9.1

READY, SET, GO! Name Period Date

READY

Topic: Measures of central tendency

Sam's test scores for the term were 60, 89, 83, 99, 95, and 60.

1. Suppose that Sam's teacher decided to base the term grade on the mean.
   a. What grade would Sam receive? $\frac{486}{6} \rightarrow 81$
   b. Do you think this is a fair grade? Explain your reasoning.
   NOT REALLY, GRADES SKEWED.
2. Suppose that Sam's teacher decided to base the term grade on his median score.
   a. What grade would Sam receive? [redacted]
   b. Do you think this is a fair grade? Explain your reasoning.
   [redacted]
3. Suppose that Sam's teacher decided to base the term grade on the mode score.
   a. What grade would Sam receive? 60
   b. Do you think this is a fair grade? Explain your reasoning.
   NO, VERY LOW
4. Aiden's test scores for the same term were 30, 70, 90, 90, 91, and 99. Which measure of central tendency would Aiden want his teacher to base his grade on? Justify your thinking.
   [redacted]
5. Most teachers base grades on the mean. Do you think this is a fair way to assign grades? Why or why not? NO OUTLIERS CAN SIGNIFICANTLY INCREASE OR DECREASE AVERAGE.

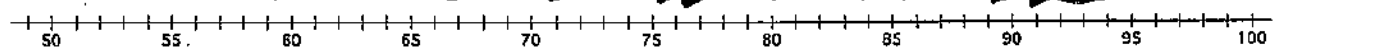
9.1

SET

Topic: Examining data distributions in a box-and-whisker plot.

6. Make a box-and-whisker plot for the following test scores.

60, 64, 68, 68, 72, 76, 76, 80, 80, 80, 84, 84, 84, 84, 88, 88, 88, 92, 92, 96, 96, 96, 96, 96, 96, 96, 100, 100



7 a. How much of the data is represented by the box? 75% of data

b. How much is represented by each whisker? 25% for each whisker

8. What does the graph tell you about student success on the test?

GO

Topic: Creating histograms.

Use the data from the SET section to answer the following questions.

9. Make a frequency table with intervals. Use an interval of 5.

Score	Frequency
60 – 64	2
65 – 69	2
70 – 74	1
75 – 79	2
80 – 84	7
85 – 89	3
90 – 94	2
95 – 99	7
100-104	2

10. Make a histogram of the data using your intervals of 5.

28

11. What information is highlighted in the histogram? Frequency of test scores in a certain interval.

12. What information is highlighted in the box-and-whisker plot?

9.2

READY, SET, GO! Name Period Date

READY

Topic: Drawing conclusions from data.

In problems 1 – 4 you are to select the best answer based on the given data. Below your chosen answer is a confidence scale. Circle the statement that best describes your confidence in the correctness of the answer you chose. *The goal is to gain awareness of how it seems easier to draw conclusions in some cases than in others.*

1. Data: 1, 2, 4, 8, 16, 32, The next number in the list will be: C

a. larger than 32 b. positive (c.) exactly 64 d. less than 32

I am certain I am correct. I am a little unsure. I had no idea so I guessed.

What about the data made you feel the way you did about the answer you marked?

EXPONENTIAL, RATIO x 2

2. Data: 47, -13, -8, 9, -23, 14, The next number in the list will be: [redacted]

[redacted]

What about the data made you feel the way you did about the answer you marked?

3. Data: -10, ¾, 38, -10, ½, -81, -10, ¼, 93, -10, The next number in the list will be: C

a. more than 93 b. negative (c.) a fraction d. a whole number

I am certain I am correct. I am a little unsure. I had no idea so I guessed.

SEE PATTERN

4. Data: 50, -43, 36, -29, 22, -15, [redacted] The next number in the list will be: [redacted]

[redacted] I am a little unsure. I had no idea so I guessed.

What about the data made you feel the way you did about the answer you marked?

[redacted]

9.2

SET

Topic: Creating histograms.

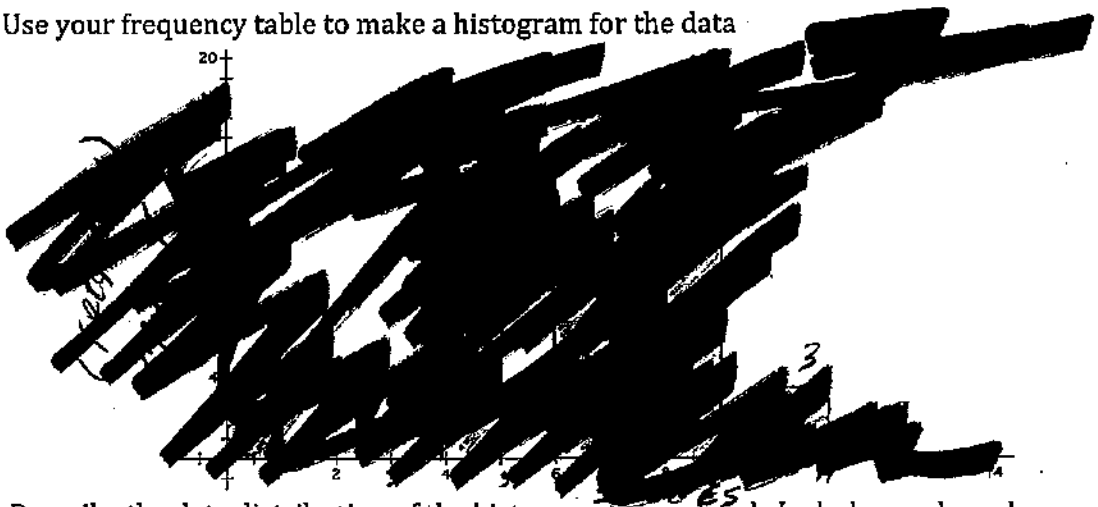
Mr. Austin gave a ten-point quiz to his 9th grade math classes. A total of 50 students took the quiz. Mr. Austin scored the quizzes and listed the scores alphabetically as follows.

1st Period Math	2nd Period Math	3rd Period Math
6, 4, 5, 7, 5,	4, 5, 8, 6, 8,	~~8, 8~~, 10, ~~5, 9~~,
9, 5, 4, 6, 6,	9, 5, 8, 5, 1,	~~7, 8, 9, 8, 5~~,
8, 5, 7, 5, 8,	5, 5, 7, 5, 7	~~8~~, 10, ~~8, 8~~, 5
1, 8, 7, 10, 9		

5. Use ALL of the quiz data to make a frequency table with intervals. Use an interval of 2.

Score	Frequency
0 - 1	2
2 - 3	~~0~~
4 - 5	17
6 - 7	10
8 - 9	18
10-11	3

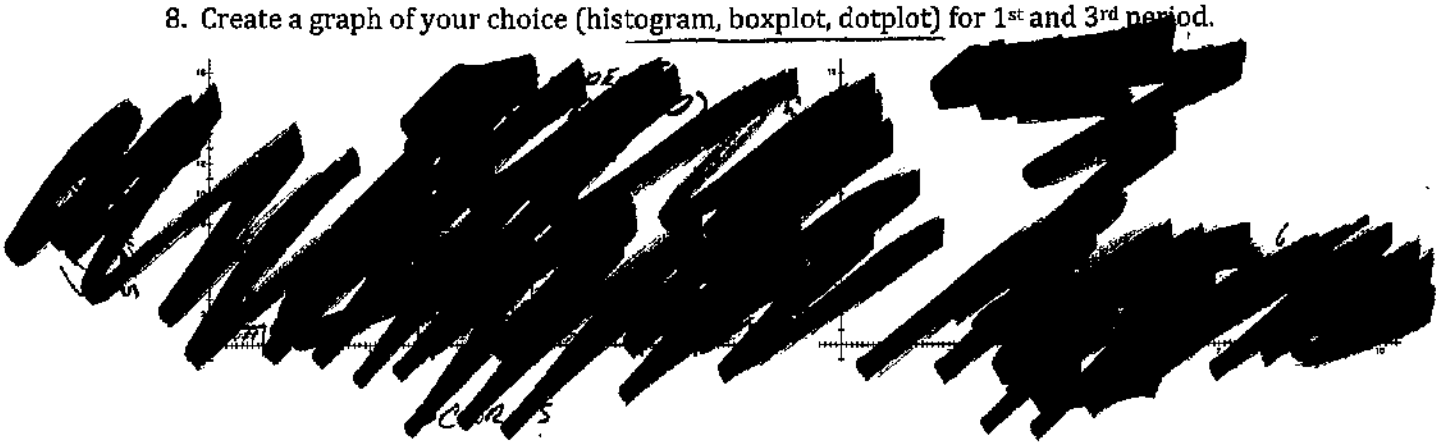
6. Use your frequency table to make a histogram for the data



7. Describe the data distribution of the histogram you created. Include words such as: *mode, skewed, outlier, normal, symmetric, center,* and *spread,* if they apply. (Hint: Don't forget standard deviation.)

MODE: 8-9 (18)
SKEWED: RIGHT
CENTER: 6-7 (MEAN)

8. Create a graph of your choice (histogram, boxplot, dotplot) for 1st and 3rd period.



9. Which class performed better? Justify your answer by comparing the shape, center, and spread of the two classes. (Hint: Don't forget standard deviation.)

Period. 3

GO

Topic: Figuring percentages

10. What percent of 97 is 11?

11. What percent of 88 is 132?

$\frac{132}{88} \rightarrow 150\%$

12. What percent of 84 is 9?

13. What percent of 88.6 is 70?

$70/88.6 \rightarrow 79\%$

14. What is 270% of 60?

15. What is 84% of 25?

$.84 \times 25 \rightarrow 21$

9.3

READY, SET, GO! **Name** **Period** **Date**

READY

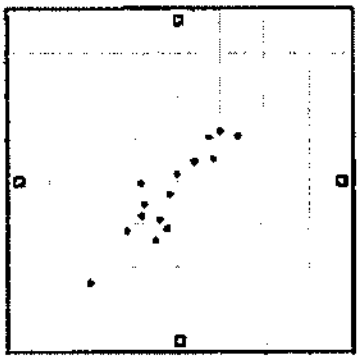
Topic: Interpreting data from a scatterplot

1. The scatter plot compares shoe size and height in adult males. Based on the graph, do you think there is a relationship between a man's shoe size and his height?

   Answer: Yes

   Explain your answer.

   Answer: As the shoe size increases the height also increases. The points trend in a positive direction.

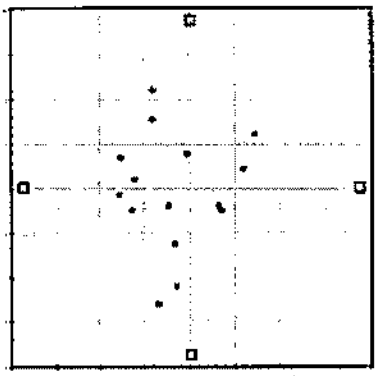


2. The scatter plot compares left-handedness to birth weight. Based on the graph, do you think being left-handed is related to a person's birth weight?

   [redacted]

   Explain your answer.

   [redacted]



mathematics vision project

9.3

SET

Topic: Two-way frequency tables

Here is the data from Mr. Austin's 10-point quiz. Students needed to score 6 or better to pass the quiz.

1st Period Math	2nd Period Math	3rd Period Math
6, 4, 3, 7, 5,	3, 3, 8, 6, 6,	9, 8, 10, 5, 9,
9, 5, 4, 6, 6,	9, 5, 8, 5, 3,	7, 8, 9, 8, 3,
8, 5, 7, 3, 6,	5, 5, 7, 5, 7	8, 10, 8, 7, 5
2, 8, 7, 10, 9		

3. Make a two-way frequency table showing how many students passed the quiz and how many students failed the quiz in each class.

	1st period	2nd period	3rd period	Total
Passed	12	7	12	31
Failed	8	8	3	19
Total	20	15	15	50

Use a colored pencil to lightly shade the cells containing the *joint frequency* numbers in the table. The un-shaded numbers are the *marginal frequencies.* (Use these terms to answer the following questions.)

4. If Mr. Austin wanted to see how many students in all 3 classes combined passed the quiz, where would he look? [redacted]

5. If Mr. Austin wanted to write a ratio of the number of passing students compared to the number of failing students for each class, where would he find the numbers he would need to do this?

   Answer: Mr. Austin would look at the joint frequencies.

6. Make a two-way frequency table that gives the *relative frequencies* of the quiz scores for each class.

	1st Period	2nd Period	3rd Period	Total
Passed	[redacted]	[redacted]	[redacted]	[redacted]
Failed				
Total				

GO
Topic: Organizing data.

7. Sophie surveyed **all** of the 6th grade students at Reagan Elementary School to find out which TV Network was their favorite. She thought that it would be important to know whether the respondent was a boy or a girl so she recorded her information the following way.

Animal Planet	*Cartoon Network*	*Disney*	*Nickelodeon*
GGBBBB BGBBBGBBB GGBB BBBBBB	BBBBBBB BBGGGBBBG BGBGGGBGG	GGGGGGBBBBBB GBGBGG BBBGGBGG GGGBBBGGGGGB	BBBBGGGGGGGGG GGGGGGBB GGGGBGGGGGGGGGBBBB BGGGGGGGG

Sophie planned to use her data to answer the following questions:

I. Are there more girls or boys in the 6th grade?
II. Which network was the boys' favorite?
III. Was there a network that was favored by more than 50% of one gender?

But when she looked at her chart, she realized that the data wasn't telling her what she wanted to know. Her teacher suggested that her data would be easier to analyze if she could organize it into a two-way frequency chart. Help Sophie out by putting the frequencies into the correct cells.

Favorite TV Networks	Girls	Boys	Totals
Animal Planet	6	19	25
Cartoon Network	10	15	25
Disney	22	16	38
Nickelodeon	36	12	48
Totals	74	62	136

Now that Sophie has her data organized, use the two-way frequency chart to answer her 3 questions.

a. Are there more girls or boys in the 6th grade?
Answer: There are more girls.

b. Which network was the boys' favorite?
Answer: Animal planet

c. Was there a network that was favored by more than 50% of one gender?
Answer: No. Nickelodeon was close since 36 out the 74 girls preferred it, but that is only 48%.

9.4

READY, SET, GO! **Name** **Period** **Date**

READY

Topic: Writing explicit function rules for linear relationships

Write the explicit linear function for the given information below.

1. (3, 7) (5, 13)

   Answer: $y = 3(x - 3) + 7$
   or $y = 3x - 2$

2. Mike earns $11.50 an hour

   [redacted]

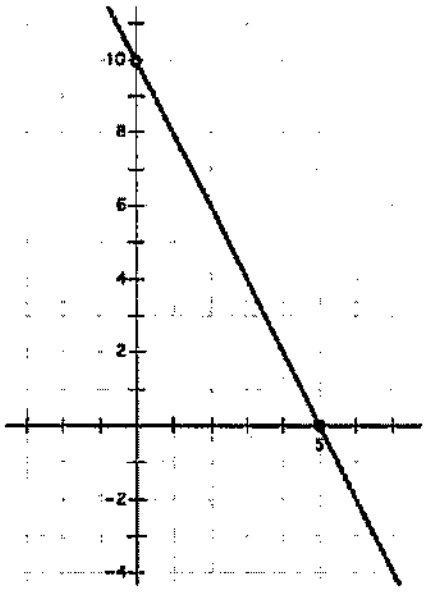
3. (-5, -2) (1, 10)

   Answer: $y = 2(x + 5) - 2$
   or $y = 2x + 8$

4. (-2, 12) (6, 8)

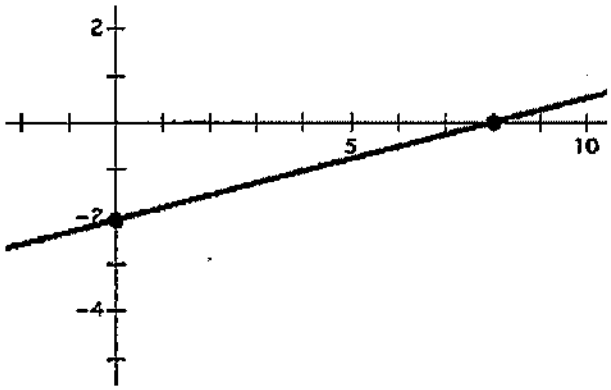
   A [redacted]

5.



Answer: $y = -2x + 10$

6.



[redacted]

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SET

Topic: Relative Frequency tables

For each two-way table below, create the indicated relative frequency table and also provide two observations with regard to the data.

7. This table represents survey results from a sample of students regarding mode of transportation to and from school.

	Walk	Bike	Car Pool	Bus	Total
Boys	37	47	27	122	233
Girls	38	22	53	79	192
Total	75	69	80	201	425

Create the *relative frequency of column table*. Then provide two observation statements.

	Walk	Bike	Car Pool	Bus	Total
Boys	49%	68%	34%	61%	55%
Girls	51%	32%	66%	39%	45%
Total	100%	100%	100%	100%	100%

Possible observations: 34% of the students who car pool are boys.
39% of the students who ride the bus are girls.

8. The two-way table contains survey data regarding family size and pet ownership.

	No Pets	Own one Pet	More than one pet	Total
Families of 4 or less	35	52	85	172
Families of 5 or more	15	18	10	43
Total	50	70	95	215

Create the *relative frequency of row table*. Then provide two observation statements.

	No Pets	Own one Pet	More than one pet	Total
F				100%

9. The two-way table below contains survey data about boys and girls shoes.

	Athletic shoes	Boots	Dress Shoe	Total
Girls	21	35	60	116
Boys	50	16	10	76
Total	71	51	70	192

Create the *relative frequency of whole table*. Then provide two observation statements.

	Athletic shoes	Boots	Dress Shoe	Total
Girls	11%	18%	31%	60%
Boys	26%	8%	5%	40%
Total	37%	27%	36%	100%

GO

Possible observations: Of all the people surveyed, 11% were girls who prefer athletic shoes. Of all the people surveyed, 5% were boys who prefer dress shoes.

Topic: One variable statistical measures and comparisons

For each set of data determine the mean, median, mode, range, and standard deviation. Then create either a box-and-whisker plot or a histogram.

10. 23, 24, 25, 20, 25, 29, 24, 25, 30

11. 20, 24, 10, 35, 25, 29, 24, 25, 33

Answer: Mean—25, Median—25, Mode—25, Range—25, Standard Deviation—6.93

12. How do the data sets in problems 10 and 11 compare to one another?

13. 2, 3, 4, 5, 3, 4, 7, 4, 4

Answer: Mean, median, mode all are 4. Range—5, Stan. Dev.—1.33

14. 1, 1, 3, 5, 5, 10, 5, 1, 14

15. How do the data sets in problems 13 and 14 compare to one another?

Possible answer: They have a similar mean, median, and mode, since #13 is 4 and #14 is 5. However, their graphs look very different because the numbers are distributed very differently. One is almost normal and the other is bimodal and the data points are more spread out with a higher standard deviation.

9.5

READY, SET, GO! **Name** **Period** **Date**

READY

Topic: Estimating the line of best fit

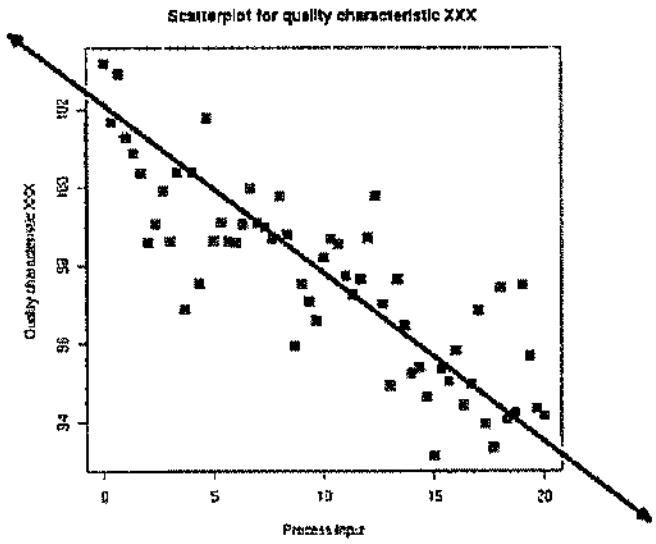
Examine the scatterplot below. Imagine that you drew a straight line through the general pattern of the points, keeping as close as possible to all points with as many points above the line as below.

Answers will vary for #1 and #2. However they should be close to the answers

1. Predict a possible y-intercept and slope for the line you imagined.

   a. y-intercept: **102 (between 101-104)**

   b. slope: $-2/5$ **(must be negative)**



2. Sketch the line that you imagined for question #1 and write an equation for that line.

[redacted]

SET

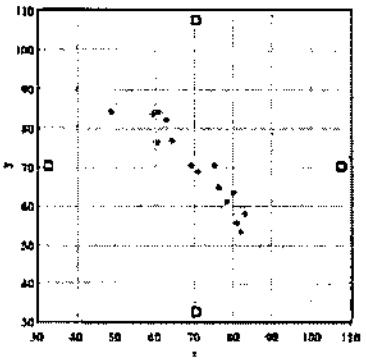
Topic: Estimating the correlation coefficient

Match the following scatterplots with the correct correlation coefficient.

Possible correlation coefficients:

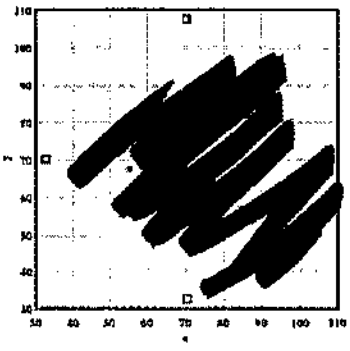
a. 0.05 b. 0.97 c. -0.94 d. -0.49 e. 0.68 f. -0.25

mathematics vision project

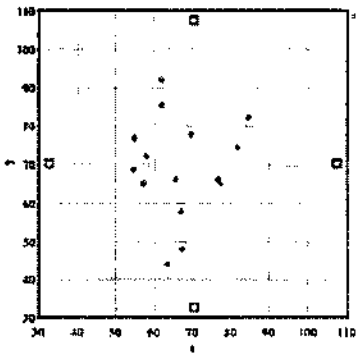
3. 

Answer:

c.

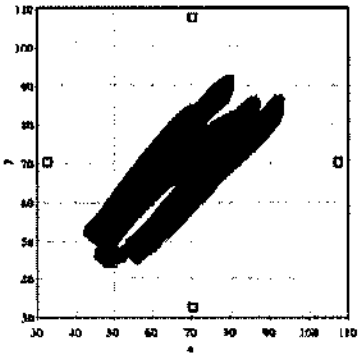
4. 

Answer: [redacted]

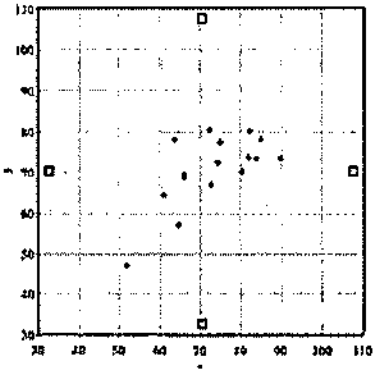
5. 

Answer:

a.

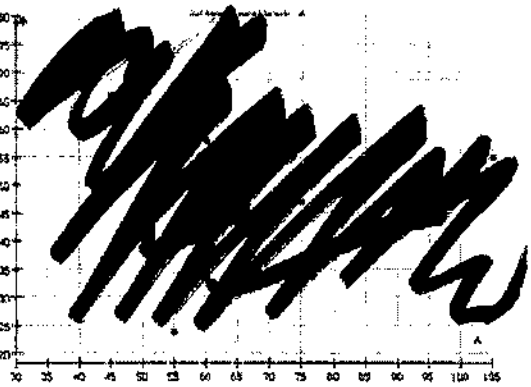
6. 

Answer: [redacted]

7. 

Answer:

e.

8. 

Answer: [redacted]

9.5

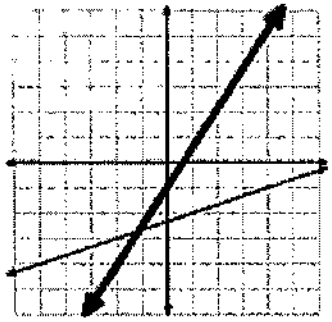
GO

Topic: Visually comparing slopes of lines.

Follow the prompt to sketch the graph of a line on the same grid with the given characteristics.

9. A greater slope

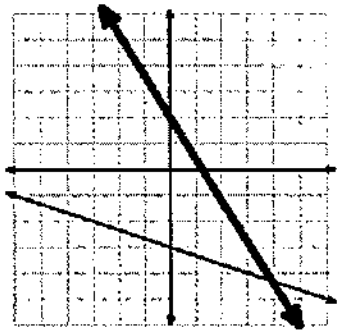
Answers will vary. Line should be positive and steeper than given line. (Example shown.)



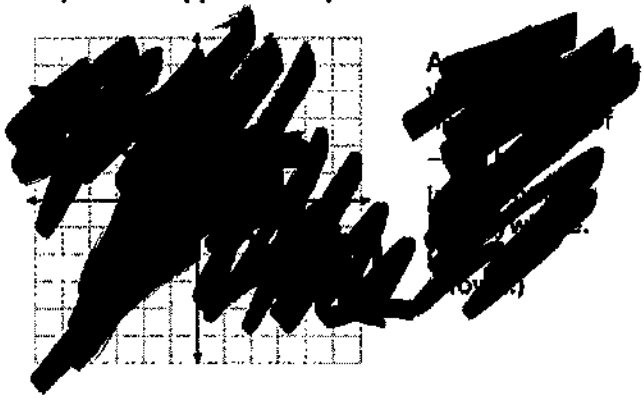
10. A lesser slope

11. A larger y-intercept and a lesser slope

Answers will vary. Line should be negative and steeper than given line and must cross the y axis at a higher point than -3. (Example shown.)



12. Slope is the opposite reciprocal.



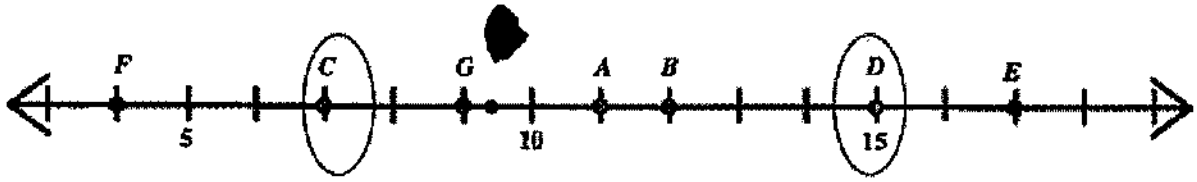
9.6

READY, SET, GO! **Name** **Period** **Date**

READY

Topic: Finding distance and averages

Use the number line below to answer the questions.



1. Find the distance between *point A* and each of the points on the number line.

AF = 7 AC = 4 AG = 2 AB = 1 AD = 4 AE = 6

2. What is the total of all the distances from *point A* that you found in exercise number one?

[redacted]

3. Find the average of the distances that you found in exercise 1.

Answer: 4

4. Which point or points on the number line are located the average distance away from *point A*?

[redacted]

5. Circle the location or locations on the number line that are the average distance away from *A*.

Answer: See graph

6. Find the distance between *point D* and each of the points on the number line.

[redacted]

7. What is the total of all the distances from *point D* that you found in exercise number six?

Answer: 34

8. Find the average of the distances that you found in exercise 6.

[redacted]

9. Is there a point on the number line located the average distance away from *point D*? Which one?

Answer: No

10. Label a location on the number line that is the average distance away from *point D*, label it *Y*.

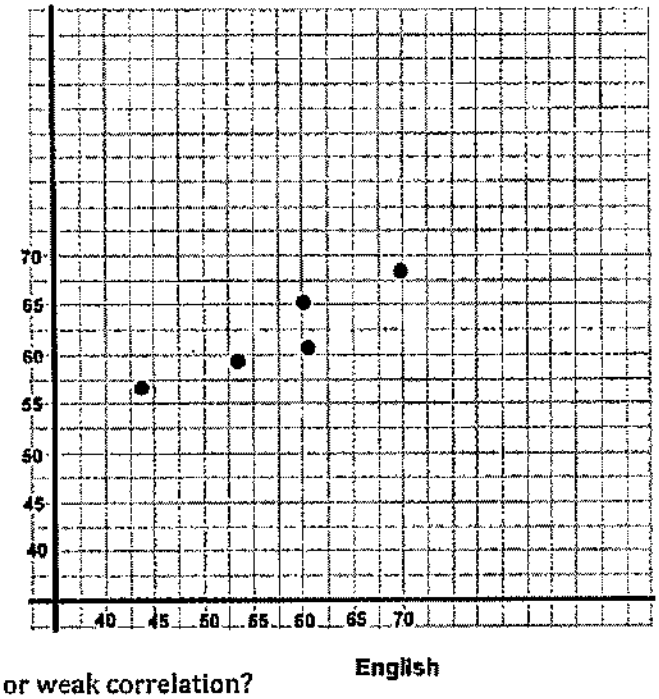
[redacted]

SET

Topic: Scatter plots and lines of best fit or trend lines

11. Create a scatter plot for the data in the table.

English Score	History Score
60	65
53	59
44	57
61	61
70	67



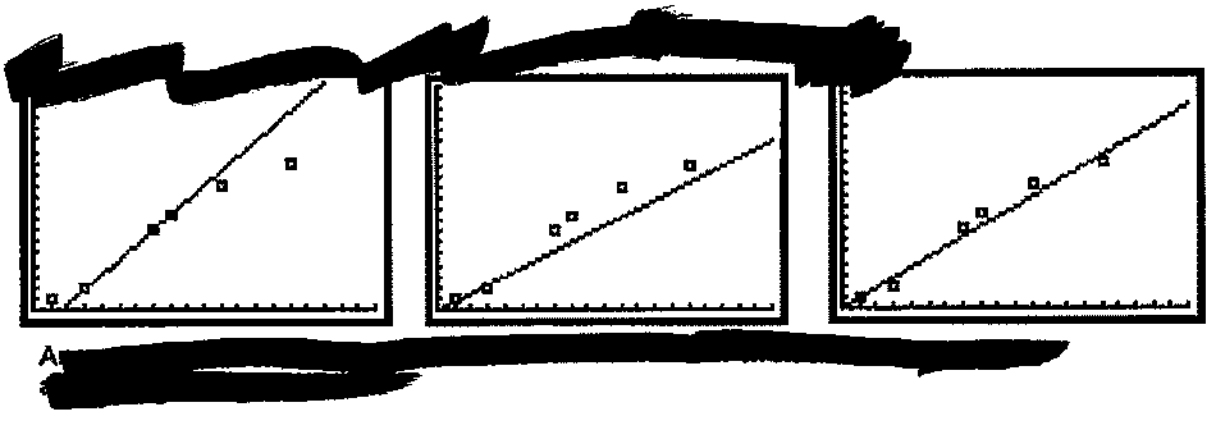
12. Do the English and history scores have a positive or negative correlation?

[redacted]

13. Do the English and history scores have a strong or weak correlation?

Answer: Strong

14. Which graph below shows the best model for the data and will create the best prediction? Explain why your choice is the best model for the data.



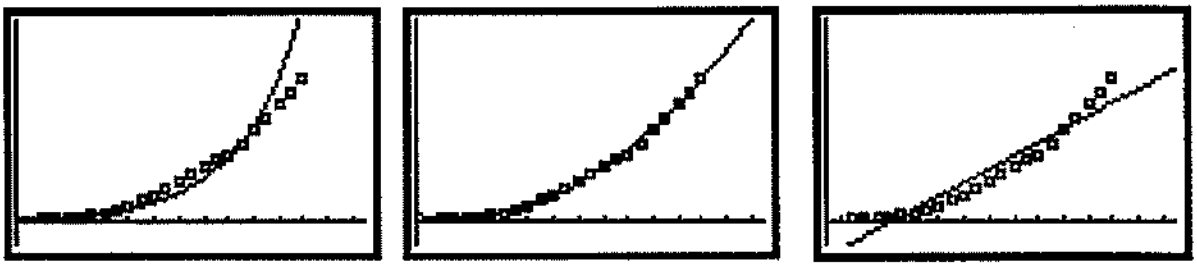
A[redacted]

15. Which graph below shows the best model for the data and will create the best prediction? Explain why your choice is the best model for the data.

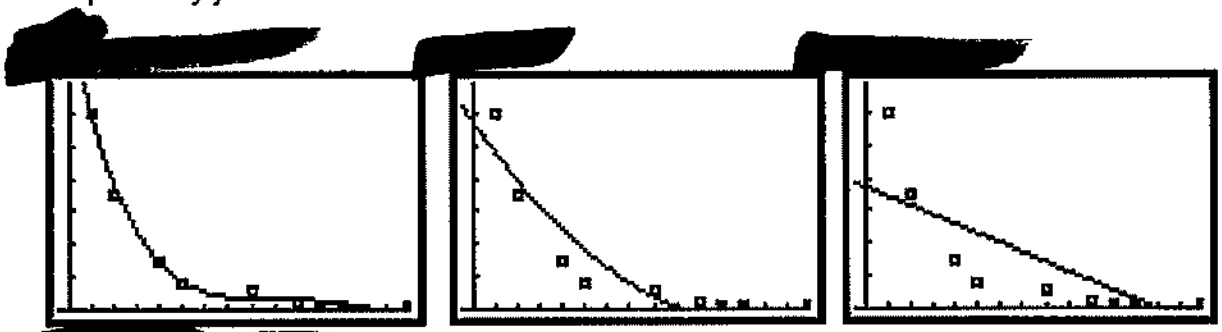
a.

b. **Answer: This model fits more of the points**

c.



16. Which graph below shows the best model for the data and will create the best prediction? Explain why your choice is the best model for the data.



GO

Topic: Creating explicit function rules for arithmetic and geometric sequences.

Use the given information below to create an explicit function rule for each sequence.

17. $f(2) = 7$; common difference = 3
Answer: $f(x) = 3(x-2) + 7$ *or* $f(x) = 3x + 1$

18. $g(1) = 8$; common ratio = 2

19. $h(6) = 3$; common ratio = -3
Answer: $h(x) = 3(-3)^{x-6}$

20. $r(5) = -3$; common difference = 7
A

21. $g(7) = 1$; common difference = -9
Answer: $g(x) = -9(x-7) + 1$

22. $g(1) = 5$; common ratio = $\frac{1}{2}$

SECONDARY MATH I // MODULE 9
MODELING DATA – RSG 9.7

9.7

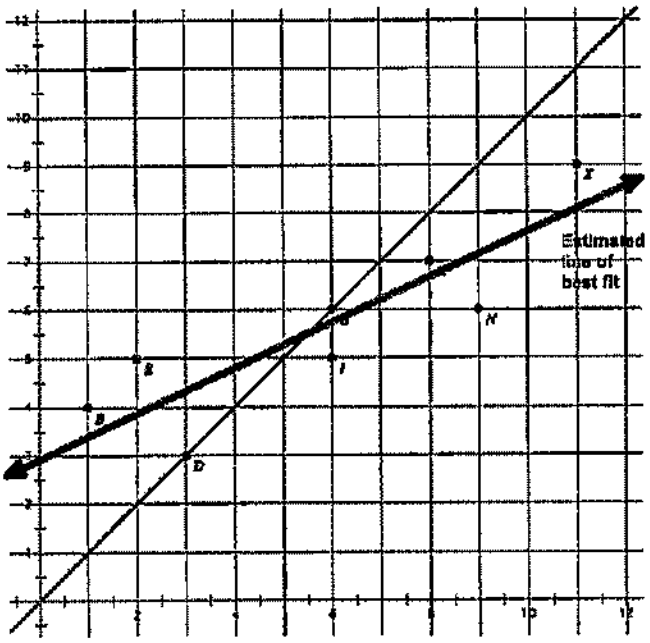
READY, SET, GO! **Name** **Period** **Date**

READY

Topic: Finding distances and averages

The graph below shows several points and the line $y = x$. Use the graph to answer each question.

1. The vertical distance between *point N* and the line $y = x$ on the graph is 3.
   Find all of the vertical distances between the points and the line $y = x$.



   B: **3**
   D: **0**
   E: **3**
   G: **0**
   I: **1**
   L: **1**
   N: **3**
   X: **2**

2. Calculate the *sum of all the distances* you found in exercise one.
   [redacted]

3. What is the *average vertical distance* of the points from the line $y = x$?
   Answer: 1.625

4. Is the line shown on the graph the line of best fit?
   Explain why or why not. [redacted]
   If it is not the best line, draw one that is better fit to the data.
   [redacted]

5. Estimate the correlation coefficient for this set of data points.
   If you have a way to calculate it exactly, check your estimate. (You could use a graphing calculator or data software.)
   Answer: Estimates will vary.
   Actual is $r = 0.85$

mathematics vision project

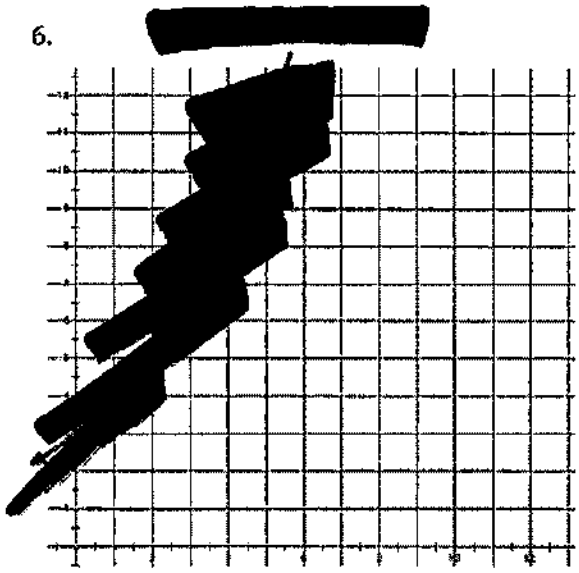
9.7

SET

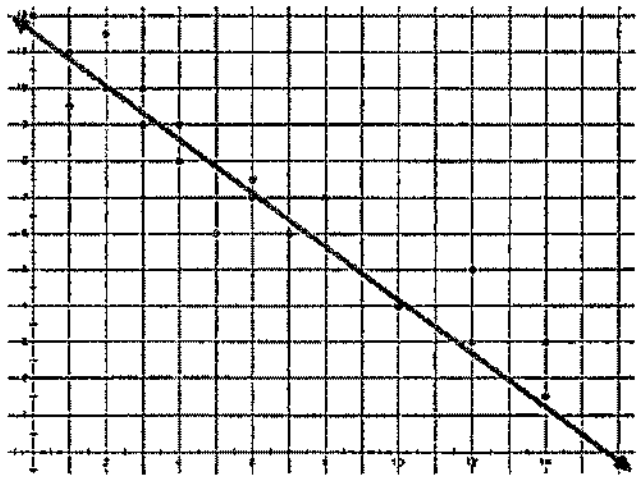
Topic: Creating and analyzing scatter plots

Determine whether a linear or an exponential model would be best for the given scatter plot. Then sketch a model on the graph that could be used to make predictions.

6. [redacted]



7. Answer: Linear



8. a) Use the data in the table below to make a scatter plot.

[redacted]

b) Is the correlation of the graph positive or negative? [redacted] Why?

[redacted]

c) What would you estimate the correlation coefficient to be? [redacted] Why?

[redacted]

d) Create a regression line and write the regression equation.

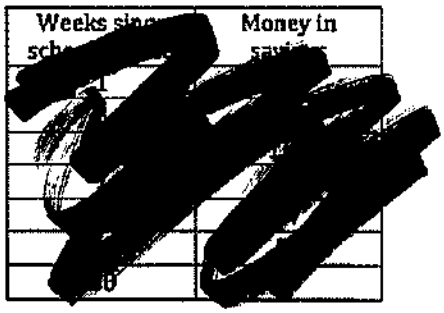
[redacted]

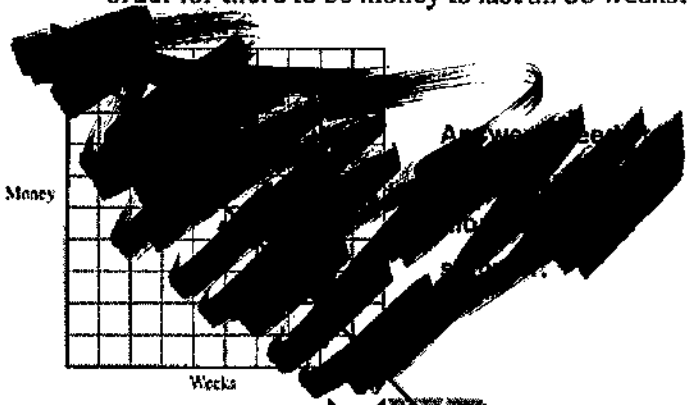
e) What does the slope of the regression equation mean in terms of the variables?

[redacted]

f) Most school years are 36 weeks. If the rate of spending is kept the same, how much more money needs to be saved during the summer in order for there to be money to last all 36 weeks?

[redacted]





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GO

Topic: Determining when to use a two-way table and when use a scatter plot

9. In which situations does it make the most sense to use a two-way table and look at the relative frequencies.

Answer: Relative frequency makes sense when comparing categorical data.

10. In which situations does it make the most sense to use a scatter plot and a linear or exponential model to analyze and make decisions or draw conclusions?

[redacted]

Label each representation below as a *function or not a function.* If it is a function, label it as *linear, exponential, or neither.* If is does not represent a function, explain why.

11.

x	y
0	12
1	12
2	12
3	12
4	12

Answer: Function, linear with 0 slope, or neither

12.

[redacted]

x	y
1	15
2	30
3	15
2	20
1	25

13.

x	y
-6	-2
-5	-3
-4	-4
-3	-5
-2	-6

Answer: Function, linear

14. $y + 12x = 4$

[redacted]

15. $y = 3 \cdot 4^{(x-1)}$

Answer: Function, exponential

16. The amount of medicine in the blood stream of a cat as time passes. The initial dose of medicine is 80mm and the medicine breaks down at 35% each hour.

[redacted]

17.

Time	0	1	2	3	4
Money in bank	$250	$337.50	$455.63	$615.09	$830.38

Answer: Function, exponential

9.8

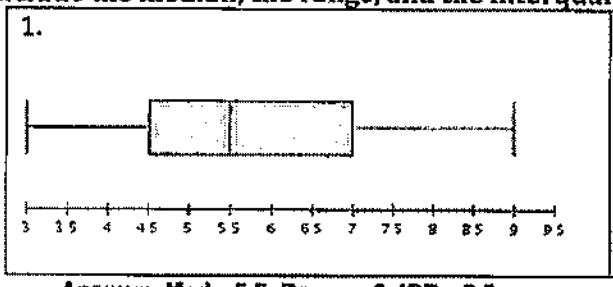
READY, SET, GO! **Name** **Period** **Date**

READY

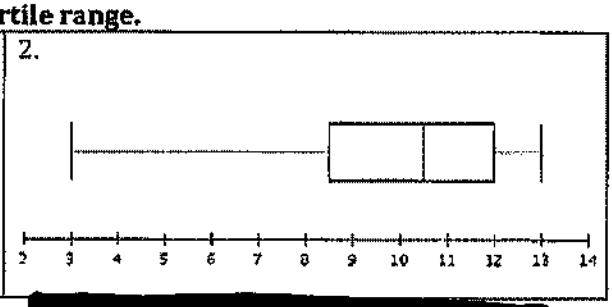
Topic: Describing spread

Describe the spread of the data set shown in each box plot shown below. Include the median, the range, and the interquartile range.

1.



2.



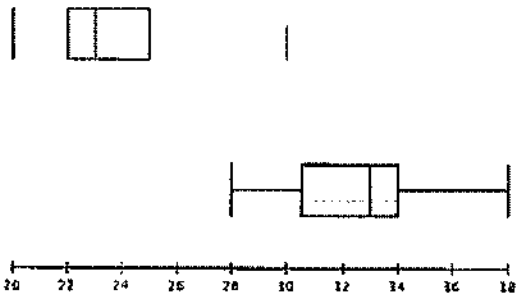
Answer: Med—5.5, Range—6, IQR—2.5

[redacted]

3. If the box plots above represent the results of two different classes on the same assessment, which class did better? Justify your answer.

Answer: Class 2. The interquartile of Class 1 is from 4.5 to 7. Class 2 is much higher at 8.5 to 12.

4. The two box plots below show the low temperatures for two cities in the United States. City D is the box plot on top and City E on the bottom.



a. Which city would be considered the coldest, City D or City E? [redacted] Why? [redacted]

b. Do these cities ever experience the same temperature? How do you know?
[redacted]

c. Is there a way to know the exact temperature for any given day from the box plots?
Answer: [redacted]

d. What advantage, if any, could a histogram of temperature data have over a box plot?
Answer: [redacted]

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9.8

SET

Topic: Residuals, residual plots and correlation coefficients

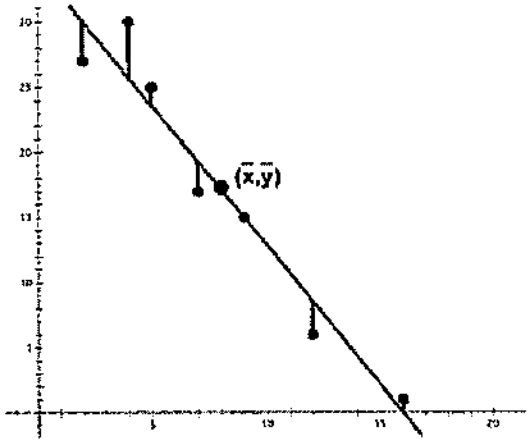
The data sheets in exercise 5 and exercise 6 are scatter plots that have the regression line and the residuals indicated. For each exercise,

a) Mark on the graph where $(\bar{x}, \bar{y})$ would be located.

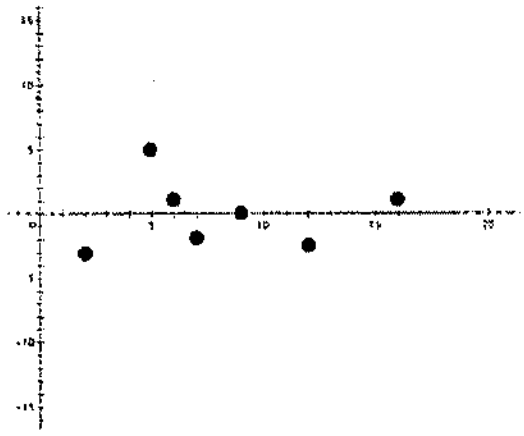
b) Use the given data sheet to create a residual plot.

c) Predict the correlation coefficient.

5. Data sheet 1 a) mark $(\bar{x}, \bar{y})$

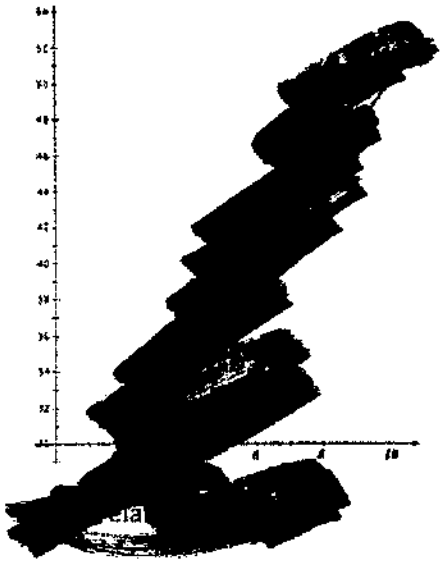


b) residual plot 1



C) Correlation coefficient? **Answers will vary. Estimates could between -.8 and -.9.**

6. Data sheet 2 a) mark $(\bar{x}, \bar{y})$



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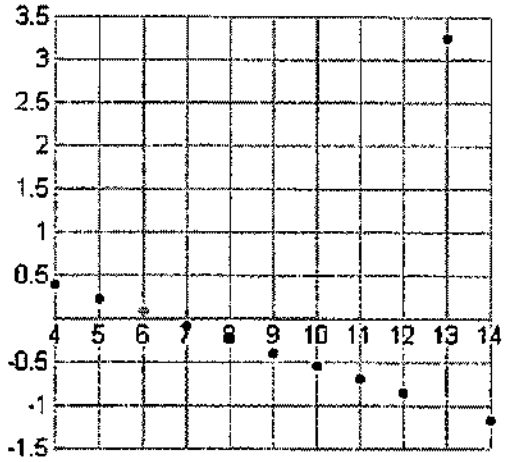
The following graphs are residual plots. Analyze the residual plots to determine how well the prediction line (line of best fit) describes the data.

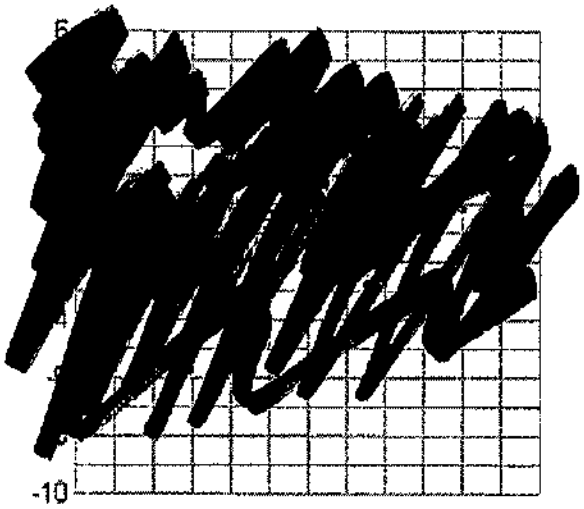
7. Plot 1



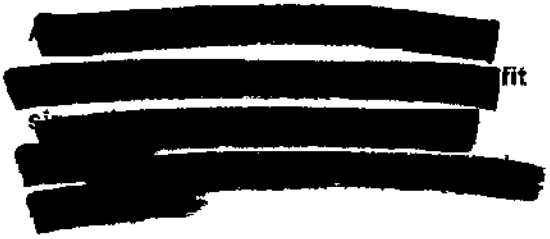
analysis

Answers may vary. Possible answer: Since the residuals make a line (with one outlier) the line of best fit is not the best representation of the data. The points should not be in a pattern (line). A different model would be better.

8. Plot 2



analysis

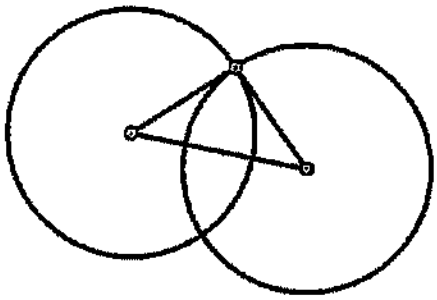


9.8

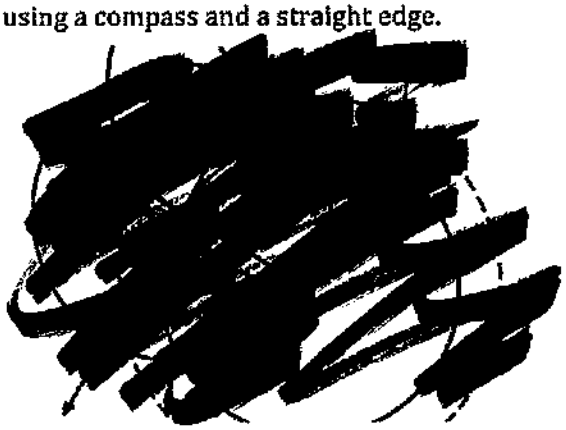
GO

Topic: Geometric constructions

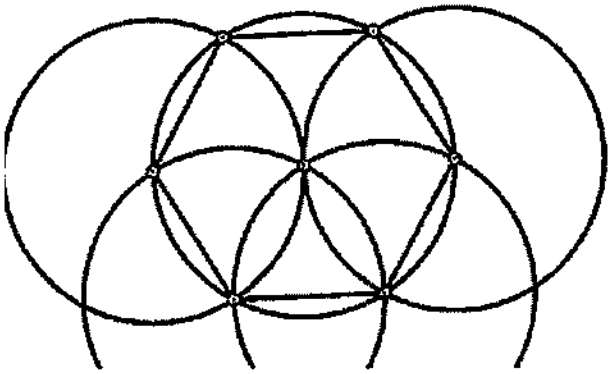
9. Construct an isosceles triangle with a compass and a straight edge.



10. Construct a square using a compass and a straight edge.



11. Use a compass and a straight edge to construct a hexagon inscribed in a circle.



9.9

READY, SET, GO! **Name** **Period** **Date**

READY

Topic: identifying types of functions and writing the explicit equations

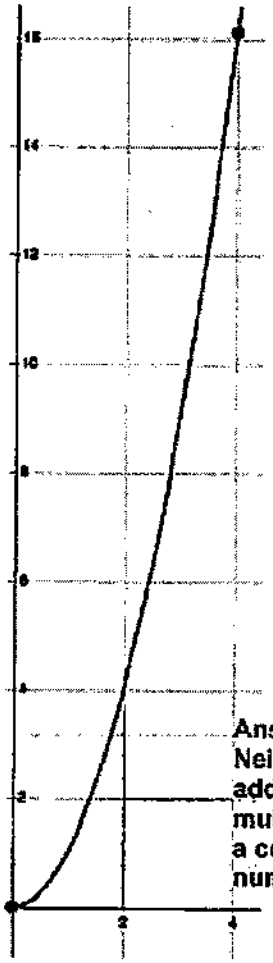
For each representation of a function, decide if the function is *linear*, *exponential*, or *neither*. Justify your answer.

1. **Answer: Exponential, multiplied by $\frac{1}{7}$**

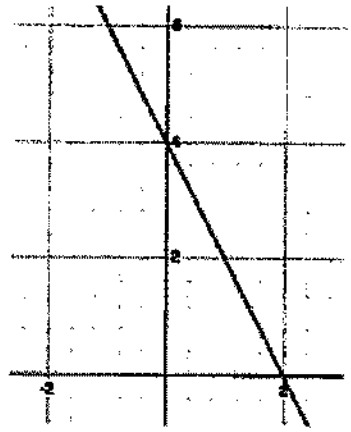
x	$f(x)$
1	117649
2	16807
3	2401
4	343
5	49

2. The fee for a taxi ride is $7 for getting into the taxi plus $2 per mile.

[redacted]

3. 

Answer: Neither, not added or multiplied by a common number.

4. 

[redacted]

6.

x	$f(x)$
1	1
4	2
9	3
16	4
25	5

[redacted]

7. $f(1) = 7; f(x) = 5 \cdot f(x-1)$

Answer: Exponential, multiplied by 5

8. $h(x) = 3(x-1) + 2$

[redacted]

9. $g(x) = 3x^2 - x - 3x^2 + 1$

Answer: Neither, not added or multiplied by a common number.

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9.9

SET

Topic: Reviewing key topics in statistics

Decide whether each statement is *sometimes true, always true, or never true.* If the statement is *sometimes true* give one example of when it is true and an example of when it is not.

10. The linear regression line passes through the average of the x values and the average of the y values.

[redacted]

11. A positive correlation coefficient means that the points in the scatterplot are very close together.

Answer: Sometimes true. If the correlation coefficient is between .9 and 1 then the points will be very close to making a line. A coefficient of .5 would mean that they aren't as close.

12. A negative residual means your predicted value is too low.

[redacted]

13. A correlation coefficient close to 1 means that a linear model is most appropriate for the data.

Answer: Always true

GO

Topic: Solving literal equations

Solve each equation for x.

14. $ax = d$ [redacted]

15. $b + cx = d$ **Answer:** $x = \frac{d-b}{c}$

16. $ab + cx = d$ [redacted]

Solve each equation for y.

17. $4x + y = 3$
Answer: $x = 3 - 4x$

18. $2y = 6x + 9$ [redacted]

19. $5x - 2y = 10$
Answer: $x = \frac{5}{2}x - 5$

Solve each equation for the indicated variable.

20. $A = \pi r^2$; Solve for r. [redacted]

21. $V = \frac{lwh}{2}$; Solve for h.
Answer: $r = \frac{2V}{lw}$

22. $P = \frac{(12V)^2}{50}$; Solve for V. [redacted]