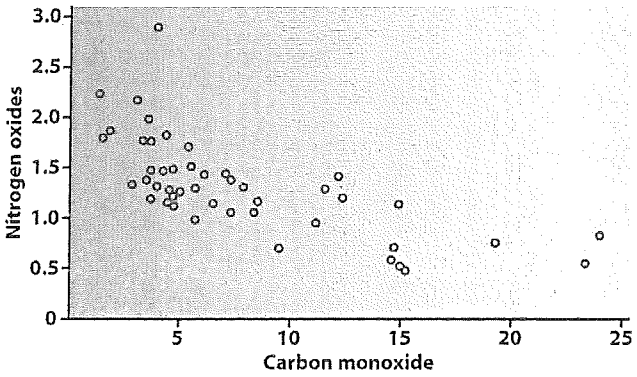
Unit 6 worksheet #1

Name Key

Hour_____

1. The plot shows the amount of two pollutants in the exhaust of 46 vehicles.



(a) What was the highest nitrogen level?

2.9

(b) What was the lowest nitrogen level?

0.5

(c) What was the highest carbon monoxide level?

24.9

(d) What was the lowest carbon monoxide level?

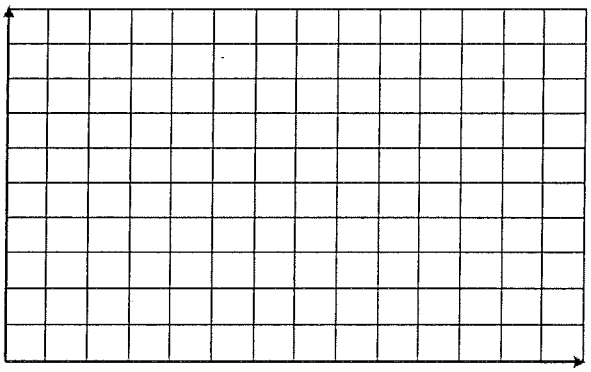
2

(e) Describe the relationship.

D: Negative
O: (5, 3.0)
F: curved
S: Moderate

2. Gathered by archeologists, this data shows the length (cm.) of fossils of Archaeopteryx.

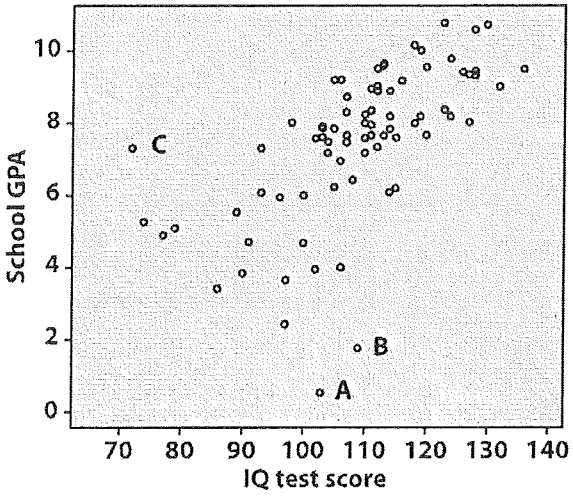
Femur	Humerus
38	41
56	63
59	70
64	72
74	84



(a) Plot the data.
(Use Femur as the explanatory variable)

(b) Describe the relationship.

3. The scatterplot is created with data from 78 seventh-grade students in a rural mid-western school.



(a) What is used as the explanatory variable?

IQ test score

(b) Would it have been incorrect to graph IQ on the y-axis and GPAs on the x-axis?

yes GPA wouldnt explain IQ's.

(c) Describe the relationship.

D: Positive
O: A, B, C
F: Linear
S: Moderate

(d) What are the IQ and GPA of student A?

IQ: 103 GPA: 0.1

(e) What are the IQ and GPA of student B?

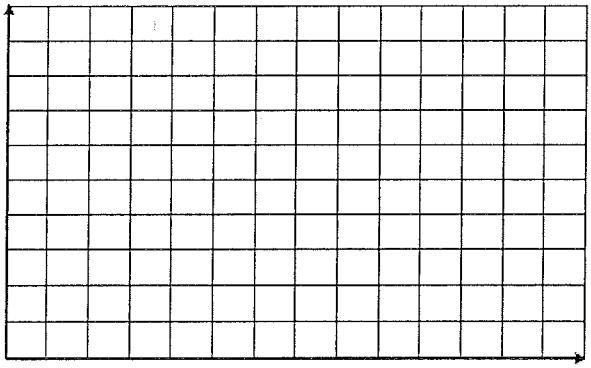
IQ: 109 GPA: 2.0

(f) What are the IQ and GPA of student C?

IQ: 71 GPA: 7.5

4. High school students gave the age and odometer reading of their vehicle for this table.

Age	Mileage	Age	Mileage
3	40,300	6	85,000
2	11,912	4	20,000
4	30,000	2	17,000
8	98,000	2	10,000
11	185,000	10	110,000
4	40,000	5	103,000
1	1,050	7	75,000
2	3,000	8	120,000



(a) Plot the data.

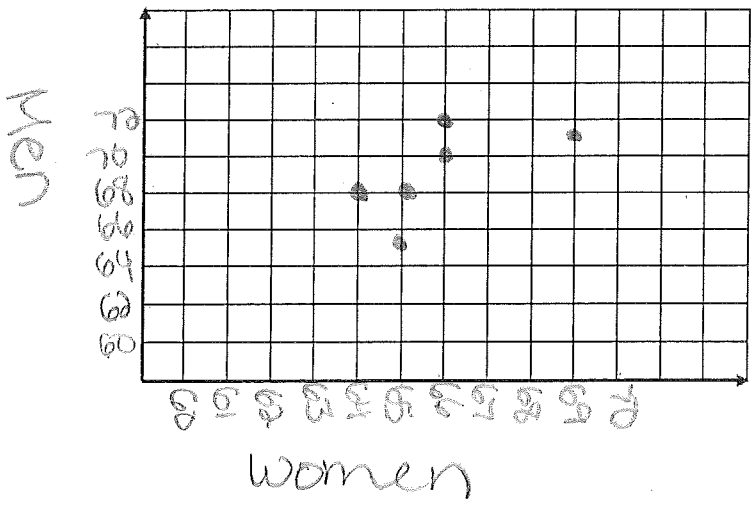
(b) Describe the relationship.

Unit 6 worksheet #2 Name Key

Hour_____

1. Here are the data collected on the heights of married couples.

Women (x)	Men (y)
66	72
64	68
66	70
65	68
70	71
65	65



(a) Make a scatterplot.

(b) Describe the relationship.

D: positive
O: None
F: Linear
S: Moderate

(c) Do you expect the correlation (r) to be positive or negative? Why?

positive because the direction is positive.

(d) If the men were all 6 in. shorter than the heights in the table, would r change? Why?

No, the data will still be "spread out" the same amount the graph would just move down.

(e) If the heights were measured in cm, rather than inches, would r change? Why?

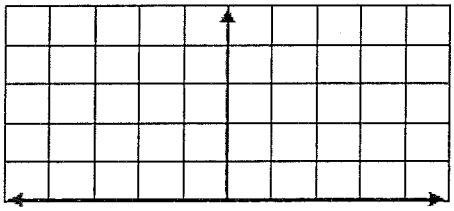
No, units dont effect r.

(f) If the height of each man was exactly 3 inches taller than each woman, what would the correlation (r) be?

r=1

2. Make a scatterplot of the data.

x	y
-5	0
-3	4
0	5
3	4
5	0



(a) Describe the relationship.

(b) Estimate the correlation (r).

3. Each of the following statements contains an error. Explain what is wrong.

(a) "We found a high correlation, r = 1.09, between SAT math and SAT verbal scores."

r cannot be above 1.

(b) "The correlation between amount of fertilizer and length of grass was r = 0.23 inches"

r does not have units.

(c) "The correlation between gender and students' scores on a math exam is r = 0.6"

gender is qualitative not quantitative

4. Match each graph to the r that best describes it.

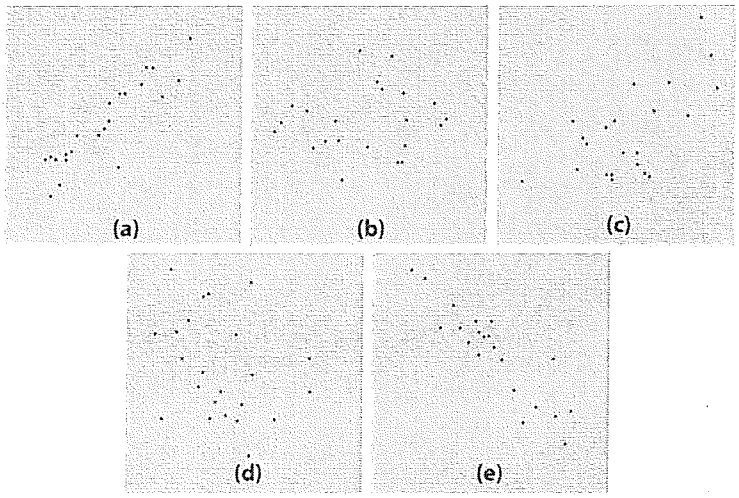
_____ r = -0.9

_____ r = -0.3

_____ r = 0

_____ r = 0.7

_____ r = 0.9



5. Rank the following relationships from the (1) highest correlation to the (3) lowest.

2 Heights of fathers and heights of their adult sons

3 Heights of husbands and heights of wives

1 Heights of girls at age 4 and their height at age 18

6. For each pair, do you expect the correlation to be positive, negative, or close to 0?

(a) The age of used cars and their prices.

(b) The weight of new cars and their gas mileage.

(c) The heights and weights of adult men.

(d) The heights and income of adult men.

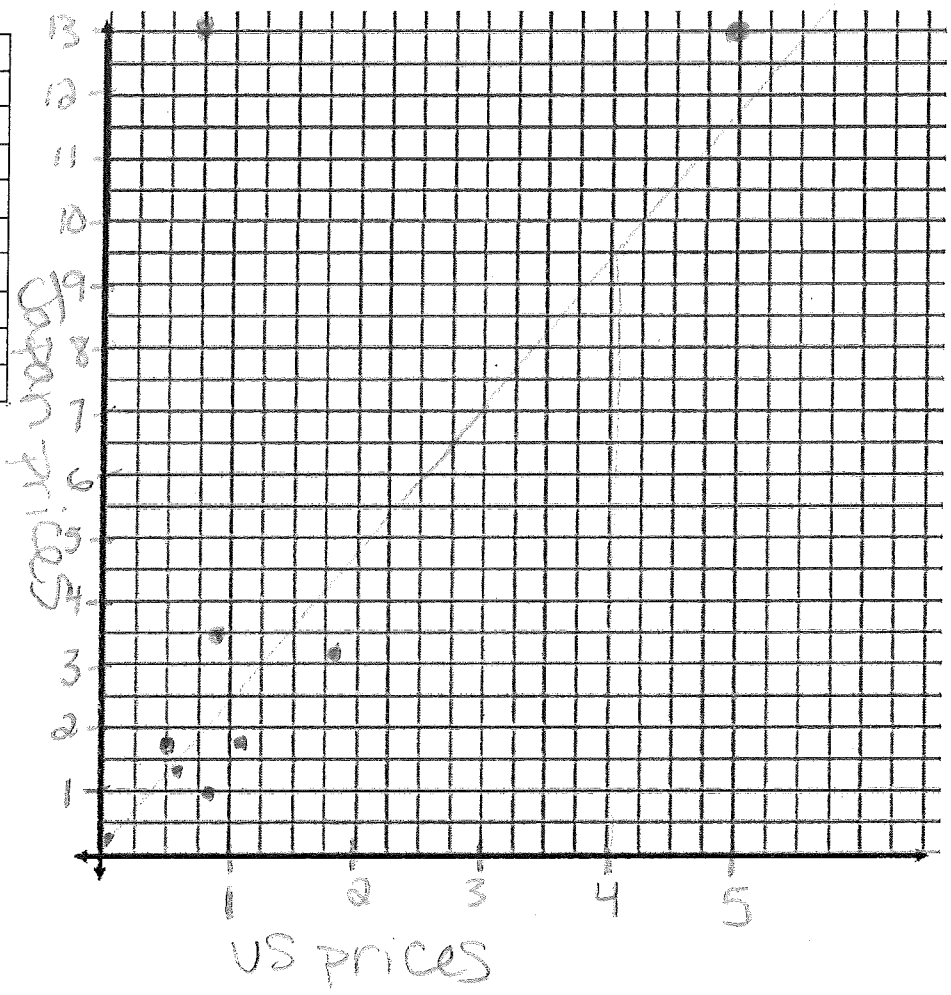
(e) The heights of daughters and the heights of their mothers.

Unit 6 worksheet #3 Name Key

Hour_____

1. The table contains data comparing prices in the U.S. and Japan in 1989 (x = U.S. prices).
(a) Make a scatterplot of the data.

Item	U.S.	Japan
Movie ticket	$5.00	$13.00
Pound of rice	$0.50	$1.89
Big Mac	$1.78	$3.08
Electricity (KwH)	$0.06	$0.33
Gallon of gas	$0.95	$3.50
Cantaloupe	$0.75	$13.00
Dozen eggs	$1.09	$1.70
Subway token	$0.80	$1.00
Quart of milk	$0.55	$1.48



(b) Describe the relationship.

D: Positive
O: Cantaloupe
F: Linear
S: Moderate

(c) Estimate the correlation (r).

r = 0.6

(d) Draw a line of best fit. Given a U.S. price of $3.00, predict the cost of the same item in Japan using your line.

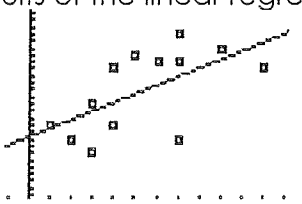
$7

(e) Given a U.S. price of $4.00, predict the cost of the same item in Japan using your line of best fit.

$9.50

2. Data on "# of quiz questions incorrect," (x) and "heart rate," (y) were entered into the calculator. The following show the results of the linear regression

```
LinReg
 y=a+bx
 a=60.31074766
 b=1.231308411
 r²=.3673016223
 r=.6060541414
```



a = _____ , b = _____ , r = _____, Equation:_____

(a) Interpret the meaning of **r** in the context of the problem.

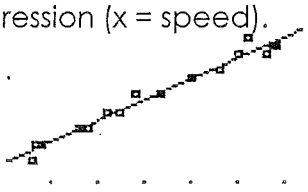
(b) Interpret the meaning of the **y intercept** in the context of the problem.

(c) Interpret the meaning of the **slope** in the context of the problem.

(d) Use the LSRL equation to predict heart rate for someone who gets 10 problems wrong on their quiz.

3. Data on "Speed" (m/sec) and "Step Length" (m) were entered into the calculator. The following show the results of the linear regression (x = speed).

```
LinReg
 y=a+bx
 a=.3609631291
 b=.2558530772
 r²=.9734507282
 r=.9866360668
```



a = 0.36 , b = 0.26 , r = 0.99 , Equation: y = 0.36 + 0.26x

(a) Interpret the meaning of **r** in the context of the problem.

There is a strong positive linear relationship between speed and step length.

(b) Interpret the meaning of the **y intercept** in the context of the problem.

When your speed is zero your step length is 0.36cm.

(c) Interpret the meaning of the **slope** in the context of the problem.

As your speed increases 1 your step length increases 0.26.

(d) Use the LSRL equation to predict step length for a speed of 3.5 m/sec.

$y = 0.36 + 0.26(3.5) = \boxed{1.27 \text{ m}}$

Unit 6 worksheet #4 Name Key Hr____

1. Enter the following data in to L_1 and L_2

Number of Years after 1950	x	5	10	15	20	25	30	35	40	45
Black &white TVs sold (in 1000s)	y	7738	5709	4125	4704	5331	7156	4390	3325	480

a) Calculate the correlation (r) and the LSRL equation.

a = 7539.9 , b = -110.67 , r = -0.71 Equation: $\hat{y} = 7539.9 - 110.7x$

b) Interpret the meaning of **r** in the context of the problem.

There is a negative moderate linear relationship between the number of years after 1950 and Black & white TVs sold.

c) Interpret the meaning of the **y intercept** in the context of the problem.

When the years after 1950 is zero the Black & White TVs sold were 7539.9 (in 1000s).

d) Interpret the meaning of the **slope** in the context of the problem.

As the years after 1950 increases by 1 the number of Black & white TVs sold decreases by 110.67 (in 1000s).

e) Use the LSRL equation to predict how many B&W TVs were sold in 2000 (x = 50 years after 1950).

$\hat{y} = 7539.9 - 110.7(50) = 2004.9$ (in 1000s)

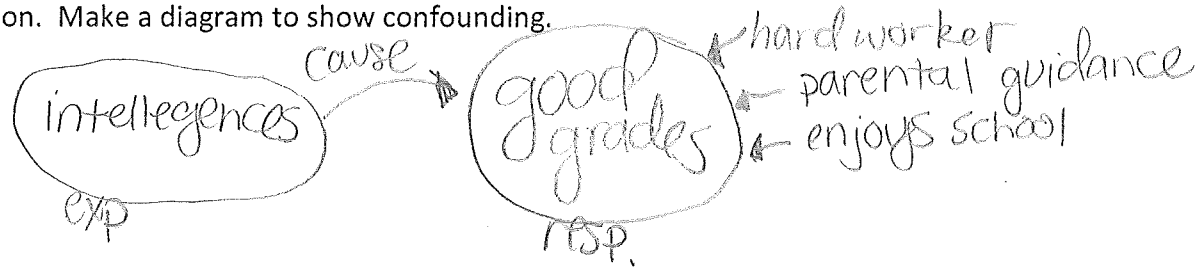
f) Use the LSRL equation to predict the year in which 5,000,000 B&W TVs were be sold.
(y = 5000 thousand TVs)

$5000 = 7539.9 - 110.7x$

$-7539.9 \quad -7539.9$

$\frac{-110.7x}{-110.7} = \frac{-2539.9}{-110.7}$ $x = 22.9 \approx$ 23 years → 1973

2. An educational researcher makes the claim that high intelligence and good grades have a positive correlation. Make a diagram to show confounding.



3. Enter the following data in to L_1 and L_2

Year of Birth (# of Years after 1890)	10	20	30	40	50	60	70	80	90	100
Life Expectancy	47.3	50	54.1	59.7	62.9	68.2	69.7	70.8	73.7	75.4

a) Calculate the correlation (r) and the LSRL equation.

a = _____ , b = _____ , r = _____ Equation: _____

b) Interpret the meaning of **r** in the context of the problem.

c) Interpret the meaning of the **y intercept** in the context of the problem.

d) Interpret the meaning of the **slope** in the context of the problem.

e) Use the LSRL equation to predict the life expectancy for someone born in 2020.

f) Use the LSRL equation to predict year of birth for someone with a life expectancy of 65 years.

4. A study of third world countries found that those with a higher number of televisions per capita had a higher life expectancy. Make a diagram to show common response.