Instructions for the TI-83 for regression

For this example, we will use the following data:

Year	Number of U.S. workers who worked at home (millions)
1960	4.66
1970	2.69
1980	2.18
1990	3.41

First, we standardize the data so that $x=0$ corresponds to 1960, $x=10$ corresponds to 1970, $x=20$ corresponds to 1980, and $x=30$ corresponds to 1990. Then we turn to the calculator

1. Enter the data into your calculator as the lists L_1 (time) and L_2 (workers). To do this, use the following key strokes:

2nd (0 , 10 , 20 , 30 2nd) STO-> 2nd 1 ENTER
2nd (4.66 , 2.69 , 2.18 , 3.41 2nd) STO-> 2nd 2 ENTER

The output to your screen should be

```
{0,10,20,30}→L₁
         {0 10 20 30}
{4.66,2.69,2.18,
3.41}→L₂
{4.66 2.69 2.18…
■
```

2. Create a scatterplot. Use the following key strokes:

2nd Y= ENTER

(Note: by hitting ENTER, you are choosing option 1. Option 2 and 3 are also available as choices) this gives you the following screen

```
Plot1 Plot2 Plot3
  On
  Off
Type: ▨ ⬈ ⊞
      ⬚ ⊡ ⬔
Xlist:L₁
Ylist:L₂
Mark: □ + ·
```

you want to make sure that the On, the first graph type, the lists L_1 and L_2 are shown, and the first mark type are shaded. If not, hit ENTER to select the appropriate item (or for the lists, hit the appropriate key to get L_1 and L_2). Now, hit the WINDOW key to set the dimensions of the graph screen. For this particular example, we will set the window to be a [-10,40] by [0,5]. Check that your screen matches the one below.

```
WINDOW
 Xmin=-10
 Xmax=40
 Xscl=10
 Ymin=0
 Ymax=5
 Yscl=1■
 Xres=1
```

Hit the $\boxed{Y=}$ and check to make sure that all equations are cleared from your calculator.
Hit the $\boxed{GRAPH}$ key to display the scatterplot. Your screen should match the one below.
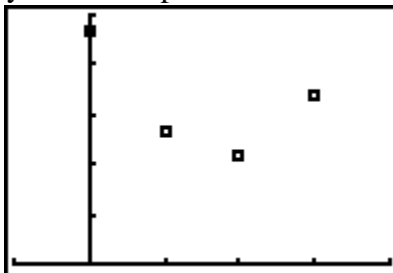
3. Find the regression. First, use the following key strokes to set the calculator so that r and/or r^2 will appear. Use the following key strokes:

$\boxed{2^{nd}}$ 0

This brings up the catalog. Hit the down arrow until you find the DiagnosticOn command.

```
CATALOG          ▫
 DelVar
 DependAsk
 DependAuto
 det(
 DiagnosticOff
▶DiagnosticOn
 dim(
```

Hit $\boxed{ENTER}$ twice so that your screen appears as follows:

```
{0,10,20,30}→L₁
      {0 10 20 30}
{4.66,2.69,2.18,
3.41}→L₂
{4.66 2.69 2.18…
DiagnosticOn
              Done
```

Now use the following key command to get the regression.

$\boxed{STAT}$ right arrow to CALC command then down arrow to chose the type of regression. For this example we will use a quadratic regression. Select this and press $\boxed{ENTER}$ or hit the 5 key. Now, type $\boxed{2^{nd}}$ 1 $\boxed{,}$ $\boxed{2^{nd}}$ 2

```
{0,10,20,30}→L₁
        {0 10 20 30}
{4.66,2.69,2.18,
3.41}→L₂
{4.66 2.69 2.18…
DiagnosticOn
                Done
QuadReg L₁,L₂■
```

Press enter to display the coefficients of our quadratic equation. Notice the value of r^2 is very close to 1. This means the data is fit well by this model.

```
QuadReg
 y=ax²+bx+c
 a=.008
 b=-.2826
 c=4.674
 R²=.9988707401
```

4. Plot the regression. Use the following key strokes:

$\boxed{\text{Y=}}$ $\boxed{\text{VARS}}$

That brings up a list of options. Choose 5: Statistics… The new menu should be

```
████  Σ  EQ  TEST  PTS
1:n
2:x̄
3:Sx
4:σx
5:ȳ
6:Sy
7↓σy
```

Use the right arrow key to choose EQ and select 1: RegEQ. Press $\boxed{\text{ENTER}}$. You should be brought back to the graphing screen. Your regression equation is now entered as the Y_1= value.

```
████  Plot2  Plot3
\Y₁█.008X^2+-.28
26X+4.674
\Y₂=
\Y₃=
\Y₄=
\Y₅=
\Y₆=
```

Hit the $\boxed{\text{GRAPH}}$ key. You now see how your model fits the data.