

## TECHNOLOGY CORNER for Section 3.2, Page 171

### 8. Least-squares regression lines on HP Prime

Let's use the Ford F-150 data to show how to find the equation of the least-squares regression line on HP Prime. Here are the data again:

Miles driven	70,583	129,484	29,932	29,953	24,495	75,678	8,359	4,447
Price (in dollars)	21,994	9,500	29,875	41,995	41,995	28,986	31,891	37,991
Miles driven	34,077	58,023	44,447	68,474	144,162	140,776	29,397	131,385
Price (in dollars)	34,995	29,988	22,896	33,961	16,883	20,897	27,495	13,997

- Press **Apps** and tap on the **Statistics 2Var** app icon. Enter the data values into the lists C1 and C2. Put the miles driven data in C1 and the price data in C2. Then make a scatterplot. Refer to *Technology Corner 7 on Scatterplots*

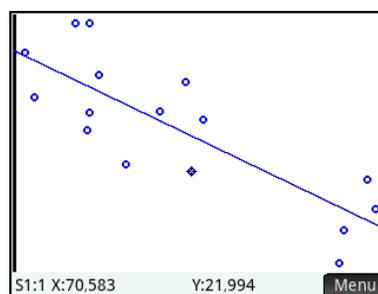
	C1	C2	C3	C4
1	70,583	21,994		
2	129,484	9,500		
3	29,932	29,875		
4	29,953	41,995		
5	24,495	41,995		
6	75,678	28,986		
7	8,359	31,891		
8	4,447	37,991		
9	34,077	34,995		
10	58,023	29,988		

- Define the scatterplot and regression line in Symbolic view of the app (Press **Symb**). Specify the settings shown below; the defaults for H1 already correspond to using C1 and C2 with a linear fit, so no changes may be needed. Tap **Fit\*** to activate plotting the linear fit as well as the scatterplot. The small white dot after the label indicates that fit plotting is active in the Plot view. You can tap it again to de-activate fit plotting at any time. This toggle appears in Plot view as well.

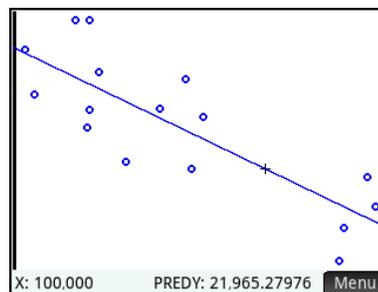
Series	Type	Fit
√ S1: C1	Linear	Fit1: M*X+B
S2: C2	Linear	Fit2: M*X+B

- Press **View** and select **Autoscale** to see both the scatterplot and the linear fit. Tap to move the tracer (or use **→** and **←**). Use **▲** and **▼** to

move between tracing the scatterplot and tracing the fit.



- To find the predicted price of an F-150 truck with 100,000 miles first select the LSRL using **▲** and **▼** and tap **Menu** and **Go To**. Enter 100,000 and tap **OK**. Tap **Menu** to show the tracer coordinates, indicating that an F-150 truck with 100,000 miles driven would have a predicted price of approximately \$21,965.



- Press **Num** to enter Numeric view and tap **Stats** to see summary statistics related to the two data sets. The linear correlation coefficient ( $r$ ) and  $R^2$  values are shown.

FORD Numeric View	
S1	
$n$	16
$r$	-0.815014049572
$R^2$	0.664247901
sCOV	-373,440,439.433
$\sigma$ COV	-350,100,411.969
$\Sigma XY$	22,890,959,959

Number of items

- Tap **OK** to return to Numeric view when you are done.

- Press **Symb** to enter the Symbolic view. The linear regression equation is shown in **Fit1**.

FORD Symbolic View	
$\sqrt{}$ S1: C1	C2
Type1: Linear	
Fit1:	$-0.162918553062 \cdot X + 38,257.1350657$
S2:	
Type2: Linear	
Fit2: M*X+B	
S3:	
Enter function	

- You can use the linear fit to make predictions from the Home view using the PredX and PredY commands. To repeat the previous calculation of the price of an F-150 with 100,000 miles, go to the Home view. Press **2nd**, tap **App**, tap *Statistic 2Var*, and select *PredY*.

FORD	
App Functions	1 PredX
Statistics 1Var	2 PredY
Geometry	3 Resid
NormalSolver	4 Do2VStats
Spreadsheet	5 SetDepend
Advanced Graphing	6 SetIndep
Inference	7 CHECK
Statistics 2Var	8 UNCHECK
CIPROBLEM2	9 ISCHECK

- Complete the command PREDY(100,000) and press **Enter**.

FORD	
PredY(100,000)	21,965.2797595

- Save these lists for later use. In Home view, enter C2 **Sto** PRICE and hit **Enter** and C1 **Sto** MILES and hit **Enter**. You will be prompted to confirm that you want to create these new variables. Simply tap **OK** to proceed.

FORD	
Do you want to create a variable called PRICE	
C2 PRICE	

FORD	
C2 PRICE	{21,994, 9,500, 29,875, 41,995, 41,995, 28,986, 3}
C1 MILES	{70,583, 129,484, 29,932, 29,953, 24,495, 75,678}