The following data show the number of miles driven and advertised price for 11 used Honda CR-Vs from the 2002–2006 model years (prices found at www.carmax.com). The scatterplot shows a strong negative linear association between number of miles and advertised price. The correlation is $r = -0.874$. The line on the plot is the regression line for predicting advertised price based on number of miles.

Enter the data (miles & price) into your Lists.

Miles driven (thousands)	Price (dollars)	Miles driven (thousands)	Price (dollars)
22	17,998	55	13,599
29	16,450	56	14,599
35	14,998	69	11,998
39	13,998	70	14,450
45	14,599	86	10,998
49	14,988		

Calculate 2-Variable Statistics to find $\bar{x}$, s_x, $\bar{y}$, and s_y.

Then calculate the equation of the LSRL using formulas.

Next, calculate LinReg on Calculator. Verify that these are the same.

$\bar{x} = 50.5$ $\quad\quad$ $\bar{y} = 14,425$

$s_x = 19.3$ $\quad\quad$ $s_y = 1899$

* LSRL always passes through $(\bar{x}, \bar{y})$.

$\hat{y} = a + bx$

$b = r\frac{s_y}{s_x}$

$b = -0.874 \cdot \frac{1899}{19.3}$

$b = -85.996$

$a = \bar{y} - b\bar{x}$

$a = 14425 - 86 \cdot 50.5$

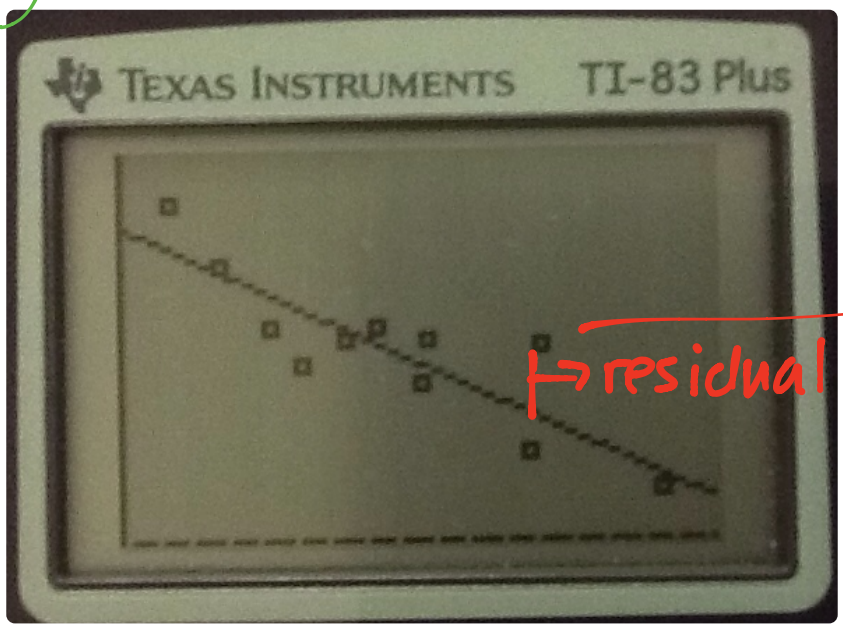
$a = 18767.81$

LSRL:

$\hat{y} = 18767.81 - 85.996x$

on calc:

$\hat{y} = 18773.28 - 86.18x$



$\rightarrow (70, 14450)$

Calculate & interpret residual for (70, 14450)

$\hat{y} = 18773 - 86.18x$

$\hat{y} = 18773 - 86.18(70)$

$\hat{y} = 12740.4$

The model predicts that a car with 70,000 miles should cost $12,740.40.

Residual = actual - predicted

$= 14450 - 12740.4$

$= \$1709.60$

The model underestimated the value by $1709.

Residual plot
explan vs. residuals

$L_3 = L_2 - Y_1(L_1)$

L_1 = explanatory

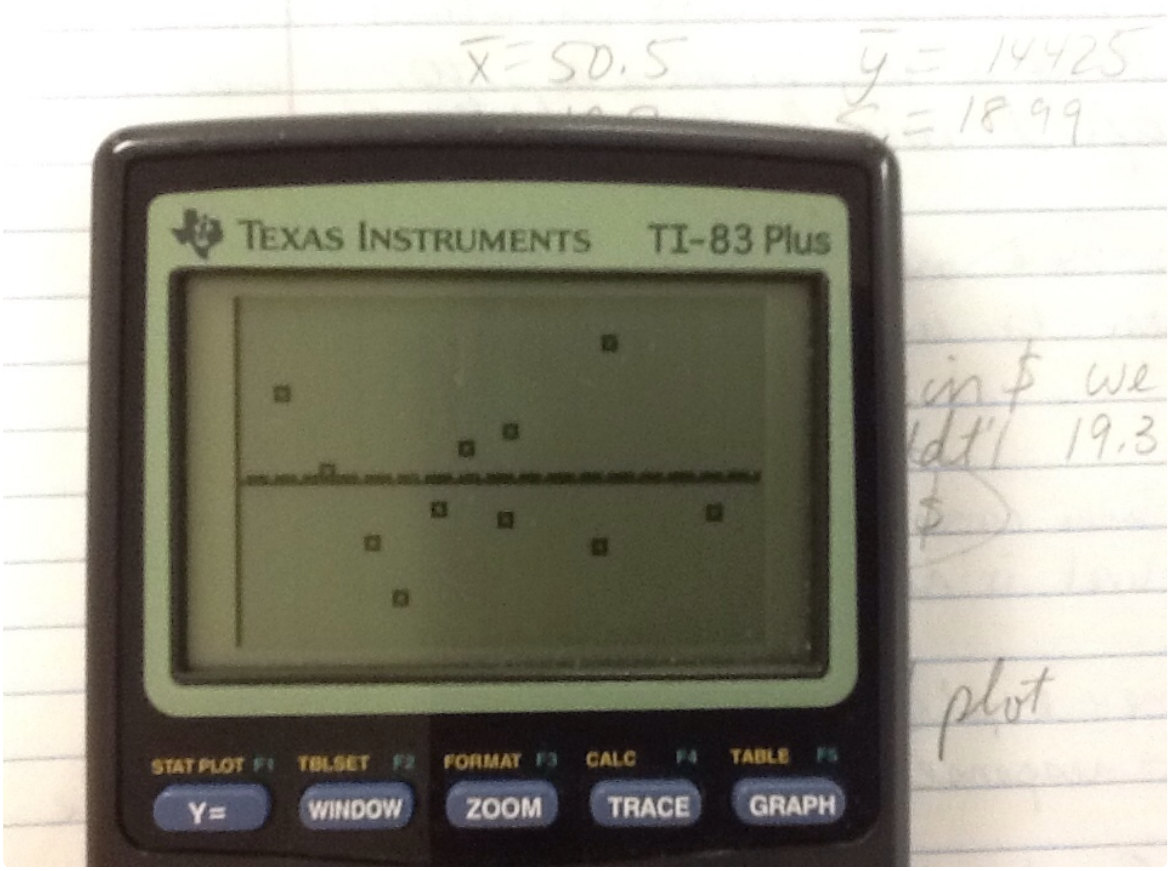
L_2 = response

residuals = actual − predicted

predicted from LSRL

Y_1 → VARS → Y-VARS → Function

$Y_1(L_1)$ — tells calc to plug in all $L_1(x)$ values into Y_1 (LSRL eqn).


$\bar{x} = 50.5$
$\bar{y} = 14425$
$\Sigma = 1899$
TEXAS INSTRUMENTS
TI-83 Plus
STAT PLOT F1
TBLSET F2
FORMAT F3
CALC F4
TABLE F5
Y=
WINDOW
ZOOM
TRACE
GRAPH
plot

Ch. 3 RG Δ