Pre-Test Unit 9: Scatter Plots

You may use a calculator.

Construct a scatter plot for the following data set using appropriate scale for both the x- and y-axis. (10 pts, 5 pts partial credit for appropriate axes, 5 pts partial credit for correctly plotted points)

1. This table shows the number of hours students slept the night before their math test and their scores.

<table>
<thead>
<tr>
<th>Hours Slept</th>
<th>Test Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anna</td>
<td>8</td>
</tr>
<tr>
<td>Bob</td>
<td>7</td>
</tr>
<tr>
<td>Carly</td>
<td>8</td>
</tr>
<tr>
<td>Damien</td>
<td>6</td>
</tr>
<tr>
<td>Esther</td>
<td>5</td>
</tr>
<tr>
<td>Franco</td>
<td>8</td>
</tr>
<tr>
<td>Georgia</td>
<td>8</td>
</tr>
<tr>
<td>Hank</td>
<td>9</td>
</tr>
<tr>
<td>Innya</td>
<td>7</td>
</tr>
<tr>
<td>Jacob</td>
<td>6</td>
</tr>
</tbody>
</table>

Use the following scatter plot to answer each question. The scatter plot shows the monthly income of each person in hundreds of dollars versus the percent of their income that they save each month. (5 pts, 2 pts partial credit for no explanation)

2. Does this scatter plot represent a positive association, negative association, or no association? Why?
Positive, as income increases so does percent saved

3. Which person makes the most money per month? How much do they make?
Paul, about $2800

4. Does this appear to a linear or non-linear association? Why?
Linear, data does not curve, only has an outlier

5. Which person is the outlier in this data set? Why?
Kory, far away from the rest of the data
**Draw an informal line of best for the given scatter plots.**  (5 pts, partial credit at teacher discretion)

6. This scatter plot shows the amount copper in water in ppm versus plant growth in cm over three months.

7. This scatter plot shows the hours a cubic foot of ice was exposed to sunlight versus the amount of ice that melted in cubic inches.

**Explain why the drawn line of best fit is accurate or why not.**  (5 pts, partial credit at teacher discretion)

8. This scatter plot shows the age in years versus the height in inches of a group of children.

9. This scatter plot shows the hours of TV watched per week versus the GPA on a 4.0 scale for a group of students.

Not accurate because there are too many points below at the beginning of the line, and too many above at the end of the line.

Accurate because there is a balance of how far away the data points are from the line.
The scatter plot shows what people think the temperature “feels like” as the humidity varies when the room is actually at 68°F. The equation of the line of best fit is \( y = \frac{1}{10}x + 61 \). (5 pts; 3 pts for equation answer, 2 pts for graph answer)

10. Predict what a person would say the temperature “feels like” when the humidity is at 80% using both the equation and graph.

<table>
<thead>
<tr>
<th>Equation Work:</th>
<th>Graph Prediction:</th>
</tr>
</thead>
<tbody>
<tr>
<td>69°</td>
<td>68° or 69°</td>
</tr>
</tbody>
</table>

11. Predict what the humidity would be if someone said that it “feels like” 65°F in that room using both the equation and graph.

<table>
<thead>
<tr>
<th>Equation Work:</th>
<th>Graph Prediction:</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
<td>40%</td>
</tr>
</tbody>
</table>

Using the same scatter plot and equation of the line of best fit of \( y = \frac{1}{10}x + 61 \), answer the following questions. (5 pts, partial credit at teacher discretion)

12. What does the slope of this equation mean in terms of the given situation? In other words, explain what the rise and run mean for this problem.

The “feels like” temperature will go up one degree for every 10% increase in humidity.

13. What does the y-intercept of this equation mean in terms of the given situation? In other words, explain what the y-intercept means when considering the humidity and “feels like” temperature.

The y-intercept of 61 degrees means that with 0% humidity it will “feel like” 61 degrees instead of 68 degrees.
**Answer the following questions about two-way tables.** (5 pts, partial credit at teacher discretion)

14. Construct a two-way table from the following data about whether people are democrats or republicans and whether or not they support stricter gun control laws.

<table>
<thead>
<tr>
<th>Democrat or Republican?</th>
<th>D</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>D</th>
<th>D</th>
<th>R</th>
<th>D</th>
<th>D</th>
<th>D</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>D</th>
<th>D</th>
<th>R</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Strict Gun Control?</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Republican</th>
<th>Democrat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Gun Control</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Against Gun Control</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

15. Do you think there is a relationship between party affiliation and gun control laws? Based on the data, why or why not? *(no credit without explanation of why, partial credit at teacher discretion for explanation)*

Yes. 80% of Republicans are against gun control while 80% of Democrats support gun control.

**Answer the following questions using the given two-way table.** (5 pts, no partial credit)

<table>
<thead>
<tr>
<th></th>
<th>Support School Uniforms</th>
<th>Do Not Support School Uniforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>278</td>
<td>1726</td>
</tr>
<tr>
<td>Teachers</td>
<td>82</td>
<td>23</td>
</tr>
</tbody>
</table>

16. How many students were surveyed?

2004

17. How many people support school uniforms?

360

18. How many students do not support school uniforms?

1726

19. As a percent to the nearest hundredth (two decimal places) what is the relative frequency of students who support school uniforms?

\[
\frac{278}{2004} \approx 13.87\%
\]
Lesson 9.1

Unit 9 Homework

Use the given data to answer the questions and construct the scatter plots.

Pathfinder Character Level vs. Total Experience Points

<table>
<thead>
<tr>
<th>Level</th>
<th>2</th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>14</th>
<th>15</th>
<th>17</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>XP</td>
<td>15</td>
<td>35</td>
<td>150</td>
<td>500</td>
<td>710</td>
<td>1050</td>
<td>2950</td>
<td>4250</td>
<td>8500</td>
<td>24000</td>
</tr>
</tbody>
</table>

1. Which variable should be the independent variable (x-axis) and which should be the dependent variable (y-axis)?
   Level should be x, XP should be y

2. Should you use a broken axis? Why or why not?
   No broken axis, uses all space in range

3. What scale and interval should you use for the x-axis?
   0 to 20 by ones

4. What scale and interval should you use for the y-axis?
   0 to 24,000 by 1,200

5. Construct the scatter plot.

Age vs. Weekly Allowance

<table>
<thead>
<tr>
<th>Age</th>
<th>12</th>
<th>12</th>
<th>13</th>
<th>13</th>
<th>14</th>
<th>14</th>
<th>15</th>
<th>15</th>
<th>16</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowance</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
</tbody>
</table>

6. Which variable should be the independent variable (x-axis) and which should be the dependent variable (y-axis)?
   Age should be x, Allowance should be y

7. Should you use a broken axis? Why or why not?
   Broken axis for x since 0 to 11 not used

8. What scale and interval should you use for the x-axis?
   12 to 16 by 0.25

9. What scale and interval should you use for the y-axis?
   0 to 30 by 1.5 or 0 to 40 by twos

10. Construct the scatter plot.
### Age vs. Number of Baby Teeth

<table>
<thead>
<tr>
<th>Age</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby Teeth</td>
<td>20</td>
<td>19</td>
<td>17</td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

11. Which variable should be the independent variable (x-axis) and which should be the dependent variable (y-axis)?

**Age should be x, Baby Teeth should be y**

12. Should you use a broken axis? Why or why not?

**No broken axis, range greater than gap beforehand**

13. What scale and interval should you use for the x-axis?

**0 to 20 by ones**

14. What scale and interval should you use for the y-axis?

**0 to 20 by ones**

15. Construct the scatter plot.

### Car Speed (in mph) vs. Gas Mileage (in mpg)

<table>
<thead>
<tr>
<th>Speed</th>
<th>20</th>
<th>25</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>55</th>
<th>65</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mileage</td>
<td>25</td>
<td>27</td>
<td>28</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>30</td>
<td>29</td>
<td>25</td>
<td>22</td>
</tr>
</tbody>
</table>

16. Which variable should be the independent variable (x-axis) and which should be the dependent variable (y-axis)?

**Speed should be x, Mileage should be y**

17. Should you use a broken axis? Why or why not?

**Broken axis for y since 0 to 22 not used**

18. What scale and interval should you use for the x-axis?

**0 to 100 by fives**

19. What scale and interval should you use for the y-axis?

**22 to 32 by ones (or by halves)**

20. Construct the scatter plot.
Lesson 9.2

*Use the given scatter plots to answer the questions.*

1. Does this scatter plot show a positive association, negative association, or no association? Explain why.
   - Positive, going up from left to right

2. Is there an outlier in this data set? If so, approximately how old is the outlier and how about many minutes does he or she study per day?
   - 12 years old and 75 minutes

3. Is this association linear or non-linear? Explain why.
   - Linear, increases by about the same amount each year

4. What can you say about the relationship between your age and the amount that you study?
   - The older you are, the more you study

5. Does this scatter plot show a positive association, negative association, or no association? Explain why.
   - Negative, going down from left to right

6. Is there an outlier in this data set? If so, approximately how old is the outlier and about how many minutes does he or she spend with family per day?
   - No outlier in this data set

7. Is this association linear or non-linear? Explain why.
   - Non-linear, it curves down

8. What can you say about the relationship between your age and the amount of time that you spend with family?
   - As you get older, you spend much less time with family each day
9. Does this scatter plot show a positive association, negative association, or no association? Explain why.
Negative, going down from left to right

10. Is there an outlier in this data set? If so, approximately how much does that person watch TV daily and what is his or her approximate math grade?
About 5.5 hours of TV and 95% math grade

11. Is this association linear or non-linear? Explain why.
Linear, grade goes down by the same amount for each hour of TV

12. What can you say about the relationship between the amount of time you watch TV and your math grade?
Watching more TV correlates with lower math grades

13. Does this scatter plot show a positive association, negative association, or no association? Explain why.
Positive, math grade goes up from left to right

14. Is there an outlier(s) in this data set? If so, approximately how much time does that person(s) spend with his or her family daily and what is his or her approximate math grade?
40 minutes with 92% and 100 minutes with 96%

15. Is this association linear or non-linear? Explain why.
Questionable, could go either way

16. What can you say about the relationship between the amount of time that you spend with your family and your math grade?
More time with family correlates with higher math grades

17. Are there any other patterns that you notice in this data?
Clumping around 280 minutes and also around 140 minutes
18. Does this scatter plot show a positive association, negative association, or no association? Explain why.
**Negative, going down from left to right**

19. Is there an outlier(s) in this data set? If so, approximately how many pets does that person(s) have?
**No outlier**

20. Is this association linear or non-linear? Explain why.
**Linear, going down the same amount each time**

21. What can you say about the relationship between your last name and the number of pets you have?
**Earlier in the alphabet has more pets**

22. Are there other patterns that you notice about people’s last names and how many pets they have?
**Clumping, early alphabet between 8 and 13 pets, middle alphabet between 4 and 6, later alphabet between 0 and 2 pets**

23. Does this scatter plot show a positive association, negative association, or no association? Explain why.
**No association, no clear pattern**

24. Is there an outlier(s) in this data set? If so, approximately how old is that person?
**No outlier**

25. Is this association linear or non-linear? Explain why.
**Neither since there is no association**

26. What can you say about the relationship between your last name and your age?
**There is no relationship**
27. Does this scatter plot show a positive association, negative association, or no association? Explain why.
Positive, going up from left to right

28. Is there an outlier(s) in this data set? If so, approximately how tall is that person and how much does he or she make in allowance each week?
72 inches with $0 allowance

29. Is this association linear or non-linear? Explain why.
Non-linear, it curves up

30. What can you say about the relationship between your height and your allowance?
As height increases, allowance increases

31. Do you think that being taller means that you will get more allowance? In other words, do you think this relationship is a causation or a correlation?
This is a correlation, not a causation because being tall doesn't cause more allowance

32. Does this scatter plot show a positive association, negative association, or no association? Explain why.
Positive, going up from left to right

33. Is there an outlier(s) in this data set? If so, approximately how old is that person and how much does he or she make in allowance each week?
16 years old with $0 allowance

34. Is this association linear or non-linear? Explain why.
Non-linear, it curves up

35. What can you say about the relationship between your age and your allowance?
As age increases, allowance increases

36. Do you think that being older means that you will get more allowance? In other words, do you think this relationship is a causation or a correlation?
This is probably a causation since being older means you generally spend more money and therefore need more allowance
Lesson 9.3

Draw an informal line of best fit on the given scatter plot and explain why you drew the line where you did. The real line of best fit is the thick line in red.

1. 

2. 

3. 

4.
Determine whether the drawn line of best fit is accurate or not. Explain why you think your position is true. The real line of best fit is the thick line in red.
Use the given line of best fit or equation of the line of best fit to answer the following questions.

17. Using the graph only, about how much would you expect an 18 year old to weigh?
   185 – 190 lbs

18. Using the graph only, about how much would you expect a 4 year old to weigh?
   40 lbs

19. Using the graph only, if a person weighed 80 pounds, how old would you expect them to be?
   8 years old

20. Using the graph only, if a person weighed 120 pounds, how old would you expect them to be?
   12 years old

The line of best fit for the scatter plot showing age (x-value) compared to weight (y-value) is approximately:

\[ y = \frac{21}{2}x - \frac{7}{2} \]

21. Using the line of best fit equation (show your work), about how much would you expect an 18 year old to weigh? How does this answer compare to the answer you gave to problem number 17?
   185.5 lbs

22. Using the line of best fit equation (show your work), about how much would you expect a 4 year old to weigh? How does this answer compare to the answer you gave to problem number 18?
   38.5 lbs

23. Using the line of best fit equation (show your work), about how old would you expect a person to be if they weighed 80 pounds? How does this answer compare to the answer you gave to problem number 19?
   \[ \approx 8 \text{ years old} \]

24. Using the line of best fit equation (show your work), about how old would you expect a person to be if they weighed 120 pounds? How does this answer compare to the answer you gave to problem number 20?
   \[ \approx 11.8 \text{ years old} \]

25. What is the rate of change (slope) of the line of best fit? What does the slope represent in this context and does that make sense?
   \[ \frac{21}{2} \text{ represents how many lbs per year you gain} \]

26. What is the initial value (y-intercept) of the line of best fit? What does it represent in this context and does that make sense?
   \[ -\frac{7}{2} \text{ represents weight at birth, doesn't make sense to have negative weight} \]
27. Using the graph only, about how much would you expect a 22 year old to sleep?  
4 hours

28. Using the graph only, about how much would you expect a 4 year old to sleep?  
12 hours

29. Using the graph only, if a person slept 6 hours, how old would you expect them to be?  
17 years old

30. Using the graph only, if a person slept 13 hours, how old would you expect them to be?  
2 years old

The line of best fit for the scatter plot showing age (x-value) compared to daily hours of sleep (y-value) is approximately:

\[ y = -\frac{1}{2}x + 14 \]

31. Using the line of best fit equation (show your work), about how much would you expect a 22 year old to sleep? How does this answer compare to the answer you gave to problem number 27?  
3 hours

32. Using the line of best fit equation (show your work), about how much would you expect a 4 year old to sleep? How does this answer compare to the answer you gave to problem number 28?  
12 hours

33. Using the line of best fit equation (show your work), about how old would you expect a person to be if they slept 6 hours? How does this answer compare to the answer you gave to problem number 29?  
16 years old

34. Using the line of best fit equation (show your work), about how old would you expect a person to be if they slept 13 hours? How does this answer compare to the answer you gave to problem number 30?  
2 years old

35. What is the rate of change (slope) of the line of best fit? What does the slope represent in this context and does that make sense?  
\[-\frac{1}{2} \text{ represents sleeping a half hour less per year}\]

36. What is the initial value (y-intercept) of the line of best fit? What does it represent in this context and does that make sense?  
14 represents hours of sleep at birth
Lesson 9.4

Use the data set to answer the following questions. For this data set a class of middle school students was asked what they thought was most important in school: good grades or popularity.

<table>
<thead>
<tr>
<th>Boy or Girl</th>
<th>Grades or Popularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>G</td>
</tr>
<tr>
<td>B</td>
<td>G</td>
</tr>
<tr>
<td>G</td>
<td>P</td>
</tr>
<tr>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>B</td>
<td>G</td>
</tr>
<tr>
<td>B</td>
<td>G</td>
</tr>
<tr>
<td>B</td>
<td>G</td>
</tr>
<tr>
<td>G</td>
<td>B</td>
</tr>
<tr>
<td>B</td>
<td>G</td>
</tr>
<tr>
<td>B</td>
<td>G</td>
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<tr>
<td>G</td>
<td>G</td>
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<tr>
<td>G</td>
<td>G</td>
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<td>G</td>
<td>G</td>
</tr>
<tr>
<td>B</td>
<td>G</td>
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<tr>
<td>G</td>
<td>P</td>
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<td>G</td>
<td>G</td>
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<tr>
<td>G</td>
<td>P</td>
</tr>
<tr>
<td>P</td>
<td>G</td>
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<tr>
<td>G</td>
<td>P</td>
</tr>
<tr>
<td>P</td>
<td>G</td>
</tr>
<tr>
<td>G</td>
<td>P</td>
</tr>
<tr>
<td>P</td>
<td>G</td>
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<tr>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>P</td>
<td>G</td>
</tr>
<tr>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>G</td>
<td>P</td>
</tr>
</tbody>
</table>

1. Construct a two-way table of the data.

<table>
<thead>
<tr>
<th></th>
<th>Grades</th>
<th>Popularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Girls</td>
<td>15</td>
<td>5</td>
</tr>
</tbody>
</table>

2. What is the frequency of students who believe grades are more important? 22

3. What is the relative frequency of students who believe grades are more important? \( \frac{22}{40} = 55\% \)

4. What is the frequency of students who believe popularity is more important? 18

5. What is the relative frequency of students who believe popularity is more important? \( \frac{18}{40} = 45\% \)

6. What is the frequency of girls who believe grades are more important? 15

7. What is the relative frequency of girls who believe grades are more important? \( \frac{15}{20} = 75\% \)

8. What is the frequency of boys who believe popularity is more important? 13

9. What is the relative frequency of boys who believe popularity is more important? \( \frac{13}{20} = 65\% \)

10. Based on this data, do you feel there is relationship between a student’s gender and what they think is most important in school? What is that relationship and what evidence do you have that it exists?

   Based on the relative frequencies, girls typically believe that grades are more important, while boys believe popularity is more important.
Use the data set to answer the following questions. For this data set a class of middle school students was asked what hand was their dominant hand.

<table>
<thead>
<tr>
<th>Boy or Girl</th>
<th>B</th>
<th>B</th>
<th>G</th>
<th>G</th>
<th>G</th>
<th>B</th>
<th>G</th>
<th>B</th>
<th>G</th>
<th>B</th>
<th>G</th>
<th>B</th>
<th>B</th>
<th>G</th>
<th>G</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right or Left</td>
<td>L</td>
<td>R</td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

11. Construct a two-way table of the data.

<table>
<thead>
<tr>
<th></th>
<th>Right-handed</th>
<th>Left-handed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>Girls</td>
<td>13</td>
<td>7</td>
</tr>
</tbody>
</table>

12. What is the frequency of students who are right-handed? 27

13. What is the relative frequency of students who are right-handed? \( \frac{27}{40} = 67.5\% \)

14. What is the frequency of students who are left-handed? 13

15. What is the relative frequency of students who are left-handed? \( \frac{13}{40} = 32.5\% \)

16. What is the frequency of girls who are right-handed? 13

17. What is the relative frequency of girls who are right-handed? \( \frac{13}{20} = 65\% \)

18. What is the frequency of boys who are right-handed? 14

19. What is the relative frequency of boys who are right-handed? \( \frac{14}{20} = 70\% \)

20. Based on this data, do you feel there is a relationship between a student’s gender and whether or not they are right-handed? What is that relationship and what evidence do you have that it exists? Based on the relative frequencies it appears that boys and girls have the same chances of being left- or right-handed and that being right-handed is much more likely than being left-handed.
Use the two-way tables representing surveys middle school students took to answer the following questions.

Survey 1: | Prefer Spicy Salsa | Prefer Mild Salsa |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>255</td>
</tr>
<tr>
<td>Girls</td>
<td>68</td>
</tr>
</tbody>
</table>

Survey 2: | Prefer Spicy Salsa | Prefer Mild Salsa |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Right-handed</td>
<td>280</td>
<td>170</td>
</tr>
<tr>
<td>Left-handed</td>
<td>43</td>
<td>7</td>
</tr>
</tbody>
</table>

21. How many students were surveyed?

500

22. What is the relative frequency of students who prefer spicy salsa? Is it the same on both two-way tables?

\[
\frac{323}{500} = 64.6\% 
\]

23. How many boys were surveyed?

300

24. How many girls were surveyed?

200

25. What is the relative frequency of boys who prefer spicy salsa?

\[
\frac{255}{300} = 85\% 
\]

26. What is the relative frequency of girls who prefer spicy salsa?

\[
\frac{68}{200} = 34\% 
\]

27. Do you think there is a relationship between gender and salsa preference? What is that relationship and what evidence do you have that it exists?

Based on the relative frequencies, it appears that boys prefer spicy salsa more than girls.

28. How many right-handed students were surveyed?

450

29. How many left-handed students were surveyed?

50

30. What is the relative frequency of right-handed students who prefer mild salsa?

\[
\frac{170}{450} = 37.7\% 
\]

31. What is the relative frequency of left-handed students who prefer mild salsa?

\[
\frac{7}{50} = 14\% 
\]

32. Do you think there is a relationship between a student’s dominant hand and salsa preference? What is that relationship and what evidence do you have that it exists?

Based on the relative frequencies, it appears that right-handed students are between two and three times as likely to prefer mild salsa.
You may use a calculator.

Unit 9 Goals

- Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. (8.SP.1)
- Know that straight lines are widely used to model relationships between to quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. (8.SP.2)
- Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. (8.SP.3)
- Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. (8.SP.4)

You may use a calculator.

Construct a scatter plot for the following data set using appropriate scale for both the x- and y-axis.

1. This table shows the age of students slept and their scores on the MAP test.

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>MAP Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anna</td>
<td>8</td>
<td>180</td>
</tr>
<tr>
<td>Bob</td>
<td>10</td>
<td>200</td>
</tr>
<tr>
<td>Carly</td>
<td>11</td>
<td>215</td>
</tr>
<tr>
<td>Damien</td>
<td>12</td>
<td>220</td>
</tr>
<tr>
<td>Esther</td>
<td>9</td>
<td>195</td>
</tr>
<tr>
<td>Franco</td>
<td>15</td>
<td>235</td>
</tr>
<tr>
<td>Georgia</td>
<td>13</td>
<td>230</td>
</tr>
<tr>
<td>Hank</td>
<td>14</td>
<td>235</td>
</tr>
<tr>
<td>Innya</td>
<td>13</td>
<td>225</td>
</tr>
<tr>
<td>Jacob</td>
<td>14</td>
<td>225</td>
</tr>
</tbody>
</table>
Use the following scatter plot to answer each question. The scatter plot shows the number of years each person invested ten thousand dollars versus the end value of that investment in thousands of dollars.

2. Does this scatter plot represent a positive association, negative association, or no association? Why?
   Negative, going down over time.

3. Which person paid off their debt? About how long did it take?
   Brady, 30 years.

4. Does this appear to a linear or non-linear association? Why?
   Non-linear, curves down.

5. Which person is the outlier in this data set? Why?
   Mike, has more debt after many years.

**Draw an informal line of best for the given scatter plots.**

6. This scatter plot shows the age in years versus the height in inches of a group of children.

7. This scatter plot shows the hours of TV watched per week versus the GPA on a 4.0 scale for a group of students.
Explain why the drawn line of best fit is accurate or why not.

8. This scatter plot shows the amount copper in water in ppm versus plant growth in cm over three months.
   Inaccurate, does not split data in half.

9. This scatter plot shows the hours a cubic foot of ice was exposed to sunlight versus the amount of ice that melted in cubic inches.
   Inaccurate, not the right slope.

The scatter plot shows the price of a gallon of milk from 2001 to 2012. The equation of the line of best fit is approximately \( y = \frac{21}{250} x + 2.68 \).

10. Predict what price of a gallon of milk would have been in 2005 using both the equation and the graph.

    Equation Work: 
    \[
    y = \frac{21}{250} (5) + 2.68 = 3.10
    \]

    Graph Prediction: \$3.10

11. Predict what year it would have been when a gallon of milk cost approximately \$3.00 using both the equation and the graph.

    Equation Work: 
    \[
    3 = \frac{21}{250} x + 2.68 \\
    1.32 = \frac{21}{250} x \\
    x \approx 3.8 \text{ meaning about 2004}
    \]

    Graph Prediction: 2004
Using the same scatter plot and equation of the line of best fit of $y = \frac{21}{250}x + 2.68$, answer the following questions.

12. What does the slope of this equation mean in terms of the given situation? In other words, explain what the rise and run mean for this problem.

The price goes up $21$ every $250$ years.

13. What does the $y$-intercept of this equation mean in terms of the given situation? In other words, explain what the $y$-intercept means when considering the price of a gallon of milk and the year.

In the year 2000, the price of a gallon of milk was $2.68.

Answer the following questions about two-way tables.

14. Construct a two-way table from the following data about whether or not students own an iPhone and whether or not they own an iPad.

<table>
<thead>
<tr>
<th>Own an iPhone?</th>
<th>Y</th>
<th>N</th>
<th>Y</th>
<th>Y</th>
<th>N</th>
<th>Y</th>
<th>N</th>
<th>N</th>
<th>Y</th>
<th>Y</th>
<th>N</th>
<th>N</th>
<th>Y</th>
<th>N</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own a iPad?</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Owns iPhone</th>
<th>Does Not Own iPhone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owns iPad</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Does Not Own iPad</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

15. Do you think there is a relationship between owning a iPhone and owning an iPad? Based on the data, why or why not?

Yes, there is a relationship. Owners of iPhones are more likely to own iPads. 70% of iPhone owners also own an iPad and 70% of those who do not own an iPhone also do not own an iPad.
Answer the following questions using the given two-way table.

<table>
<thead>
<tr>
<th></th>
<th>Support Year-Round School</th>
<th>Do Not Support Year-Round School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>250</td>
<td>2150</td>
</tr>
<tr>
<td>Teachers</td>
<td>80</td>
<td>70</td>
</tr>
</tbody>
</table>

16. How many teachers were surveyed?
150

17. How many students were surveyed?
2400

18. How many people support year-round school?
330

19. How many teachers do not support year-round school?
70

20. How many students do not support year-round school?
2150

21. As a decimal to the nearest hundredth (two decimal places) what is the relative frequency of the teachers compared to all those surveyed?
\[
\frac{150}{2550} \approx 5.88\%
\]

22. As a decimal to the nearest hundredth (two decimal places) what is the relative frequency of the students who support year-round school compared to all students?
\[
\frac{250}{2400} \approx 10.42\%
\]

23. As a decimal to the nearest hundredth (two decimal places) what is the relative frequency of the teachers who do not support year-round school compared to all teachers?
\[
\frac{70}{150} \approx 46.67\%
\]