#108

Name Key
8A; Algebra 1

Date _____
Period _____

Line of Best Fit Day II

1) The table below shows the number of prom tickets sold over a ten-day period.

Prom Ticket Sales

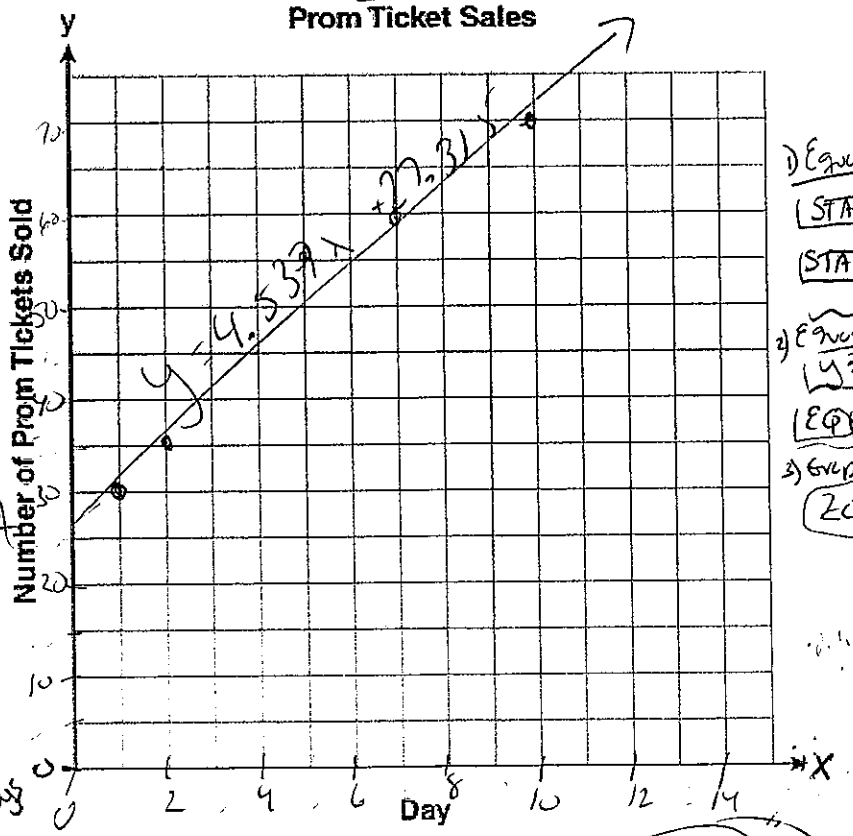
L_1 **Day (x)**	1	2	5	7	10
L_2 **Number of Prom Tickets Sold (y)**	30	35	55	60	70

1st step

Plot these data points on the coordinate grid below. Use a consistent and appropriate scale. Draw a reasonable line of best fit and write its equation. ← DO B4 you draw the line

3rd step ↙

2nd step



☆ Strong positive correlation

1) Equation
STAT 1 put #'s into L_1, L_2
STAT CALC 4

2) Equation into Y=
Y= → VARS STATS →
EQ 1 RESID

3) Graph
ZOOM 9

NO arrow B/C you can't have a # of days or tickets

☆ nearest thousandths

Calc: $y = 4.537x + 27.315$

must start line here!

$r = .983$

↑ The correlation coeff. shows a strong positive linear relationship between the day + the # of prom tickets sold B/C the correlation coefficient is close to +1

C

2) A large industrial plant studies the relationship between the number of hours devoted to safety training and the number of work hours lost due to workplace accidents. The data is shown in the table below

Time Spent on Safety Training (hours)	Work Time Lost Due to Accidents (hours)
10	80
19	65
30	68
45	55
50	35
65	10
80	12

L1 L2

*nearest thousandth

Must start line here

*STAT CALC 4

Calc:

$y = -1.062x + 91.801$

$r = -.952$

The correlation coefficient shows a strong negative linear relationship between the time spent on safety trainings and work time lost due to accidents BC the correlation coefficient is close to -1.

a) Use this data to create a scatter diagram, and to draw a line of best fit. Determine the equation of the line of best fit too.

$y = -1.062x + 91.801$ → Begin line here

b) What type of correlation does the data represent?

Negative correlation. As the time spent on safety training increases, the work time lost due to accidents decreases

*Y variable NO NEGATIVE

Safety Training vs. Time lost due to Accidents

Work Time lost due to Accidents (Hrs)

0 10 20 30 40 50 60 70 80 90 100

$y = -1.062x + 91.801$

*X NO GAPS NO NEGATIVE

Time Spent on Safety Training (hrs)

BIVARIATE DATA ANALYSIS
COMMON CORE ALGEBRA I

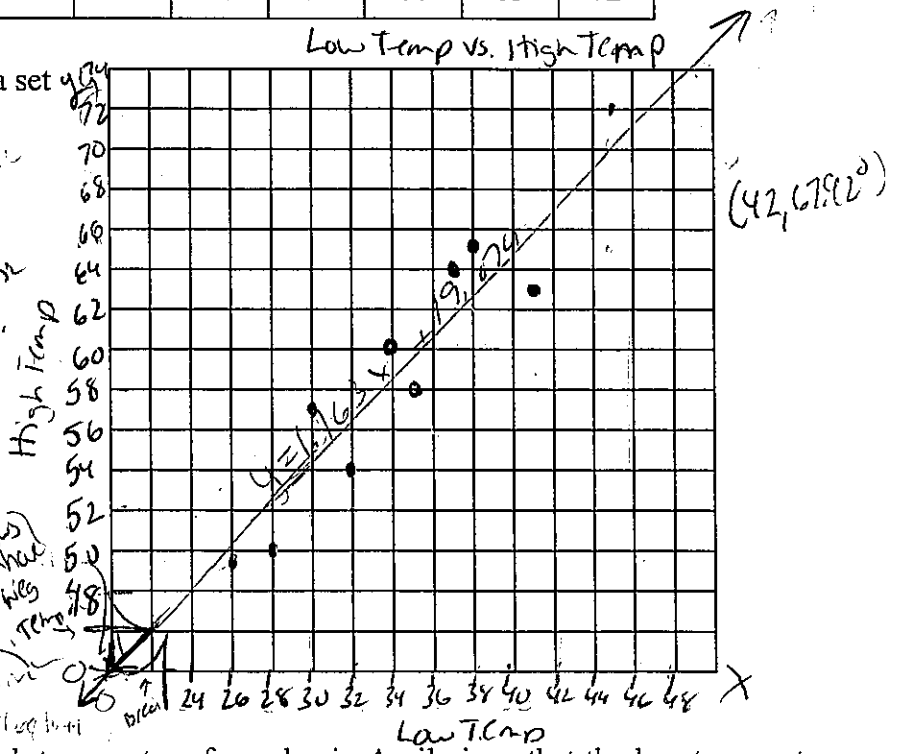
Oftentimes, statistical studies are done where data is collected on **two variables** instead of one in order to establish whether there is a **relationship** between the **two variables**. This is called a **bivariate data analysis.**

HW

Exercise #3 A survey was taken of 10 low and high temperatures, in Fahrenheit, in the month of April to try to establish a relationship between a day's low temperature and high temperatures.

L1	Low Temperature, x	26	28	30	32	34	35	37	38	41	45
L2	High Temperature, y	49	50	57	54	60	58	64	66	63	72

(a) Construct a scatter plot of this bivariate data set on the grid below.



The correlation coeff. shows a strong positive linear relationship between the low temp & high temp B/C the correlation coefficient is close to +1

(b) Draw a line of best fit through this data set. Also determine its equation.

Calc: $y = 1.163x + 19.074$ → start line here

$r = .948$

nearest hundredth (STATCALC 4)

(c) Use your line of best fit to estimate the high temperature for a day in April given that the low temperature was 42 degrees. Illustrate your answer on your graph.

Interpolating ≈ 67° on the graph

$y = 1.163x + 19.074$
$y = 1.163(42) + 19.074$
$y = 48.846 + 19.074$
$y = 67.92$

67.92° } check!

(d) Would you characterize the relationship between the low and high temperature as a **positive correlation** or a **negative correlation?** Explan.

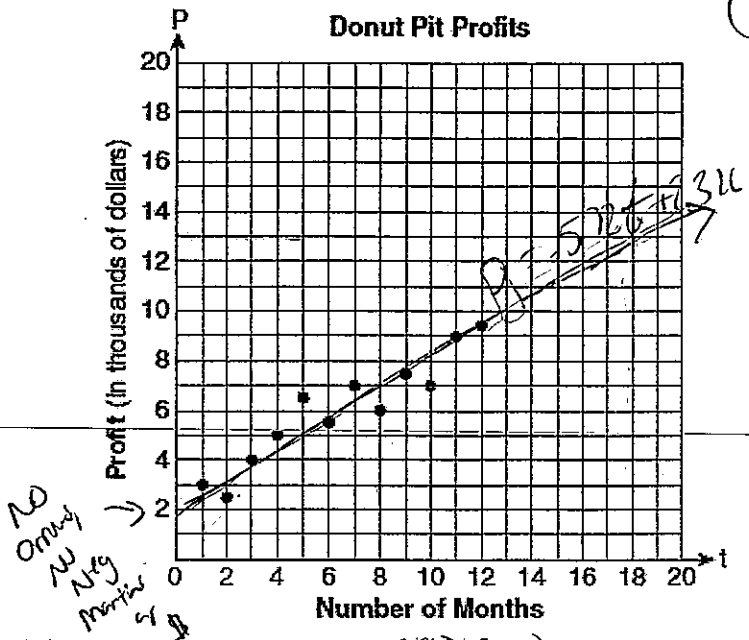
* r would be close to +1
$r = .948$

} positive correlation = As the low temperature increases, the high temperature increases.

HW

4) Megan and Bryce opened a new store called the Donut Pit. Their goal is to reach a profit of $20,000 in their 18th month of business. The table and scatter plot below represent the profit, *P*, in thousands of dollars that they made during the first 12 months.

t (months)	P (profit, in thousands of dollars)
1	3.0
2	2.5
3	4.0
4	5.0
5	6.5
6	5.5
7	7.0
~~8~~	~~6.0~~
9	7.5
10	7.0
11	9.0
12	9.5



(a) Write the equation of the line of the best fit and draw the line of best fit. (STAT)(CALC) 4

$y = .572x + 2.326$

$P = .572t + 2.326$ → start like here

$r = .946$ The correl. coeff shows a strong pos. linear relationship between the # of months & the profit

(b) Using the line of best fit, predict whether Megan and Bryce will reach their goal in the 18th month of business. Justify your answer.

extrapolating

B/C the correlation coeff is close to +1

NO they will not, B/C at 18 months they will only have made around $13,000 not the $20,000 they need.

check: $P = .572t + 2.326$

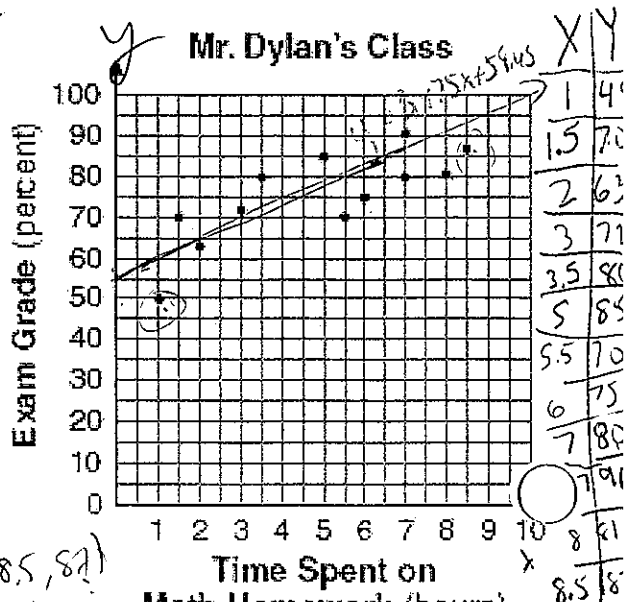
$P = .572(18) + 2.326$

$P = 16.296 + 2.326$

$P = 12.622$

$\Rightarrow 12,622$ NOT enough

5) The number of hours spent on math homework each week and the final exam grades for twelve students in Mr. Dylan's algebra class are plotted below.



X	Y
1	4
1.5	7
2	6
3	71
3.5	80
5	85
5.5	70
6	75
7	80
7	91
8	81
8.5	8

(a) Write the equation of the line of the best fit. start like here

$y = 3.475x + 58.454$ (in calc)

$y = 5.067x + 43.933$ (by hand)

(b) Draw the line of best fit.

(c) Using the line of best fit, predict whether a student will earn 100% after studying 10 hours. Justify your answer.

according to my line, yes I think that a student will earn a 100% after studying for 10 hours

according to the equation now → $y = 5.067(10) + 43.933$

$y = 50.67 + 43.933$

$y = 94.603$

(1, 49) (8.5, 87)

$\frac{87-49}{8.5-1} = \frac{38}{7.5} = 5.067$

$y = 5.067x + 43.933$

$y = mx + b$

$49 = 5.067(1) + b$

$49 = 5.067 + b$

$-5.067 \quad -5.067$

$b = 43.933$