many students weigh less than 8 pounds?

13 students

c) Which interval contained the most students?

7-7.9 16

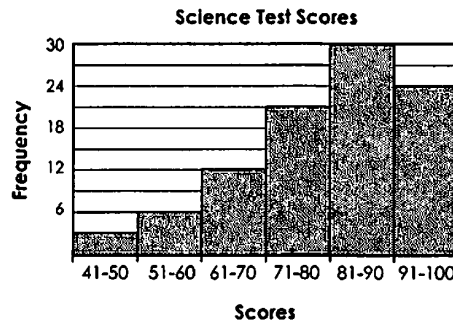
5. The typing speeds of students in a keyboarding class is given below. What percent of the students type between 41 and 45 words per minute?



$$\frac{9}{20} = \frac{45}{100}$$

45%

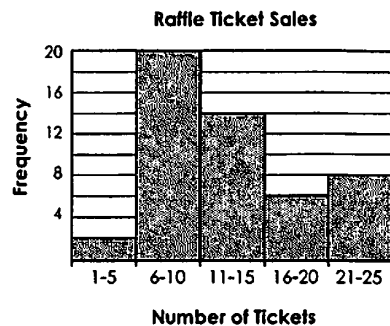
6. The histogram below shows the test scores on a science test by a group of students. What percent of the students scored between 91 and 100?



$$\frac{24}{96} = \frac{1}{4}$$

25%

7. The histogram below shows the number of raffle tickets sold by a group of students. What percent of the students sold at most 15 tickets?



$$\frac{36}{50} = \frac{72}{100}$$

72%

## Creating HISTOGRAMS

### SOME IMPORTANT RULES:

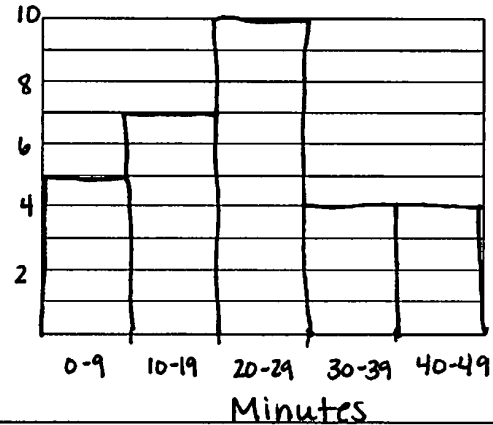
- Intervals must be the same size and not overlap.
- There should be no space between the bars.

8. The data below represents the length of time, in minutes, for 30 random calls to a customer service center.

{24, 7, 16, 5, 20, 18, 24, 32, 48, 35, 12, 17, 8, 26, 20, 34, 27, 40, 12, 23, 5, 36, 42, 14, 10, 21, 28, 6, 41, 23}

Interval	Frequency
0-9	5
10-19	7
20-29	10
30-39	4
40-49	4

+++  
+++ II  
+++ +++  
IIII  
IIII

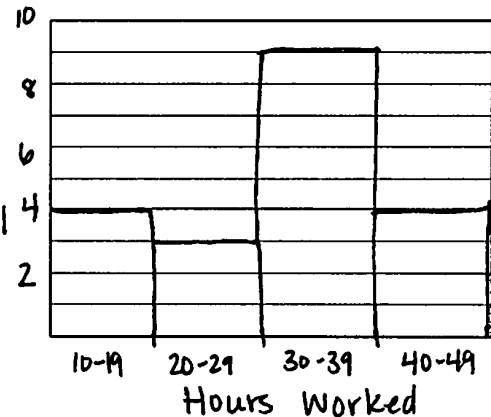


9. The data below gives the hours worked in a single week by each employee at a company.

{39, 42, 20, 16, 32, 35, 30, 28, 40, 36, 32, 45, 12, 25, 18, 32, 10, 40, 32, 38}

Interval	Frequency
10-19	4
20-29	3
30-39	9
40-49	4

IIII  
III  
++++ IIII  
IIII

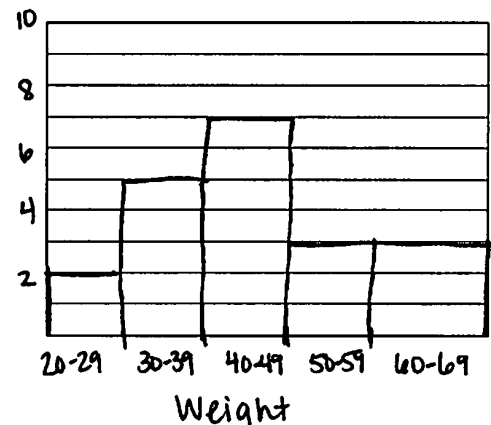


### Dog Weights (lbs)

Stem	Leaf
2	1 7
3	0 1 3 5 7
4	1 2 4 5 5 8 9
5	3 5 9
6	2 3 8

Key: 2 | 1 = 21 lbs

Interval	Frequency
20-29	2
30-39	5
40-49	7
50-59	3
60-69	3



Name: \_\_\_\_\_

Unit 8: Data &amp; Statistics

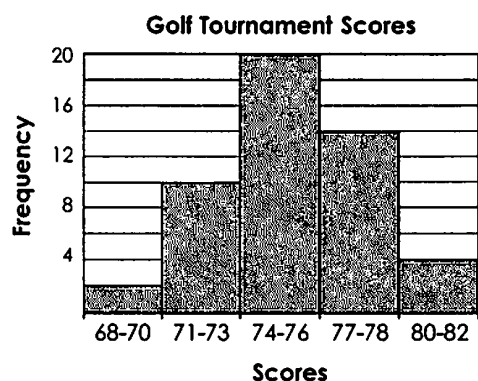
Date: \_\_\_\_\_

Per: \_\_\_\_\_

Homework 6: Histograms

**\*\* This is a 2-page document! \*\***

1. The histogram below shows the scores of golfers in a tournament.

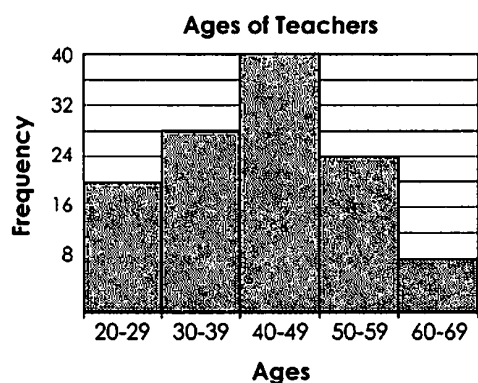
a) How many golfers scored between 77 and 78? 14b) How many golfers scored less than 74? 12c) Which interval contained the most scores? 74-76

d) What percent of the golfers scored at least 74?

$$\frac{38}{50} = \frac{76}{100}$$

$$\boxed{76\%}$$

2. The below histogram shows the ages of teachers at a school.

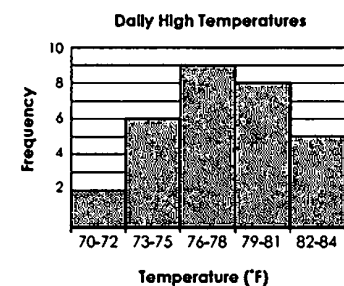
a) How many teachers work at the school? 120b) Which interval contained the fewest teachers? 60-69c) How many teachers are at least 30 years old? 100

d) What percent of the teachers are between 50 and 59?

$$\frac{24}{120} = \frac{1}{5}$$

$$\boxed{20\%}$$

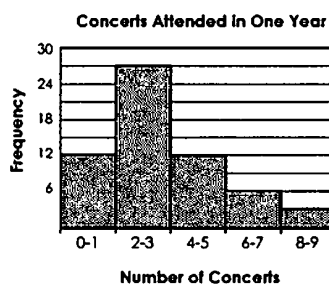
3. The high temperatures of a town each day in single month are shown in the histogram below. What percent of the days was the high temperature between 76 and 78 degrees?



$$\frac{9}{30} = \frac{3}{10}$$

$$\boxed{30\%}$$

4. A group of people were asked how many concerts they had attended in the last year. The results are shown in the histogram below. What percent of the people asked attended fewer than 4 concerts?



$$\frac{39}{60} = \frac{13}{20}$$

$$\boxed{65\%}$$

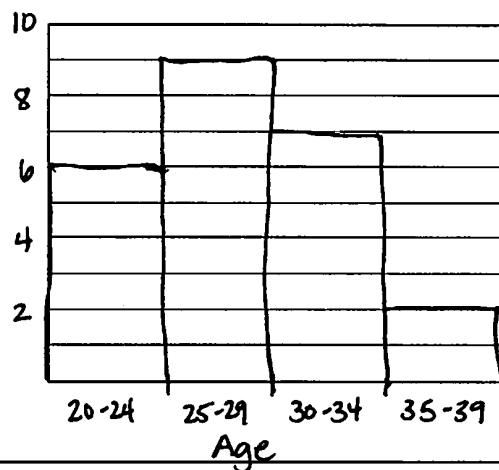


Use the given data to create a frequency table, then use the table to draw a histogram.

5. The ages of players on a football team:

{36, 32, 23, 29, 25, 30, 24, 22, 26, 25, 27, 30, 34, 26, 29, 28, 31, 30, 35, 24, 21, 28, 24, 32}

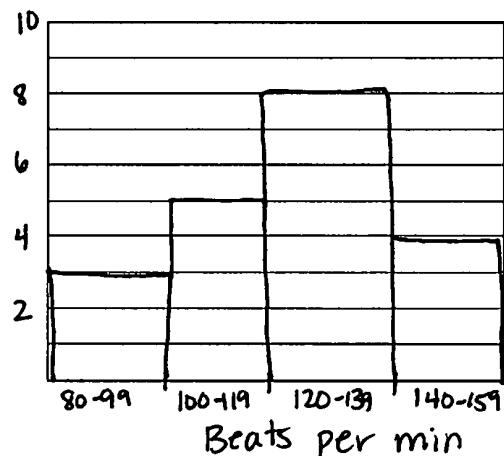
	Interval	Frequency
+++	20-24	6
+++	25-29	9
+++	30-34	7
	35-39	2



6. The beats per minute of the songs on a certain playlist:

{106, 98, 85, 126, 132, 148, 137, 118, 130, 107, 151, 121, 105, 126, 92, 146, 121, 110, 137, 140}

	Interval	Frequency
	80-99	3
+++	100-119	5
+++	120-139	8
	140-159	4

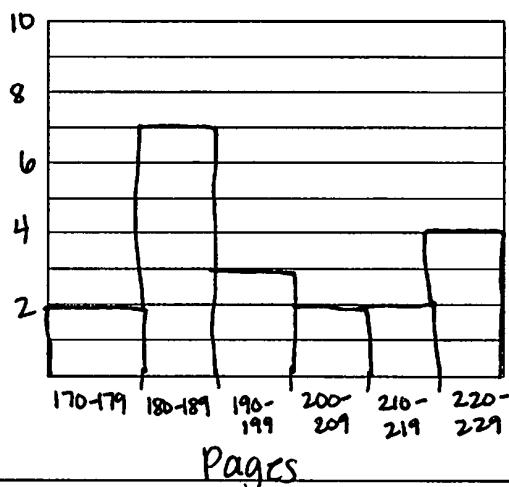


7. The number of pages in each book that Beth read last year:

Number of Pages	
Stem	Leaf
17	3 9
18	0 2 4 5 6 8 8
19	2 5 7
20	1 9
21	0 4
22	2 3 6 8

Key: 17 | 3 = 173 pages

Interval	Frequency
170-179	2
180-189	7
190-199	3
200-209	2
210-219	2
220-229	4



Name:

Date:

Topic:

Class:

## Main Ideas/Questions

## Notes/Examples

**WARM-UP:***Percent of a Number*

1. What is 25% of 60?

$$\begin{array}{r} 60 \\ \times 0.25 \\ \hline 300 \\ 1200 \\ \hline 15.00 \end{array}$$

**15**

2. What is 40% of 95?

$$\begin{array}{r} 95 \\ \times 0.40 \\ \hline 000 \\ 3800 \\ \hline 38.00 \end{array}$$

**38**

3. What is 70% of 120?

$$\begin{array}{r} 120 \\ \times 0.70 \\ \hline 000 \\ 8400 \\ \hline 84.00 \end{array}$$

**84**

4. What is 85% of 40?

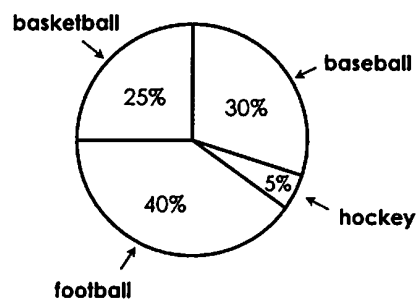
$$\begin{array}{r} 40 \\ \times 0.85 \\ \hline 200 \\ 3200 \\ \hline 34.00 \end{array}$$

**34****CIRCLE***Graphs*

- A circle graph (or pie chart) displays data as sections of a circle.
- A full circle represents 100% of the data.
- The percent in each section represents a part of the whole data set.

**EXAMPLE:** The 20 students in Mrs. Adams' homeroom were asked their favorite sport. The results are given in the circle graph below. Complete the table identifying the number of students who reported each type of sport. Show your work in the spaces below.

Favorite Sports



Favorite Sport	Number of Students
Football	8
Baseball	6
Basketball	5
Hockey	1

Football:

$$\begin{array}{r} 20 \\ \times 0.40 \\ \hline 00 \\ 800 \\ \hline 8.00 \end{array}$$

**8**

Baseball:

$$\begin{array}{r} 20 \\ \times 0.30 \\ \hline 00 \\ 600 \\ \hline 6.00 \end{array}$$

**6**

Basketball:

$$\begin{array}{r} 20 \\ \times 0.25 \\ \hline 100 \\ 400 \\ \hline 5.00 \end{array}$$

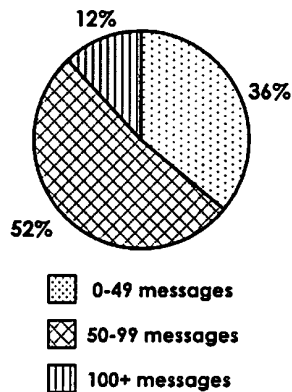
**5**

Hockey:

$$\begin{array}{r} 20 \\ \times 0.05 \\ \hline 1.00 \end{array}$$

**1**

Text Messages Sent



Seventy-five students were surveyed and asked how many text messages they sent the previous day. The results of the survey are shown in the graph to the left. Use the circle graph to answer questions 5 and 6.

5. How many students sent more than 100 text messages?

$$\begin{array}{r} 75 \\ \times 0.12 \\ \hline 150 \\ 750 \\ \hline 9.00 \end{array}$$

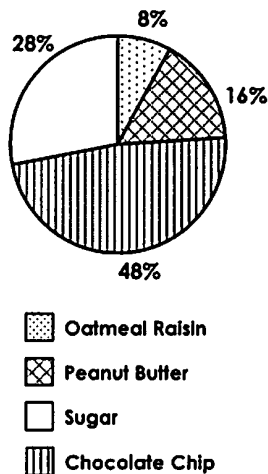
9 students

6. How many students sent between 50 and 99 text messages?

$$\begin{array}{r} 75 \\ \times 0.36 \\ \hline 150 \\ 3750 \\ \hline 39.00 \end{array}$$

39 students

Favorite Cookies



A bake shop surveyed 150 random customers and asked their favorite type of cookie. The results of the survey are shown in the graph to the left. Use the circle graph to answer questions 7 and 8.

7. How many customers said chocolate chip?

$$\begin{array}{r} 150 \\ \times 0.48 \\ \hline 1200 \\ 6000 \\ \hline 72.00 \end{array}$$

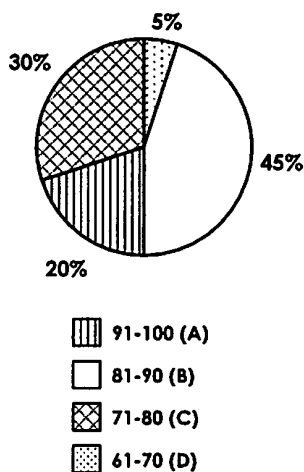
72 customers

8. How many customers said oatmeal raisin or peanut butter?

$$\begin{array}{r} 150 \\ \times 0.24 \\ \hline 600 \\ 3000 \\ \hline 36.00 \end{array}$$

36 customers

Test Scores



Mr. Hayes gave a test to his 120 social studies students and displayed the grades in the circle graph to the left. Use the circle graph to answer questions 9 and 10.

9. How many students scored higher than 70?

$$\begin{array}{r} 120 \\ \times 0.95 \\ \hline 600 \\ 10800 \\ \hline 114.00 \end{array}$$

114 students

10. How many more students earned an A than a D?

$$\begin{array}{r} 120 \\ \times 0.20 \\ \hline 000 \\ 2400 \\ \hline 24.00 \end{array} \quad \begin{array}{r} 120 \\ \times 0.05 \\ \hline 6.00 \end{array}$$

$$\begin{array}{r} 24 \\ - 6 \\ \hline 18 \end{array}$$

18 students

## Creating CIRCLE GRAPHS

Quarter	Number of Points
First	16
Second	6
Third	10
Fourth	8

### TO CREATE A CIRCLE GRAPH

- Find the percent of the whole for each section. (percent = part/whole)
- Approximate the size of the sections (for example, 24% would be approximately one-fourth of the circle). For the exact angle, multiply the percent by  $360^\circ$  and use a protractor to draw the angle.
- Title the graph, label the sections with the percents, and include a key or label for each section.

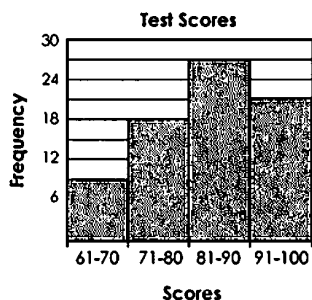
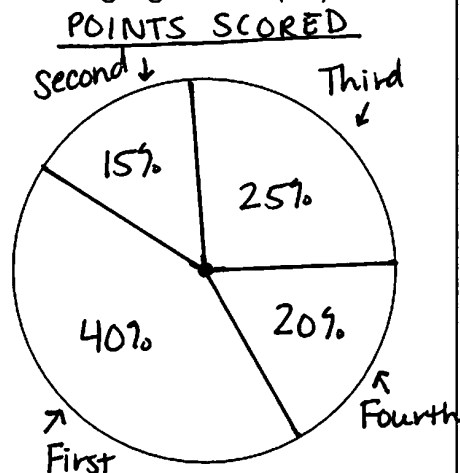
11. The table to the left shows the number of points scored by a football team during each of the four quarters in a single game. Display the data as a circle graph.

$$\text{First: } \frac{16}{40} = \frac{2}{5} = 40\%$$

$$\text{Second: } \frac{6}{40} = \frac{3}{20} = 15\%$$

$$\text{Third: } \frac{10}{40} = \frac{1}{4} = 25\%$$

$$\text{Fourth: } \frac{8}{40} = \frac{1}{5} = 20\%$$



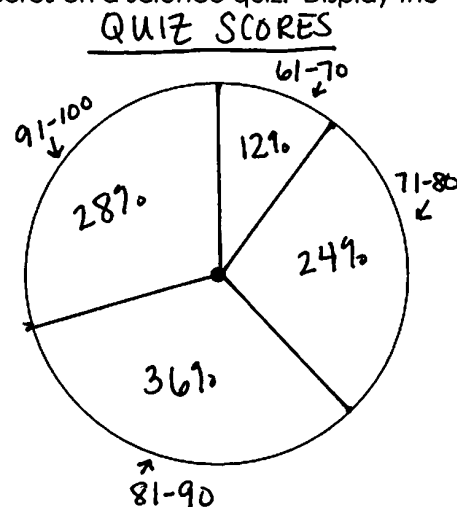
12. The histogram to the left gives the scores on a science quiz. Display the data as a circle graph.

$$61-70: \frac{9}{75} = \frac{3}{25} = 12\%$$

$$71-80: \frac{18}{75} = \frac{6}{25} = 24\%$$

$$81-90: \frac{27}{75} = \frac{9}{25} = 36\%$$

$$91-100: \frac{21}{75} = \frac{7}{25} = 28\%$$

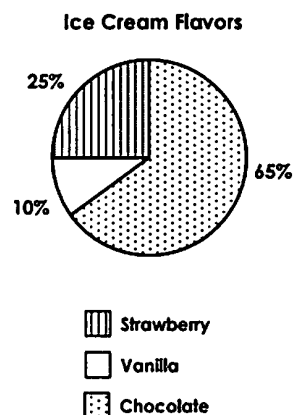


Name: \_\_\_\_\_ Unit 8: Data & Statistics

Date: \_\_\_\_\_ Per: \_\_\_\_\_ Homework 7: Circle Graphs

**\*\* This is a 2-page document! \*\***

1. The circle graph shows the results of a survey in which 400 students were asked their favorite ice cream flavor. Use the graph to answer parts a and b.



a) How many students said chocolate?

$$\begin{array}{r} 400 \\ \times 0.65 \\ \hline 2000 \\ 24000 \\ \hline 260.00 \end{array}$$

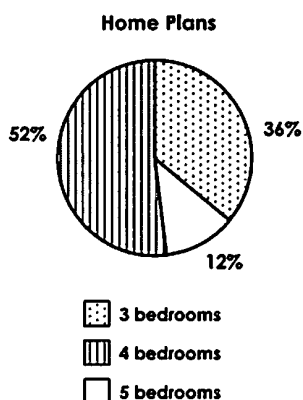
260 students

b) How many students chose strawberry?

$$\begin{array}{r} 400 \\ \times 0.25 \\ \hline 2000 \\ 8000 \\ \hline 100.00 \end{array}$$

100 students

2. The circle graph below shows the plan for 3-bedroom, 4-bedroom, and 5-bedroom homes to be built in a new neighborhood with 175 homes. Use the graph to answer parts a and b.



a) How many homes will have 5 bedrooms?

$$\begin{array}{r} 175 \\ \times 0.12 \\ \hline 350 \\ 1750 \\ \hline 21.00 \end{array}$$

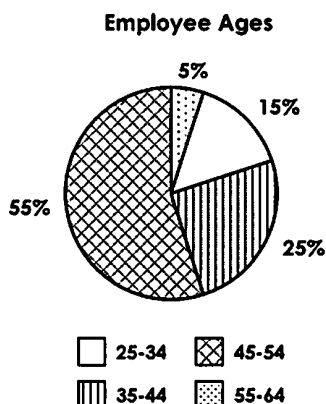
21 homes

b) How many homes will have 4 bedrooms?

$$\begin{array}{r} 175 \\ \times 0.52 \\ \hline 350 \\ 8750 \\ \hline 91.00 \end{array}$$

91 homes

3. The circle graph below shows the age distribution of 260 employees at a company. Use the graph to answer parts a and b.



a) If all employees that are at least 55 years old retire, how many employees will be left?

$$\begin{array}{r} 260 \\ \times 0.05 \\ \hline 13.00 \end{array}$$

260  
- 13  
247 employees

b) How many employees are younger than 45?

$$\begin{array}{r} 260 \\ \times 0.40 \\ \hline 000 \\ 10400 \\ \hline 104.00 \end{array}$$

104 employees

4. A group of people were surveyed and asked their favorite season. The results are shown in the table below. Make a circle graph to display the data.

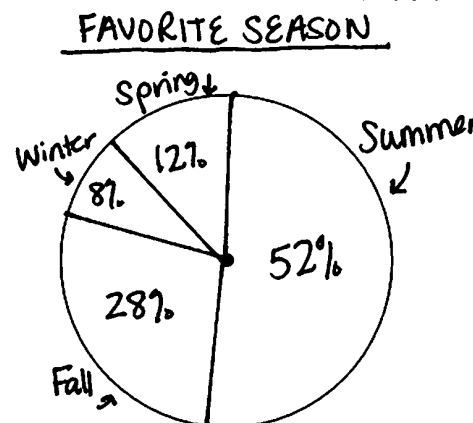
Season	Number of People
Winter	12
Spring	18
Summer	78
Fall	42

$$\text{Winter: } \frac{12}{150} = \frac{2}{25} = 8\%$$

$$\text{Spring: } \frac{18}{150} = \frac{3}{25} = 12\%$$

$$\text{Summer: } \frac{78}{150} = \frac{13}{25} = 52\%$$

$$\text{Fall: } \frac{42}{150} = \frac{7}{25} = 28\%$$



5. The stem-and-leaf plot below shows the number of points scored by a football team in both their preseason and regular season games last year. Make a circle graph to display the data.

**Points Scored**

Stem	Leaf
1	0 3 6 7
2	0 2 2 4 7 9
3	0 1 3 3 3 4 5
4	2 5 8

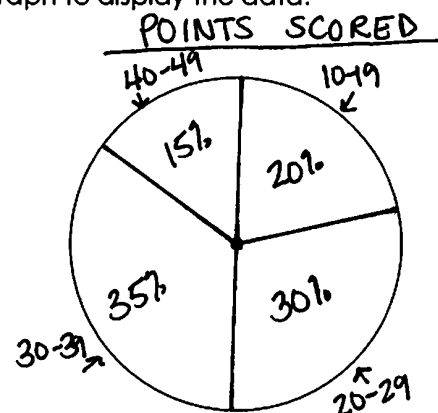
Key: 1 | 0 = 10 points

$$10-19: \frac{4}{20} = \frac{1}{5} = 20\%$$

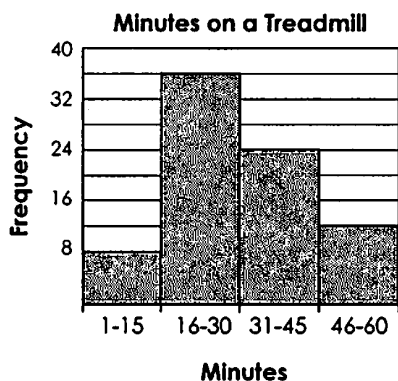
$$20-29: \frac{6}{20} = \frac{3}{10} = 30\%$$

$$30-39: \frac{7}{20} = 35\%$$

$$40-49: \frac{3}{20} = 15\%$$



6. A gym recorded the number of minutes that gym members spent on a treadmill on a certain day. The results are shown in the histogram below. Make a circle graph to display the data.

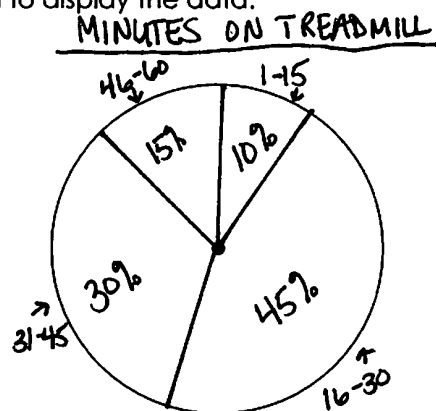


$$1-15: \frac{8}{80} = \frac{1}{10} = 10\%$$

$$16-30: \frac{36}{80} = \frac{9}{20} = 45\%$$

$$31-45: \frac{24}{80} = \frac{3}{10} = 30\%$$

$$46-60: \frac{12}{80} = \frac{3}{20} = 15\%$$

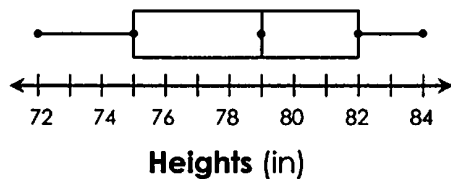


Name: \_\_\_\_\_ Math 6

Date: \_\_\_\_\_ Per: \_\_\_\_\_ Unit 8: Data & Statistics

### Quiz 8-2: Box-and-Whisker Plots, Histograms, Circle Graphs

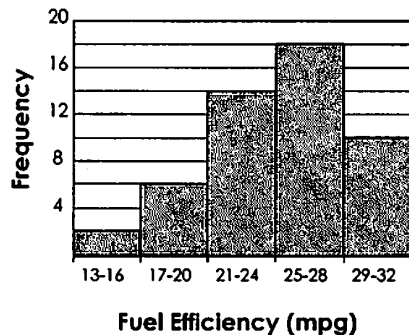
The box-and-whisker plot below shows heights, in inches, of the players on a basketball team. Use the plot to answer questions 1-4.



1. What is the median height?
2. What is the interquartile range?
3. What is the lower quartile?
4. What is the maximum height?

1. 79 in  
 2. 7  
 3. 75 in  
 4. 84 in

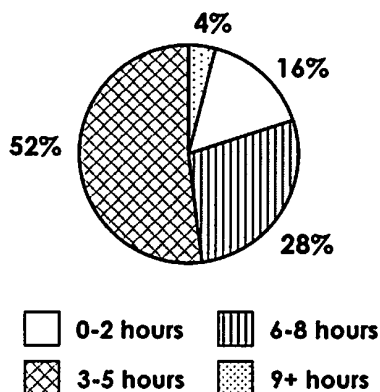
The histogram shows the distribution of sales of vehicles at a dealership in a single week based on the fuel efficiency of the vehicle, in miles per gallon (mpg). Use the histogram to answer questions 5-8.



5. How many vehicles did the dealership sell?
6. How many vehicles sold had a fuel efficiency of at least 25 mpg?
7. What percent of the vehicles sold were 29-32 mpg?
8. What percent of the vehicles sold had a fuel efficiency of no more than 24 mpg?

5. 50 vehicles  
 6. 28 vehicles  
 7. 20%  
 8. 44%

The circle graph below shows the results of a survey in which 125 people were asked how many hours they exercise each week. Use the circle graph to answer questions 9 and 10.



9. How many people exercise a minimum of 9 hours each week?
10. How many people exercise no more than 5 hours each week?

9. 5 people  
 10. 85 people

$$\begin{array}{r}
 125 \\
 \times 0.68 \\
 \hline
 1000 \\
 7500 \\
 \hline
 85.00
 \end{array}$$

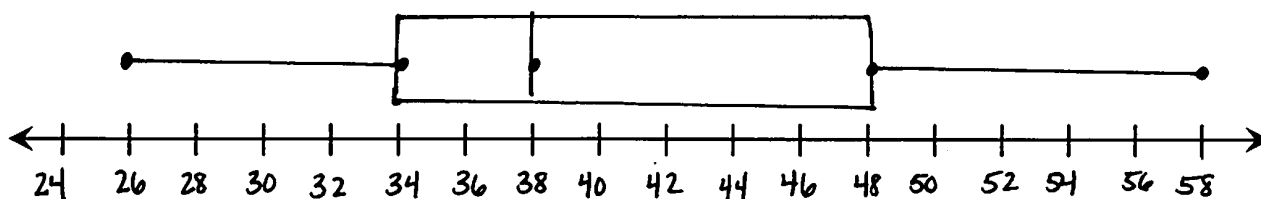
The stem-and-leaf plot to the right shows the number of minutes that a group of students took to complete a math test. Use the stem-and-leaf plot to answer questions 11-15.

Time to Complete a Test	
Stem	Leaf
2	6 8
3	0 2 <span style="border: 1px solid black;">3 5</span> 5 5 6 7 9
4	2 2 3 <span style="border: 1px solid black;">7 9</span>
5	0 0 5 8
KEY: 2   6 = 26 minutes	

11. Give the five-number summary, range, and interquartile range (IQR) of the data.

Minimum Value: 26      Range: 32  
 Lower Quartile: 34      IQR: 14  
 Median: 38  
 Upper Quartile: 48  
 Maximum Value: 58

12. Display the data in a box-and-whisker plot.



13. Display the data in a frequency table.

Interval	Frequency
20-29	2
30-39	9
40-49	5
50-59	4

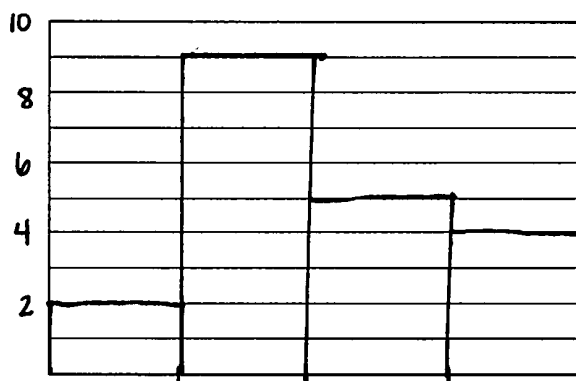
$$\frac{2}{20} = \frac{1}{10} = 10\%$$

$$\frac{9}{20} = 45\%$$

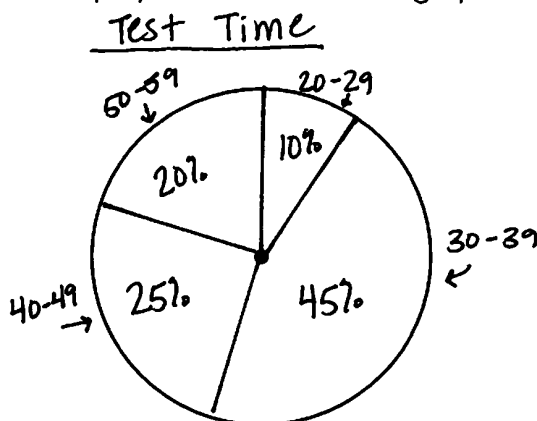
$$\frac{5}{20} = \frac{1}{4} = 25\%$$

$$\frac{4}{20} = \frac{1}{5} = 10\%$$

14. Display the data in a histogram



15. Display the data in a circle graph.





Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples	
Using Multiple DATA DISPLAYS	The heights, in inches, of a random group of students are given below. Use this data to create the four data displays below. {65, 59, 63, 68, 62, 66, 60, 62, 64, 62, 60, 65, 59, 62}	
	A Dot Plot	B Box-and-Whisker Plot
	C Stem-and-Leaf Plot	D Histogram
	1. Without actually finding the values, in which of the data displays above are you able to identify the following measures if asked?	
	Mean: A, C	Median: A, B, C
Min Value: A, B, C	Lower Quartile: A, B, C	Range: A, B, C
Max Value: A, B, C	Upper Quartile: A, B, C	IQR: A, B, C
Choosing a DATA DISPLAY	2. Determine whether the data display shows individual data, distribution of data, or both.	
	Data List: individual data	Box-and-Whisker Plot: dist. of data
	Dot Plot: both	Histogram: dist. of data
	Stem-and-Leaf Plot: both	Circle Graph: dist. of data
	3. Which data displays do not give ANY individual values? Circle Graphs + Histograms	

## Interpreting MULTIPLE DATA DISPLAYS

The golf scores of six groups of golfers in a single round of golf are given displayed below in varying ways. The number of golfers in each group differs. Answer the questions below using the displays.

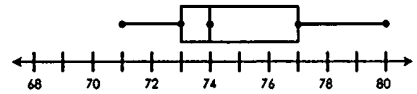
**Group A Scores**



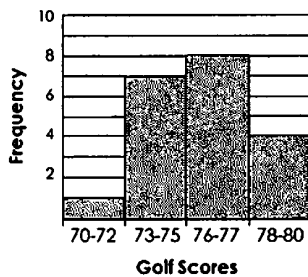
**Group B Scores**

{83, 77, 71, 76, 71, 78, 75, 73, 80}

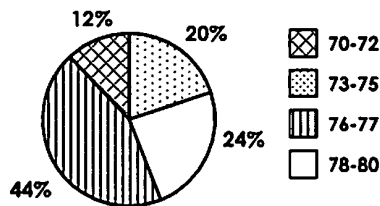
**Group C Scores**



**Group D Scores**



**Group E Scores**



There are 25 golfers in Group E

**Group F Scores**

Stem	Leaf
6	8
7	0 2 2 2 4 8 9
8	1 4

Key: 6 | 8 = points

1. Identify the groups that you are able to identify the following measures:

Mean: A, B, F	Median: A, B, C, F	Mode(s): A, B, F
Min Value: A, B, C, F	Lower Quartile: A, B, C, F	Range: A, B, C, F
Max Value: A, B, C, F	Upper Quartile: A, B, C, F	IQR: A, B, C, F

2. Compare the mean score in Group A to the mean score in Group F.

A: 74 F has a higher mean.  
F: 75

3. Compare the median score in Group B to the median score in Group C.

B: 76 C has a smaller median.  
C: 74

4. Compare the range in Group B to the range in Group F.

B: 12 F has a greater range.  
F: 16

5. Compare the interquartile range in Group A to the interquartile range in Group C.

A: 3 B has a greater IQR.  
B: 4

6. Which group has the golfer with the lowest score?

Group F

7. How many golfers in Group E had a maximum score of 75?

25  
x 0.32  
8 golfers

8. How many golfers in Group D scored higher than 72?

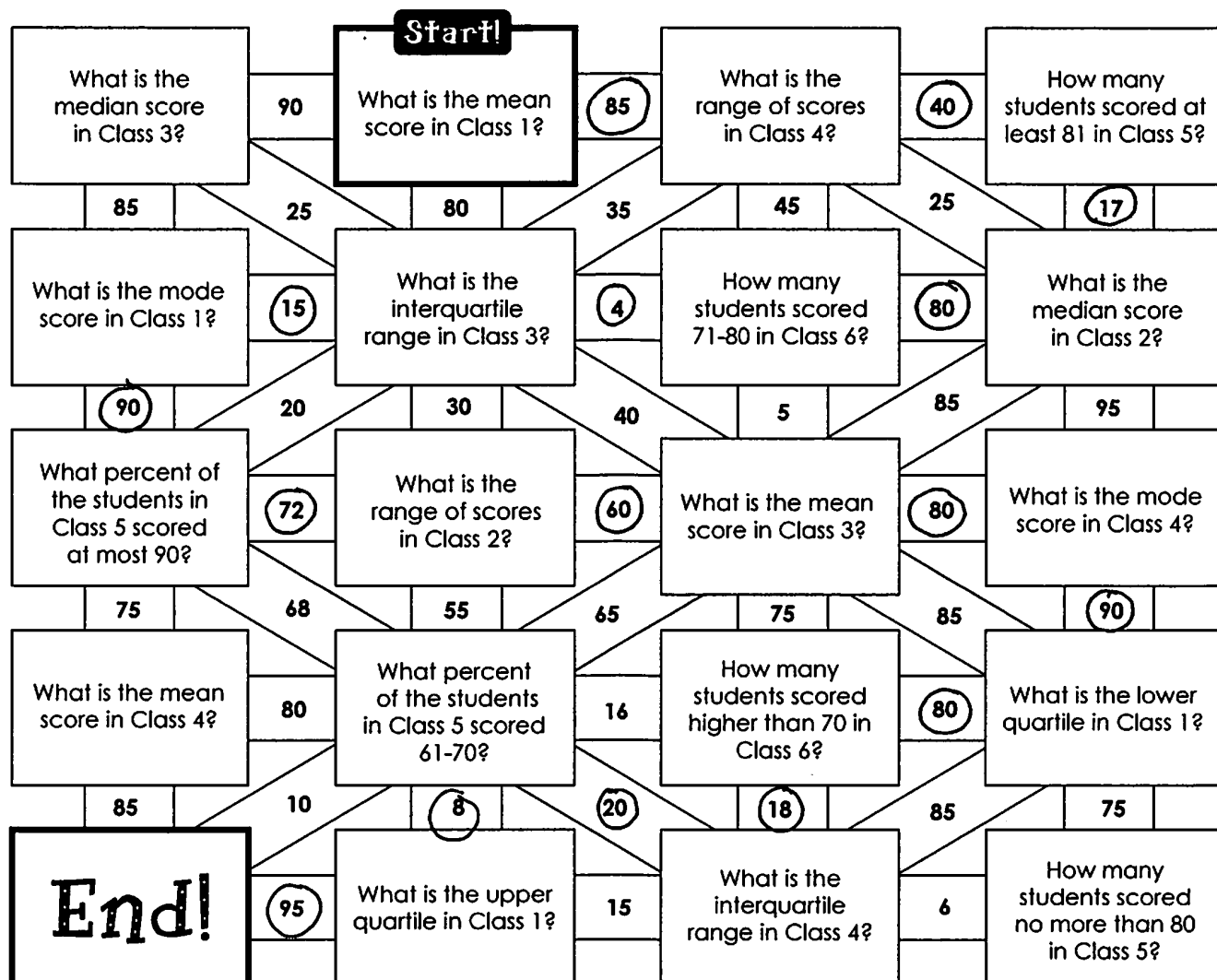
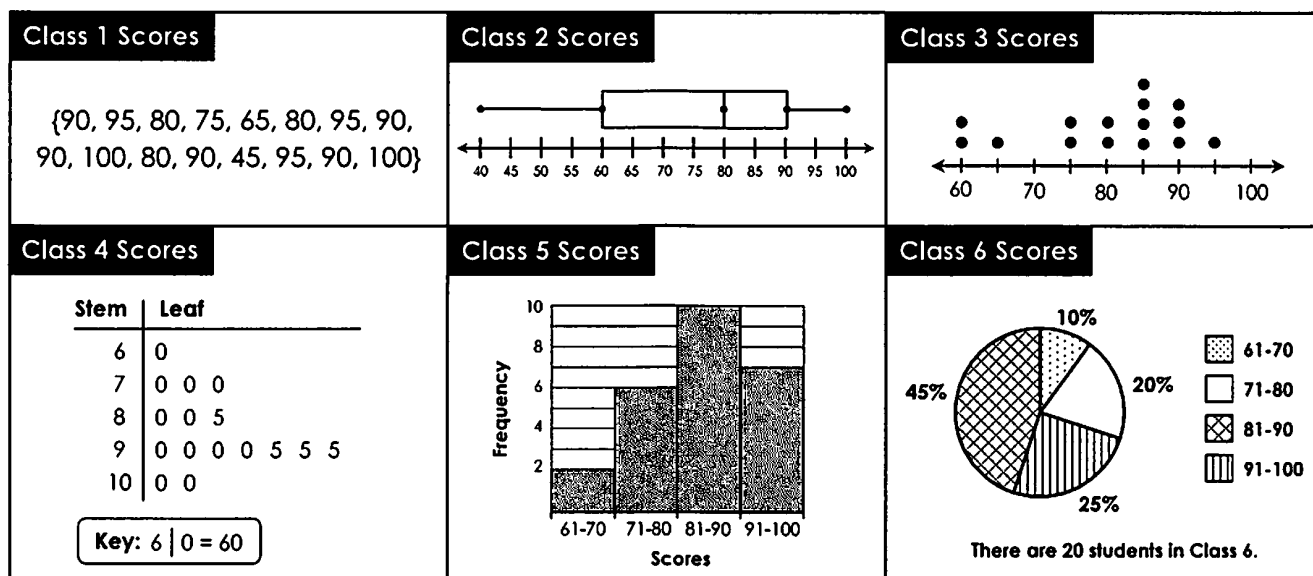
19 golfers

9. What percent of the golfers in Group D scored 73-77?

$\frac{15}{20} = \frac{3}{4}$  75%

# Data Displays Maze!

**Directions:** The scores of 6 classes on the same math test are displayed in various ways below. Answer each question using the data in the displays. **Staple all work to this paper!**



Name: \_\_\_\_\_ Unit 8: Data & Statistics

Date: \_\_\_\_\_ Per: \_\_\_\_\_ Homework 8: Comparing Data Displays

**\*\* This is a 2-page document! \*\***

**Directions:** Indicate whether each statement is true or false.

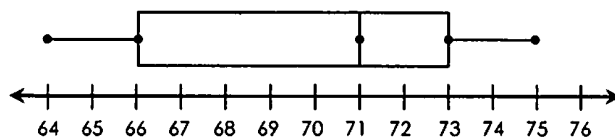
1. The mean of a set of data can be identified given a circle graph.	False
2. The upper quartile of a set of data can be identified given a stem-and-leaf plot.	True
3. The median of a set of data can be identified given a box-and-whisker plot.	True
4. The range of a set of data can be identified given a dot plot.	True
5. The mode of a set of data can be identified given a histogram.	False
6. The interquartile range of a set of data can be found from a stem-and-leaf plot.	True
7. The maximum value of a set of data can be identified given a circle graph.	False
8. The number of data values can be identified from a histogram.	True

**Directions:** The high temperatures from May 1-14 in two different cities is given below. Use the data to answer questions 9-12. Write "not possible" if you are unable to compare the data.

**City A High Temperatures:**

{72, 78, 64, 75, 67, 61, 74,  
54, 74, 68, 74, 77, 66, 76}

**City B High Temperatures:**



54, 61, 64, 66, 67, 68, 72, 74, 74, 74, 75, 76, 77, 78

9. Compare the mean high temperature in City A to the mean high temperature in City B.

A: 70  
B: Not possible

10. Compare the median high temperature in City A to the median high temperature in City B.

A: 73  
B: 71  
A has a larger median.

11. Compare the range of high temperatures in City A to the range of high temperatures in City B.

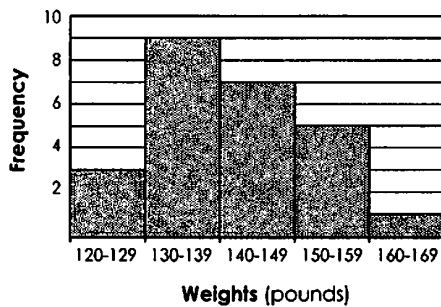
A: 24  
B: 11  
A has a greater range.

12. Compare the interquartile range of high temperatures in City A to the interquartile range of high temperatures in City B.

A: 9  
B: 7  
B has a smaller IQR.

**Directions:** The weights of the wrestlers on two wrestling teams, Team A and Team B, are displayed below. Use the data to answer questions 13-15. Write "not possible" if you are unable to compare the data.

**Team A Weights:**



**Team B Weights:**

Stem	Leaf
12	5 9
13	0 4 9
14	1 2 4 7 7 9
15	0 4 5 5 9
16	2 3 7 8

**Key:** 12 | 5 = 125 pounds

**13.** Compare the mode weight on Team A to the mode weight on Team B.

A:   
 B: 147, 155   
 Not Possible

**14.** Compare the number of wrestlers on Team A to the number of wrestlers on Team B.

A: 25   
 B: 20   
 B has a smaller team.

**15.** Compare the percent of the wrestlers on Team A who are at least 140 pounds to the percent of wrestlers on Team B who are at least 140 pounds.

$$A: \frac{13}{25} = 52\% \quad B: \frac{15}{20} = \frac{3}{4} = 75\%$$

Team B has a higher percentage.

**Directions:** Check the data displays that can be constructed from the indicated display.

**16.** List of Data Values

- ☒ Dot Plot
- ☒ Stem-and-Leaf Plot
- ☒ Box-and-Whisker Plot
- ☒ Histogram
- ☒ Circle Graph

**17.** Circle Graph

- ☐ List of Data Values
- ☐ Dot Plot
- ☐ Stem-and-Leaf Plot
- ☐ Box-and-Whisker Plot
- ☒ Histogram

**18.** Dot Plot

- ☒ List of Data Values
- ☒ Stem-and-Leaf Plot
- ☒ Box-and-Whisker Plot
- ☒ Histogram
- ☒ Circle Graph

**19.** Stem-and-Leaf Plot

- ☒ List of Data Values
- ☒ Dot Plot
- ☒ Box-and-Whisker Plot
- ☒ Histogram
- ☒ Circle Graph

**20.** Box-and-Whisker Plot

- ☐ List of Data Values
- ☐ Dot Plot
- ☐ Stem-and-Leaf Plot
- ☐ Histogram
- ☐ Circle Graph

**21.** Histogram

- ☐ List of Data Values
- ☐ Dot Plot
- ☐ Stem-and-Leaf Plot
- ☐ Box-and-Whisker Plot
- ☒ Circle Graph

# Unit 8 Test Study Guide (Data & Statistics)

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Per: \_\_\_\_\_

## Topic 1: Measures of Center & Range

Find the mean, median, mode(s), and range for each of the following data sets.

<p>1. The time, in minutes, it took students to complete a test:  <math>\{36, 27, 42, 31, 33, 39, 52, 42, 31\}</math>  <math>27, 31, 31, 33, 36, 39, 42, 42, 52</math>  <math>\uparrow</math>  <math>\text{Mean} = \frac{333}{9} = 37</math>  <math>\text{Range} = 52 - 27 = 25</math></p>	Mean:
	37
	Median:
	36
	Mode(s):
	31, 42
	Range:
	25

<p>2. The maximum wind speeds of six hurricanes: <math>\{125, 110, 115, 165, 145, 180\}</math>  <math>110, 115, 125, 145, 165, 180</math>  <math>\text{Mean} = \frac{840}{6} = 140</math>  <math>\text{Range} = 180 - 110 = 70</math></p>	Mean:
	140
	Median:
	135
	Mode(s):
	None
	Range:
	70

<p>3. The number of days that certain homes were on the market before selling are given below. Identifier the outlier, then find the measures with and without the outlier.  <math>\{17, 12, 28, 21, 14, 74, 32, 14, 25, 23\}</math>  <math>12, 14, 14, 17, 21, 23, 25, 28, 32, 74</math>  <math>\text{Mean} = \frac{260}{10} = 26</math>  <math>\text{Range} = 74 - 12 = 62</math>  <math>12, 14, 14, 17, 21, 23, 25, 28, 32</math>  <math>\uparrow</math>  <math>\text{Mean} = \frac{186}{9} = 20.6</math></p>	Identify the Outlier:	
	With Outlier	Without Outlier
	Mean:	Mean:
	26	20.6
	Median:	Median:
	22	21
	Mode(s):	Mode(s):
	14	14
	Range:	Range:
	62	20

4. Create a list of 6-8 data values in which the given measure of center would be most appropriate for and explain why.

Center	List of Data Values	Why is this center best for this data?
Mean	5, 7, 3, 9, 4, 6, 5, 8	No outliers
Median	11, 17, 10, 15, 13, 56, 17, 19	56 is an outlier
Mode	1, 4, 2, 4, 4, 4, 7, 4	4 repeats many times

5. A customer service center added a 2-minute questionnaire to the beginning of each service call. How does this affect the mean, median, mode, and range length of the service calls?

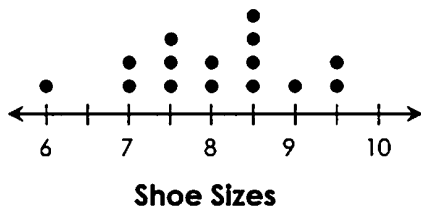
The mean, median, and mode will all increase by 2 minutes. The range would stay the same.

6. The orchestra plans to play 8 pieces for a concert, each of different lengths. If they decide not to play the longest piece, how will this affect the mean, median, mode, and range lengths?

The mean, median, and range will all decrease. The mode will not change.

### Topic 2: Dot Plots & Stem-and-Leaf Plots

7. The shoe sizes of the people in a fitness class are shown in the dot plot below.



- a) Compare the median and mode shoe sizes.

6, 7, 7, 7.5, 7.5, 7.5, 8, 8, 8.5, 8.5, 8.5, 8.5, 9, 9.5, 9.5

Median = 8

Mode = 8.5

The mode is greater than the median.

- b) How many people have a shoe size of at least 8?

9 people

8. The ages of the players on a soccer team are shown in the stem-and-leaf plot below.

Ages of Soccer Players

Stem	Leaf
1	8 9
2	1 3 5 5 6 7
3	0 2 2 4

Key: 1 | 8 = 18 years

- a) What is the mean?

18, 19, 21, 23, 25, 25, 26, 27, 30, 32, 32, 34

$$\text{Mean} = \frac{312}{12} = 26$$

- b) How many players are younger than 30?

8 players

### Topic 3: Mean Absolute Deviation

Find the mean absolute deviation of each set of data.

9. Data Set A: {28, 16, 26, 22, 18}

$$\text{Mean} = \frac{110}{5} = 22$$

$$\begin{aligned} \text{MAD} &= \frac{6 + 6 + 4 + 0 + 4}{5} \\ &= \frac{20}{5} = \boxed{4} \end{aligned}$$

10. Data Set B: {114, 158, 121, 215, 167}

$$\text{Mean} = \frac{775}{5} = 155$$

$$\begin{aligned} \text{MAD} &= \frac{41 + 3 + 34 + 60 + 12}{5} \\ &= \frac{150}{5} = \boxed{30} \end{aligned}$$

11. In the previous two questions, is the the mean absolute deviation of Data Set A less than, greater than, or equal to the mean absolute absolute deviation of Data Set B? What does this mean in comparing the data values in each set?

The MAD on #9 is less than the MAD on #10. Since the MAD on #9 is closer to zero, it shows less of a variation in the data.

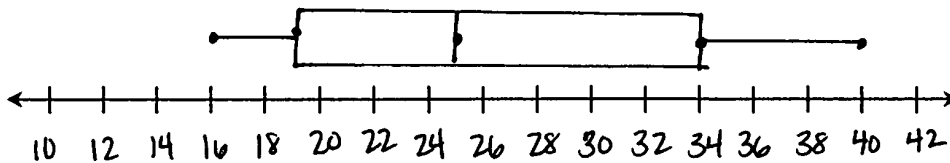
#### Topic 4: Box-and-Whisker Plots

Draw the box-and-whisker plot, then give the five-number summary, range, and IQR.

12. Wait time, in minutes, of 9 rides at an amusement park:

{28, 40, 18, 25, 20, 16, 36, 21, 32}

16, 18, 20, 21, 25, 28, 32, 36, 40

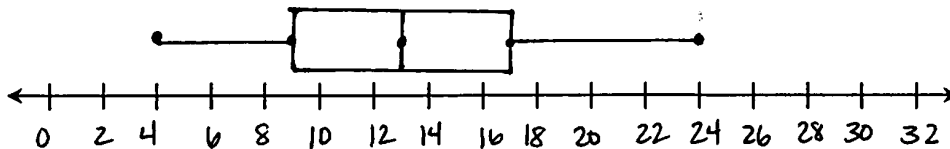


Minimum: 16  
Lower Quartile: 18  
Median: 25  
Upper Quartile: 32  
Maximum: 40  
Range: 24  
IQR: 15

13. Number of cars sold each month by a salesman in a single year:

{4, 15, 20, 12, 7, 13, 24, 16, 10, 8, 18, 13}

4, 7, 8, 10, 12, 13, 13, 15, 16, 18, 20, 24



Minimum: 4  
Lower Quartile: 9  
Median: 13  
Upper Quartile: 17  
Maximum: 24  
Range: 20  
IQR: 8

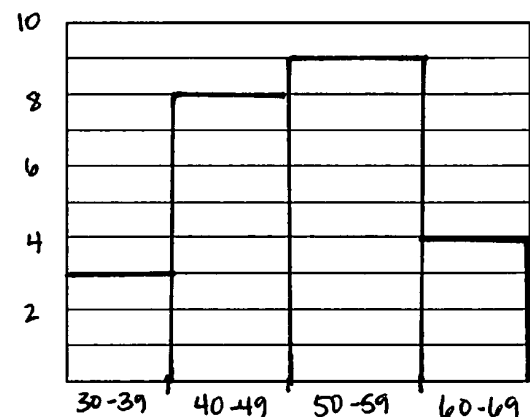
#### Topic 5: Histograms

14. The data below represents the salaries, in tens of thousands of dollars, of a group of employees. Organize the data in a frequency table, then make a histogram to display the data.

{53, 58, 45, 68, 41, 35, 60, 47, 54, 56, 36, 49,  
46, 38, 52, 42, 57, 63, 50, 45, 55, 60, 51, 43}

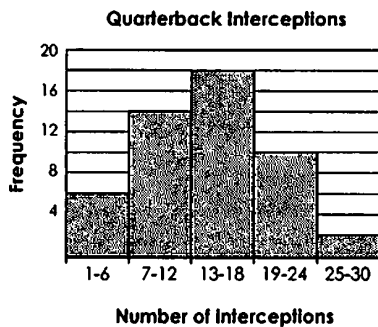
Interval	Frequency
30-39	3
40-49	8
50-59	9
60-69	4

|||  
++++|||  
++++|||  
||||





15. The histogram below shows the number of interceptions thrown by a group of quarterbacks in a season.



- a) How many quarterbacks had more than 12 interceptions?

30 quarterbacks

- b) What percent of the quarterbacks threw 19-24 interceptions?

$$\frac{10}{50} = \frac{1}{5}$$

20%

- c) What percent of the quarterbacks threw no more than 18 interceptions?

$$\frac{38}{50} = \frac{76}{100}$$

76%

### Topic 6: Circle Graphs

16. A group of students were surveyed and asked their favorite subject. The results are shown in the table below. Make a circle graph to display the data.

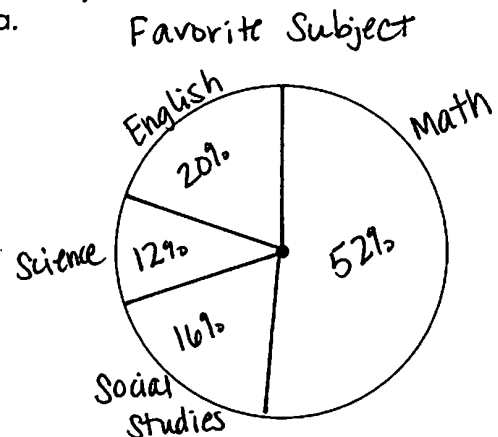
Subject	Number of Students
English	15
Math	39
Science	9
Social Studies	12

$$\frac{15}{75} = \frac{1}{5} = 20\%$$

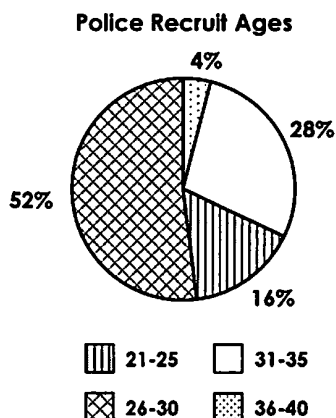
$$\frac{39}{75} = \frac{13}{25} = 52\%$$

$$\frac{9}{75} = \frac{3}{25} = 12\%$$

$$\frac{12}{75} = \frac{4}{25} = 16\%$$



17. The circle graph below shows the distribution of ages of the 125 police recruits in an academy.



- a) How many of the recruits are 36-40?

$$\begin{array}{r} 125 \\ \times 0.04 \\ \hline 5.00 \end{array}$$

5 recruits

- b) How many of the recruits are at most 30 years old?

$$\begin{array}{r} 125 \\ \times 0.68 \\ \hline 1000 \\ 7500 \\ \hline 85.00 \end{array}$$

85 recruits

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Per: \_\_\_\_\_

## Unit 8 Test

### Data & Statistics

1. The data below represents the total number of points scored by the eight AFC football teams in the NFL last season. What measure is the greatest?

{419, 314, 279, 306, 531, 289, 335, 279}

279, 279, 289, 306, 314, 335, 419, 531

- A. mean = 344  
B. median = 310  
C. mode = 279  
D. range = 252

A

2. A taxi driver recorded the number of miles she drove each day for a week. What is the mean number of miles driven?

Day	Miles
Monday	186
Tuesday	155
Wednesday	210
Thursday	164
Friday	155

$$\frac{870}{5}$$

174 mi

3. The maximum depth, in feet, of the Great Lakes is given below. What is the range of depths?

Great Lake	Maximum Depth
Lake Michigan	925
Lake Huron	748
Lake Ontario	804
Lake Superior	1,333
Lake Erie	210

-

-

1123 ft

4. The hourly wages of a group of people are given below. Find the median wage.

Hourly Wages	
Stem	Leaf
0	8 9
1	0 2 2 4 5 5 6 8
2	1 1 4 7 8
3	0 2 5

KEY: 0 | 8 = \$8 per hour

- A. \$15 per hour    B. \$16 per hour  
C. \$17 per hour    D. \$18 per hour

C

5. Two data sets are given below. Which statement is true?

SET A	{72, 98, 50, 81, 64}
SET B	{83, 40, 72, 65, 90, 76}

73; 72

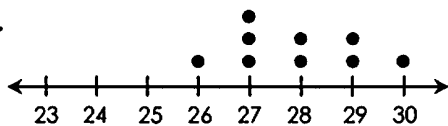
71; 74

- A. The mean of Set A is less than the mean of Set B.  
B. The median of Set A is greater than the mean of Set B.  
C. The mean of Set A is equal to the median of Set B.  
D. The median of Set A is equal to the mean of Set B.

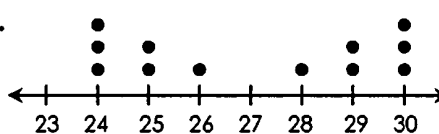
B

6. For which dot plot is both the median and mode equal to 27?

A.



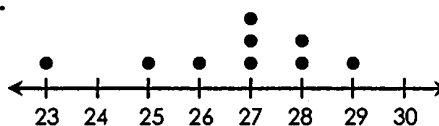
B.



C.



D.



D

7. The table below gives the number of new memberships at a gym each month from January through June. If the number of memberships in January are removed, which statement is true?

Month	New Memberships
January	290
February	60
March	70
April	45
May	60
June	75

Mean: 100 → 62

Med: 65 → 60

Mode: 60 → 60

- A. The mode is affected more than the median.
- B. The median is affected more than the mean.
- C. The mode is affected more than the mean.
- D. The mean is affected more than the median.

D

8. Determine whether the mean, median, or mode would be the most appropriate measure of center for each list of numbers below. Write the letter of the measure in the box beside each list. Each measure can only be used one time.

A: Mean    B: Median    C: Mode

B

List 1: {7, 40, 42, 45, 48, 50, 55}

C

List 2: {12, 12, 9, 12, 5, 12, 12}

A

List 3: {13, 16, 18, 20, 24, 27, 29}

9. Which action would cause the range of the list of numbers below to increase?

{16, 20, 28, 40, 45}

- A. Adding 5 to each data value.
- B. Multiplying each data value by 2.
- C. Adding a sixth data value of 45.
- D. Removing 16 from the data list.

B

10. Which list of values would likely have the smallest mean absolute deviation?

- A. {121, 122, 123, 124, 125}
- B. {4, 8, 17, 20, 26}
- C. {10, 20, 30, 40, 50}
- D. {2, 4, 6, 8, 10}

A

11. The table below shows the total number of miles that six runners ran last month. What is the mean absolute deviation of the miles ran?

Name	Miles Ran
Mitch	95
Kelsey	126
Jamie	68
Rory	111
Liam	102
Antonio	86

$$\text{Mean} = \frac{588}{6} = 98$$

$$\text{MAD} = \frac{3 + 28 + 30 + 13 + 4 + 12}{6} = \frac{90}{6} = 15$$

- A. 14  
B. 15  
C. 16  
D. 17

B

12. The data represents the miles that the employees at a company live from work. Represent the data as a box-and-whisker plot, then identify each value to the right.

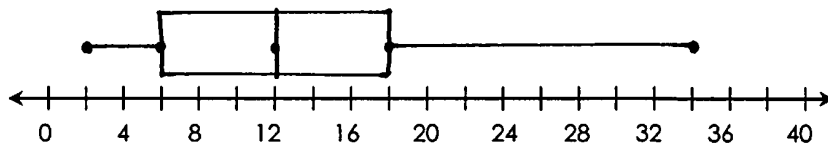
{8, 20, 3, 15, 12, 10, 4, 26, 13, 6, 2, 18, 35, 16, 12}

2, 3, 4, 6, 8, 10, 12, 12, 13, 15, 16, 18, 20, 26, 35

↑

↑

↑



Minimum Value = 2

Lower Quartile = 6

Median = 12

Upper Quartile = 18

Maximum Value = 35

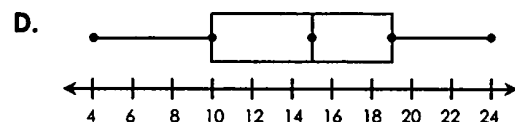
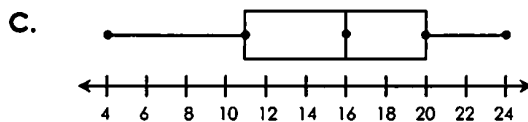
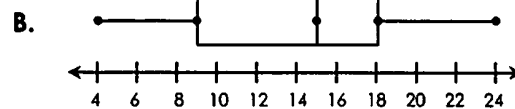
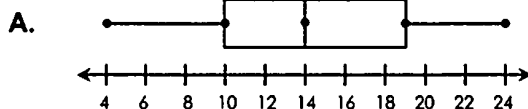
Range = 33

Interquartile Range = 12

13. Which box-and-whisker plot best represents the following values:

{11, 19, 7, 21, 16, 24, 10, 4, 18, 14}

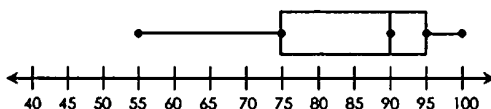
4, 7, 10, 11, 14, 16, 18, 19, 21, 24



D

14. The box-and-whisker plot below compares the tests scores of two different classes. Which measure is the same in both classes?

Class A



Class B



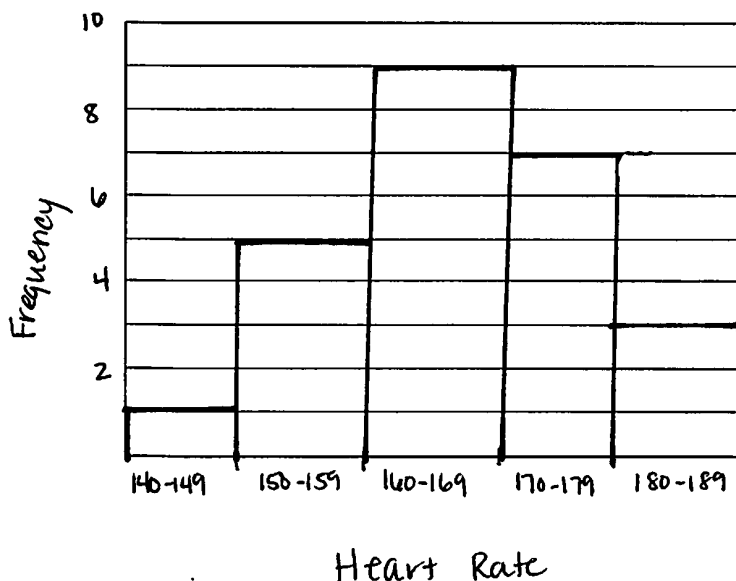
- A. median  
B. lower quartile  
C. range  
D. interquartile range

D

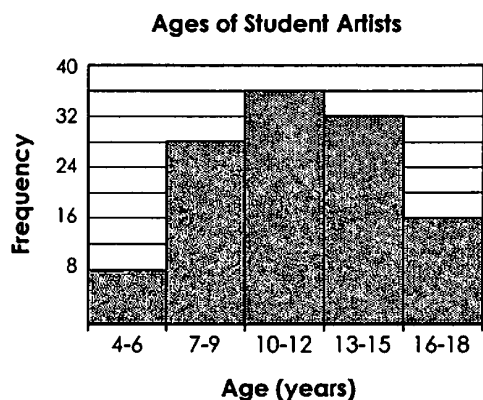
15. The maximum heart rates, in beats per minute, of 25 people in an aerobics class is given below. Organize the data in a frequency table, then use the table to create a histogram. Label all parts of the histogram.

Maximum Heart Rate (bpm)				
172	180	155	167	170
149	179	175	160	162
186	178	159	171	167
163	155	182	168	152
178	165	151	160	168

Interval	Frequency
140-149	1
150-159	5
160-169	9
170-179	7
180-189	3



Use for questions 16-17: The histogram below shows the ages of the students who submitted artwork to a competition sponsored by an art museum.



16. How many students submitted artwork?

$$8 + 28 + 36 + 32 + 16$$

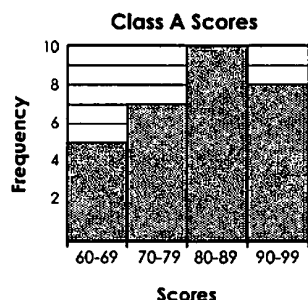
120

17. Of the students who submitted artwork, how many are at most 12 years old?

$$8 + 28 + 36$$

72

18. The scores of two classes on a math test are shown below. If the data from the two classes are combined, what percent of the students scored at least 80?



Class B Scores	
Stem	Leaf
6	1 5
7	2 5 5 8
8	1 3 4 6 6 8 9
9	2 2 5 7 8
10	0 0

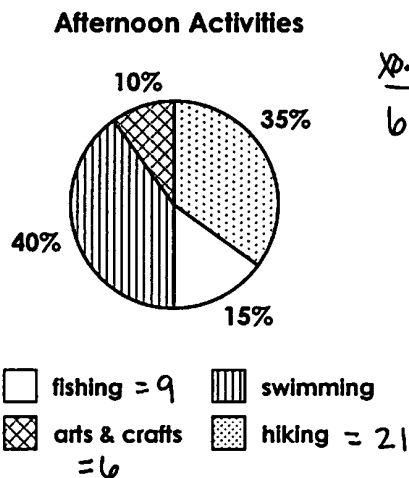
KEY: 6 | 1 = 61

$$\frac{32}{50} = \frac{64}{100}$$

- A. 62%
- B. 64%
- C. 68%
- D. 70%

B

19. A group of 60 students at a summer camp could choose one of four activities for the afternoon. Their choices are shown in the circle graph to the right. Check two activities that represent the choice of exactly 27 students?



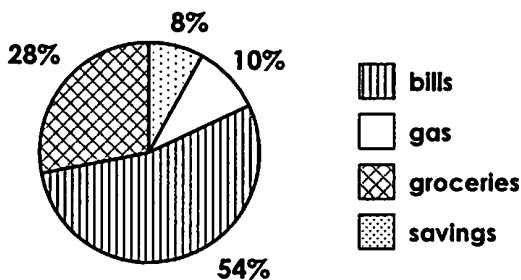
$$\begin{array}{r} 60 \\ \times 0.10 \\ \hline 6.00 \end{array}$$

$$\begin{array}{r} 60 \\ \times 0.15 \\ \hline 300 \\ 600 \\ \hline 9.00 \end{array}$$

$$\begin{array}{r} 60 \\ \times 0.35 \\ \hline 300 \\ 1800 \\ \hline 21.00 \end{array}$$

<input type="checkbox"/>	fishing
<input checked="" type="checkbox"/>	arts & crafts
<input type="checkbox"/>	swimming
<input checked="" type="checkbox"/>	hiking

20. Last week, Mariah made \$30 from babysitting, \$250 working at the grocery store, and \$120 from working at the library. She used the money for bills, gas, and groceries, then saved the rest. The circle graph below shows the distribution of her earnings. How much did she spend on groceries?

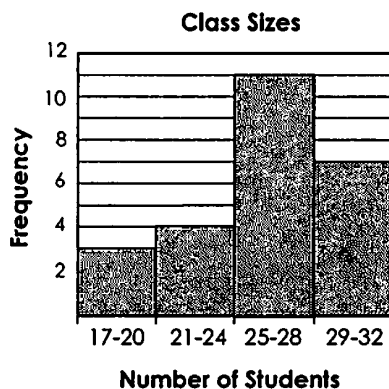


$$\begin{array}{r} 400 \\ \times 0.28 \\ \hline 3200 \\ 8000 \\ \hline 112.00 \end{array}$$

- A. \$112  
 B. \$116  
 C. \$124  
 D. \$132

A

21. The histogram below shows the class sizes of randomly selected classrooms at Edgewood Middle School. Use the data from the histogram to make a circle graph. Label all parts of your circle graph.

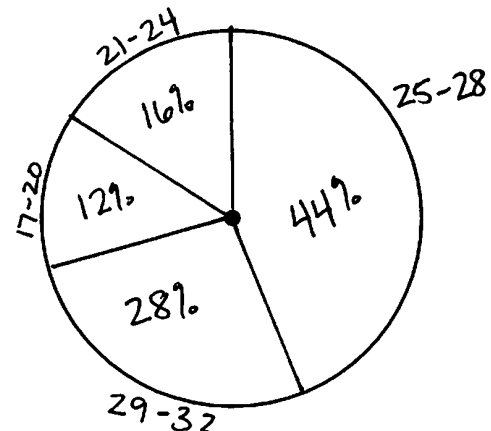


$$17-20: \frac{3}{25} = 12\%$$

$$21-24: \frac{4}{25} = 16\%$$

$$25-28: \frac{11}{25} = 44\%$$

$$29-32: \frac{7}{25} = 28\%$$



# CREDITS

I use clipart and  
fonts in my products by:



Art with Jenny K



Many thanks to these  
talented artists!