

Optimization using Ti- 84  
(Using Ti-84 solving an equation)

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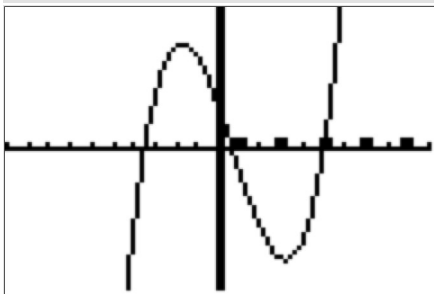
## 1.Using Ti-84 solving an equation

Example1: Solving  $f(x) = 6x^3 - 13x^2 - 99x + 70 = 0$

$-10 < x < 10$  and  $-230 < y < 230$

$Y_1 = 6x^3 - 13x^2 - 99x + 70$  for  $-10 < x < 10$  and  $-230 < y < 230$

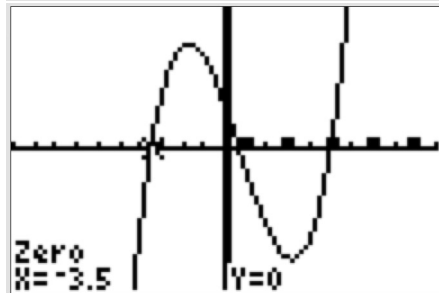
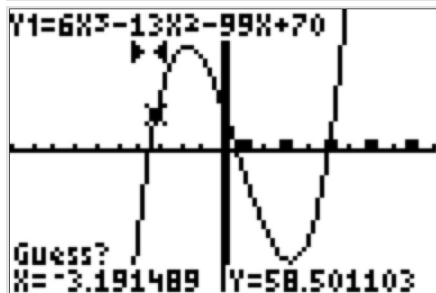
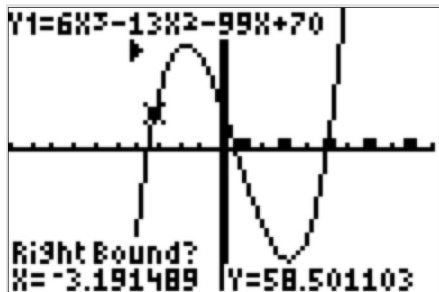
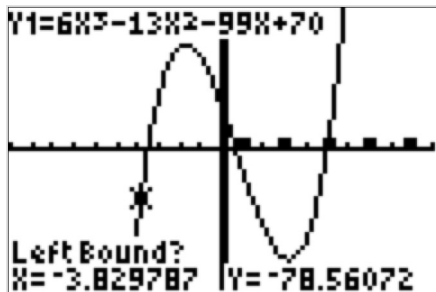
Plot1 Plot2 Plot3  
 $Y_1 = 6X^3 - 13X^2 - 99X + 70$   
 $Y_2 =$   
 $Y_3 =$   
 $Y_4 =$   
 $Y_5 =$



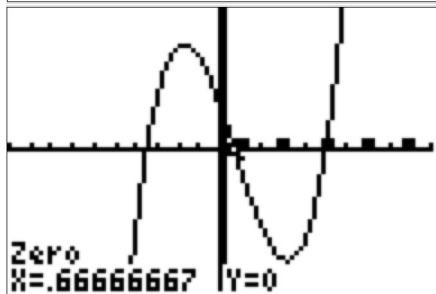
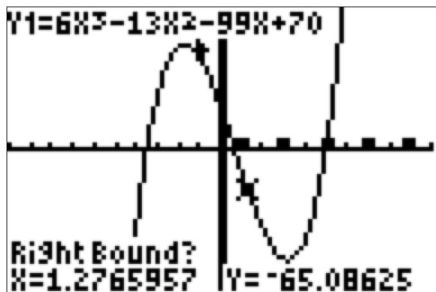
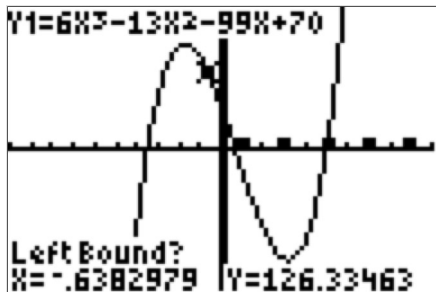
WINDOW  
Xmin=-10  
Xmax=10  
Xscl=1  
Ymin=230  
Ymax=230  
Yscl=1  
Xres=1

**CALC**  
1: value  
2: zero  
3: minimum  
4: maximum  
5: intersect  
6: dy/dx  
7:  $\int f(x) dx$

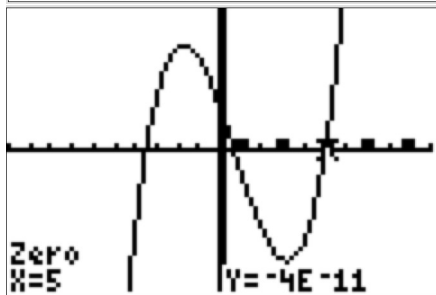
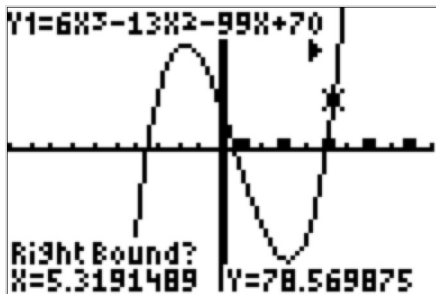
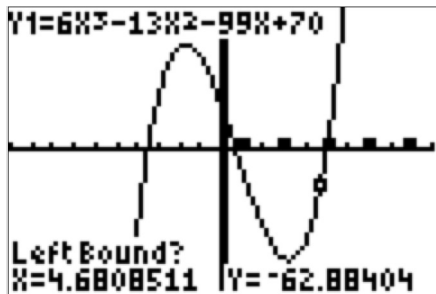
Function --> Window --> Graph --> 2nd/Calc/Zero



Left bound -- > Right bound -- > The first solution  $x = 3.5$



Left bound -- > Right bound -- > The 2ed solution  $x = 0.666 = 2/3$



Left bound -- > Right bound -- > The third solution  $x = 5$

**2. Optimization using Ti-84** The following function is from a project in the last year.

The Demand Function  $D(x)$

$$D(x) = \frac{1263.36}{1 + 0.09e^{0.28x}}$$

The Revenue Function  $R(x)$

$$R(x) = xD(x) = \frac{1263.36x}{1 + 0.09e^{0.28x}}$$

Question: Find the **price** which gives the **maximal** revenue.

$$0 < x < 30$$

Method: *We need to solve the equation  $R'(x) = 0$  using Ti-84.*

```

Plot1 Plot2 Plot3
\Y1 = 1263.36X / (1 -
\Y2 =  $\frac{d}{dx}(Y1) |_{x=x0}$ 
\Y3 =
\Y4 =
\Y5 =

```

```

Plot1 Plot2 Plot3
\Y1 = 1263.36X / (1 -
\Y2 =  $\frac{d}{dx}(Y1) |_{x=x}$ 
\Y3 =
\Y4 =
\Y5 =
\Y6 =

```

```

WINDOW
Xmin=0
Xmax=30
Xscl=1
Ymin=-230
Ymax=230
Yscl=1
Xres=1

```

```

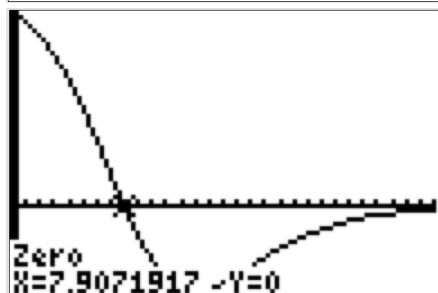
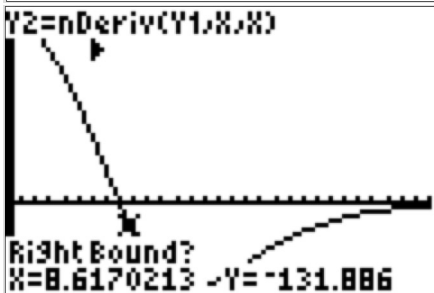
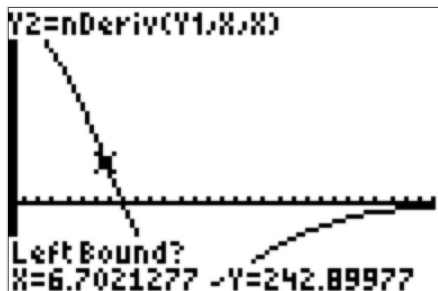
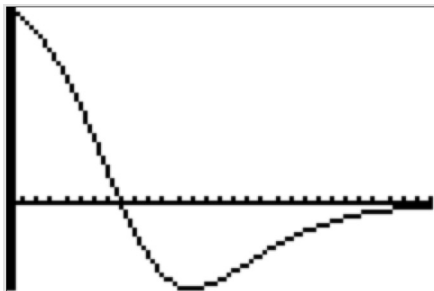
Zoom MEMORY
4: ZDecimal
5: ZSquare
6: ZStandard
7: ZTrig
8: ZInteger
9: ZoomStat
0: ZoomFit

```

Functions --> Window --> Zoom 0: ZoomFit

Test value  $Y1(2) = 2182.79731$  to make sure you function is correct





2ed/Calc/Zero -- > Left bound -- > Right bound

**2. Optimization using Ti-84** The following function is from a project in the last year.

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The Revenue Function  $R(x)$

$$R(x) = xD(x) = \frac{1263.36x}{1 + 0.09e^{0.28x}}$$

Find the **price** which gives the **maximal** revenue.

Solution:

$x = 7.9071917$  