Name_____ Period _____

Scatter Plots

Algebra 10.S

Scatter Plots display data in two variables.
Data points are plotted on a graph to represent data and determine **correlation.**
Scatter Plots may show **positive, negative,** or **no correlation.**

Positive correlation means when one variable increases, so does the other.
Negative correlation means that when one variable increases, the other decreases.
No correlation means that the data appear unrelated.

Practice: Label the correlation that you suspect would be demonstrated by each: (pos., neg., or no)

1. Height versus weight of 100 male African elephants. _____

2. Distance driven versus gas used. _____

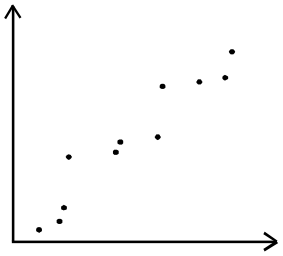
3. Amount of time spent studying versus G.P.A. _____

4. Hair length versus height of 150 adult women. _____

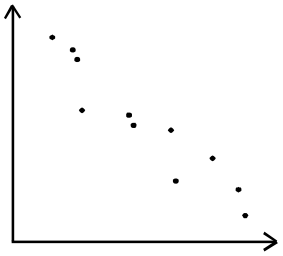
5. Distance walked in a pair of shoes versus the thickness of the sole. _____

On a graph, it is easy to recognize the correlation:

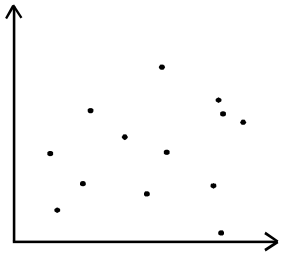
Positive



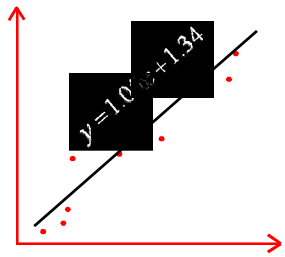
Negative

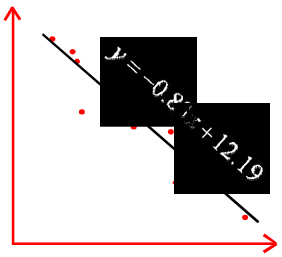


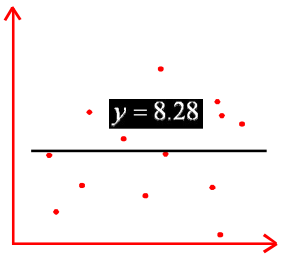
No Correlation



The trend line for a scatter plot is called the **Best Fit Line** or Line of Best Fit and can be described as a linear equation in slope-intercept form.







Name_____ Period _____

Scatter Plots

Algebra 10.S

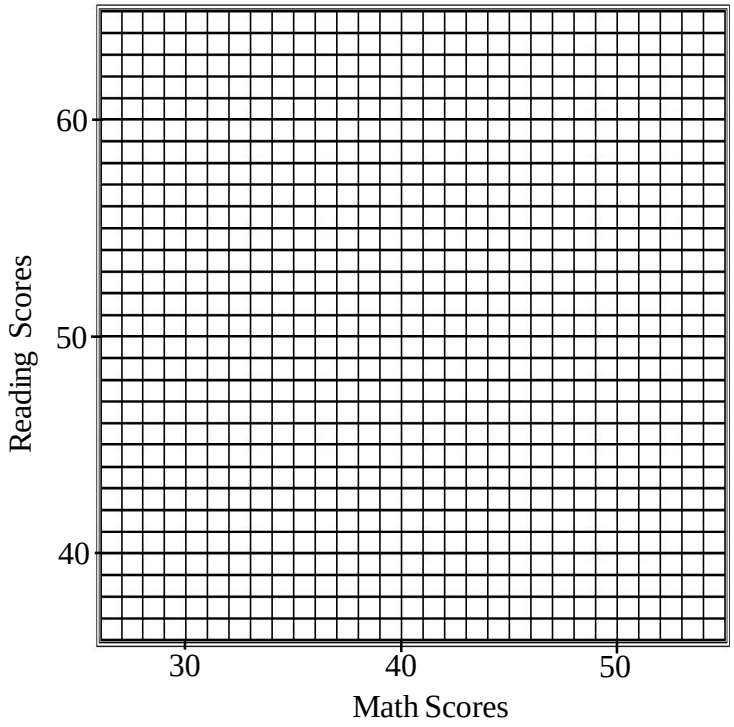
Creating a scatter plot is easy once the graph is drawn.

Practice: The Data Below shows the average test scores in California on the standardized Reading and Math tests for 8 years from 1992-1999. Create a Scatter Plot to display the data.

Math vs. Reading Scores

Year	Math Score	Reading Score
1992	32	38
1993	40	39
1994	50	55
1995	48	48
1996	39	46
1997	45	50
1998	42	45
1999	40	47

Relationship shown: _____



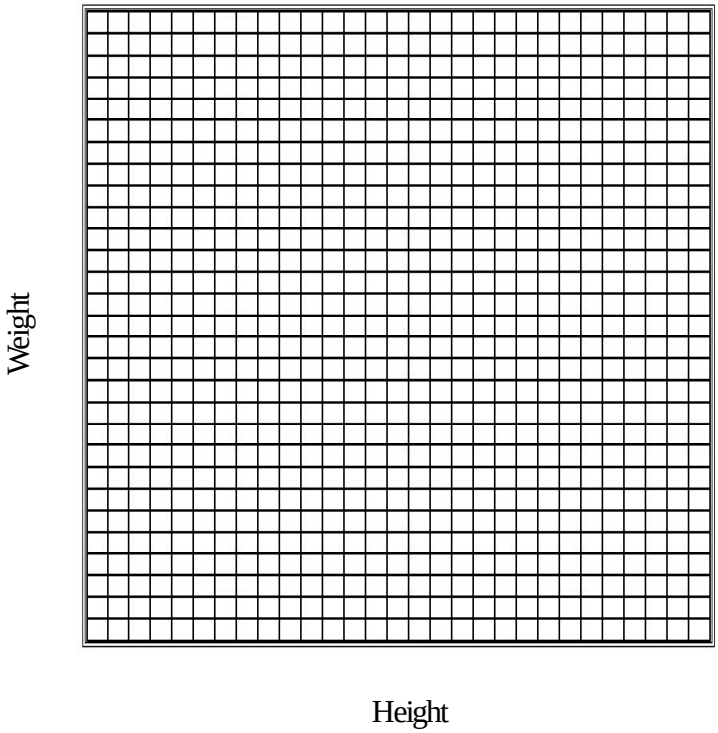
Creating a scatter plot is more difficult when you must create your own graph.

Practice: The Data Below shows the height and weight of 12 female students in Mrs. Phillips' first grade class. Label the graph so that the data fits and plot the points below.

Height versus Weight

Name	Height	Weight
Lisa	44	47
Simone	50	57
Meredith	38.5	32
Penny	39	42
Sheila	41	36
Tara	45.5	49
Meg	48	62
Mara	51	47
Steph	53	65
Callie	50.5	49
Cynthia	46.5	52
Joy	45	43

Relationship shown: _____



Name_____ Period _____

Scatter Plots on the TI-83 Calc.

Algebra 10.S

Using the data from Mrs. Phillips' first grade class, we will use the graphing calculator to display the data and determine the line of best fit.

Clear the memory of your calulator before starting.

1. Enter the data. Choose STAT and select 1: Edit...

Enter the height data under L1 and the weight data under L2.

Name	Height (L1)	Weight(L2)	Name	Height (L1)	Weight(L2)
Lisa	44	47	Meg	48	62
Simone	50	57	Mara	51	47
Meredith	38.5	32	Steph	53	65
Penny	39	42	Callie	50.5	49
Sheila	41	36	Cynthia	46.5	52
Tara	45.5	49	Joy	45	43

Tips:

Make sure all of the data lines up properly.

If you need to delete an entry use DEL. To insert a missing entry use INS (2nd DEL).

2. Plot the data.

Choose STAT PLOT (2nd Y=)
Select 1: Plot 1...
Turn the graph On. (highlight On and hit Enter)
Note the other settings, we will not change these.
ZOOM 9: ZoomStat

3. Calculate the Line of Best Fit

Push the STAT button. This time toggle right to CALC in the menu.
Select 4: LinReg (ax+b) This will calculate an equation in the form y=mx+b. Hit ENTER.
(If you did everything correctly so far, you should have gotten a=1.652 and b=-27.573).

4. Plot the Line of Best Fit

Go to Y_1= and then hit VARS.
Choose 5: Statistics...
Toggle right to EQ and select 1: RegEQ and GRAPH.
You may also enter the equation manually, but it will not be as accurate in most cases.

5. Trace the Line of Best Fit

Hit TRACE. Use the left and right arrows to bounce from point to point.
Use the down arrow to toggle onto the line (not the points).

Answer: Round to the tenth.

How much would you expect a first grade girl to weigh for each height given below?

40in _____lbs 42in _____lbs 45in _____lbs

48in _____lbs 50in _____lbs 53in _____lbs

hint: Discover the TABLE function on your own.

Name_____ Period _____

Scatter Plots on the TI-83 Calc.

Algebra 10.S

Use each table of data to create a graph and a line of best fit on your calculator to answer the questions that follow.

Latitude and Average Daily Temperature in July for 10 world cities

Name	Latitude (°N)	July Temp. (°C)
Oslo	59	7
Berlin	52	18.5
London	51	17
Vancouver	49	17
Tunis	37	26
Tomsk	56	18
Kiev	50	20
Coppermine	67	10
Rome	41	24
Salah	27	37

1. What is the linear equation that represents the July temperature of a city based on its north latitude? (Round decimals to the thousandth 0.001)

_____

2. What would be the expected July temperature at each of the given latitudes below?

25°N _____°C 54°N _____°C 70°N _____°C

Latitude and Average Daily Rainfall in July for 10 world cities

Name	Latitude (°N)	July Rainfall (mm)
Oslo	59	73.6
Berlin	52	57.4
London	51	59.5
Vancouver	49	31.3
Tunis	37	3.3
Tomsk	56	73.6
Kiev	50	77.1
Coppermine	67	31.9
Rome	41	16.3
Salah	27	0.1

1. Write the equation (to the thous.): _____

2. What would be the expected July rainfall at each of the given latitudes below?

35°N _____mm 45°N _____mm 60°N _____mm

3. Does this graph appear to show more or less correlation than the one above? _____

Name_____ Period _____

Scatter Plots on the TI-83 Calc.

Algebra 10.S

Use each table of data to create a graph and a line of best fit on your calculator to answer the questions that follow.

Global Temperature by Year 1900-2000

Year	Temp. (°F)
1900	57.20
1910	56.82
1920	56.97
1930	57.13
1940	57.47
1950	56.93
1960	57.16
1970	57.27
1980	57.67
1990	58.08
2000	57.92

1. Write the Linear equation (to the thous.): _____

2. According to this (very limited) data, predict the mean global temperature for the following years.
(Use TBLSET and TABLE, or change your WINDOW values and use TRACE)

2010 _____ 2025 _____ 2050 _____ 2100 _____

North American Population 1986-1995

Year	Population (millions)
1986	346
1987	350
1988	354
1989	358
1990	363
1991	369
1992	374
1993	379
1994	383
1995	388

3. Write the Linear equation (to the thous.): _____

4. Calculate and graph the **Exponential** Equation (Stat - Calc - ExpReg) AND the Linear Equation. What does each predict for the North American population for the year 1900?

Exponential _____million **Linear** _____million

5. What is wrong with the linear prediction? _____

Name_____ Period _____

Scatter Plots on the TI-83 Calc.

Algebra 10.S

Use each table of data to create a graph and a line of best fit on your calculator to answer the questions that follow.

Made-Up Meaningless Statistical Data Table 1

Age (years)	Length (cm)
15	143.6
20	140.7
25	132.9
30	133.7
35	129.1
40	108.9
45	109.1

6. What is the slope of the line of best fit to the hundredth? _____

7. What is the length at age 0 according to this equation? _____cm

8. Predict the length at age 100: _____cm

Made-Up Meaningless Statistical Data Table 2

X:	10	11	16	7	4	-5	1	-3
Y:	-2	-1.5	1	-3.5	-5	-9.5	-6.5	-8.5

9. What equation does this table represent (in slope-intercept form)? _____

10. What is the value of y when x=100? _____

Made-Up Meaningless Statistical Data Table 3

X:	6.1	8.7	9.9	10.1	11.0	12.9	15.1	17.3
Y:	19.3	6.1	3.2	3.5	2.8	1.5	0.3	0.1

11. Write the **linear** equation for the line of best fit (to the hundredth). _____

12. Write the **exponential** equation for the line of best fit (to the hundredth). _____

13. Which of the two equations above better fits the data given? _____

Made-Up Meaningless Statistical Data Table 4

14. Fill-in the missing data point in the table below.

X:	7.2	8.9	9.1	18.7	21.9	32.2	35.8	41.1
Y:	23.1	29.1	29.9	63.1	74.5	_____	123.2	142.1

Name_____ Period _____

Types of Data

Algebra 10.S

We have generally dealt with three types of data:
Linear data points form a straight line with a slope and intercepts.
Quadratic data forms a parabola with a vertex and (sometimes) root(s).
Exponential data forms a 'ramp' with increasing slope.

You should be able to identify data types without a calculator in many cases.

Identify each table of data as linear, quadratic, or exponential:

1. _____

X:	-2	4	10	16	22	28	34	40
Y:	-9	-10	-11	-12	-13	-14	-15	-16

2. _____

X:	0	1	2	3	4	5	6	7
Y:	1	2	4	8	16	32	64	128

3. _____

X:	-4	-3	-2	-1	0	1	2	3
Y:	6	1	-2	-3	-2	1	6	13

4. _____

X:	5	7	9	11	13	15	17	19
Y:	1.64	1.05	.67	.43	.27	.18	.11	.07

Coefficient of Correlation
The **coefficient of correlation** is a number between -1 and 1 which describes how well the equation 'fits' the data. It only works for linear and exponential data and can be found using the VARS - Statistics - EQ - r menu.
A value close to 1 or -1 means there is a strong correlation.
A value close to 0 means very weak correlation.

5. Calculate the linear equation for #4 (to the thousandth): _____

6. Calculate the coefficient of correlation (to the thousandth): _____

7. Calculate the exponential equation for #4 (to the thousandth): _____

8. Calculate the coefficient of correlation (to the thousandth): _____

Practice:

X:	-5	-2	6	9	-8	11	7	4
Y:	1.9	2.5	5.3	7.2	1.2	8.1	6.0	4.4

5. Calculate the linear equation (to the hundredth): _____

6. Calculate the coefficient of correlation (to the hundredth): _____

7. Calculate the exponential equation (to the hundredth): _____

8. Calculate the coefficient of correlation (to the hundredth): _____

Name_____ Period _____

Types of Data

Algebra 10.S

Practice:

X:	0	1	2	3	4	5	6	7
Y:	29	22	13	8	5	4	5	8

9. Calculate the linear equation (to the hundredth): _____

10. Calculate the coefficient of correlation (to the hundredth): _____

11. Calculate the exponential equation (to the hundredth): _____

12. Calculate the coefficient of correlation (to the hundredth): _____

13. Calculate the coefficient of correlation (to the hundredth): _____

13. Calculate the quadratic equation (to the hundredth): _____

14. Which of the three equations (Linear, Exponential, or Quadratic) fits the data? _____

15. If x=10, what will y=? _____

Practice:

X:	-3	-8	19	4	-1	30	14	9
Y:	7	23	102	21	12	145	54	32

16. Calculate the linear equation (to the hundredth): _____

16b. Graph the linear equation for Y_1

17. Calculate the coefficient of correlation (to the hundredth): _____

18. If the data is linear and x=10, y= (to the hundredth): _____

19. Calculate the exponential equation (to the hundredth): _____

19b. Graph the exponential equation for Y_2

20. Calculate the coefficient of correlation (to the hundredth): _____

21. If the data is exponential and x=10, y= (to the hundredth): _____

22. Calculate the quadratic equation (to the hundredth): _____

22b. Graph the quadratic equation for Y_3

23. If the data is quadratic and x=10, y= (to the hundredth): _____

24. Based on the graphs, which data point makes the data appear quadratic? (_____ , _____)