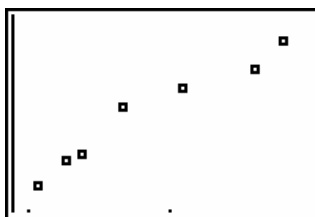


Find the Equation of the Regression Line

MPH	FINE	6
70	102	
72	110	
80	134	
76	128	
85	141	
87	150	
73	113	

Let's assume there is data in two lists, **MPH** and **FINE**.



And we've checked the scatterplot for the Straight Enough Condition. Good to go!

Let's have the calculator give us the Linear Regression numbers. After the **LinReg** function, add the x-variable and the y-variable as before...but also add another comma and the item **Y1**.

```

STAT
VAR
Y-VARS
1:Function...
2:Parametric...
3:Polar...
4:On/Off...

```

STAT

CALC

8:LinReg(a+bx) LMPH, LFINE

Now add another comma and the function **Y1**. Here's how...

```

LinReg(a+bx) LMPH, LFINE, Y1

```

VAR

Y-VARS

1:Function...

1:Y1

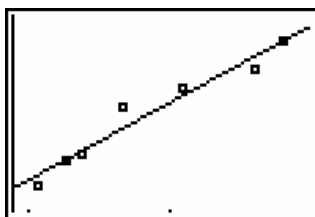
ENTER

```

LinReg
y=a+bx
a=-77.3919214
b=2.614628821
r^2=.9579372841
r=.9787427058

```

The regression equation: $\widehat{\text{fine}} = -77.39 + 2.61(\text{mph})$.



ZOOM

9:ZoomStat

Presto! The regression line is now on the scatterplot.

Check the Residuals

MPH	FINE	
70	102	
72	110	
80	134	
76	128	
85	141	
87	150	
73	113	
Name=RESID		

MPH	FINE	RESID
70	102	-3.632096
72	110	-0.8614
80	134	2.2216
76	128	6.6801
85	141	-3.852
87	150	-0.0808
73	113	-4.476
RESID(1)=-3.632096...		

Remember that you're not finished until you check the residuals! Are they sufficiently scattered?

Create a list named **RESID**.

STAT
EDIT

When you press **ENTER**, the residuals should pop into the list.

*This list will stay here and every time you ask the calculator to compute a **LinReg**, it will update this list for you!*

Now you want to see the graph of the residuals.

STAT PLOT

Suggestion: Leave the original data in **Plot1**, but turn it **Off**.

In **Plot2**, use the same x-axis as the original data. Put the **RESID** list on the y-axis.

Plot1	Off	Plot3
Type:		
Xlist:	MPH	
Ylist:	RESID	
Mark:	+	

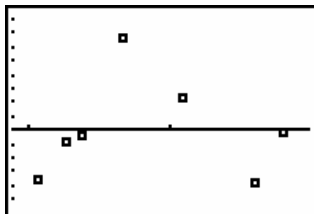
Before you graph the data...

Y=

The regression equation has been pulled into **Y1**. That's good! But you don't want it to be graphed, so turn the highlighting (on the equal sign) off.

Plot1	Off	Plot3
Y1=	-77.39192139	
Y2=	738+2.6146288209	
Y3=	607X	
Y4=		
Y5=		

9:ZoomStat



What do you see? Looks like there might be a curve. ☹ A linear model might not be the most appropriate for the data.

Moral of the story: ***Always check the residuals!***

What do we do now? The next two chapters will show us how to deal with these situations.