

Chapter 13 / Example 8

Finding the parameter from a Poisson distribution

The random variable T is modelled by a Poisson distribution. Given that $P(T > 3) = 0.53$, find the variance of T .

$T \sim Po(\lambda)$. Find $P(T > 3) = 1 - P(T \leq 3)$.

Press $[F1]$ $[Y=]$ to display the equation entry screen.

Type 1 -.

Press $[2nd]$ $[vars]$ ($[distr]$) D:poissoncdf(.).

Enter x as λ and 3 as the x value.

Navigate down to Paste and press $[enter]$.

```
poissoncdf
λ:X
x value:3
Paste
```

Press $[enter]$ to enter the first equation as Y_1 .

Type 0.53 and press $[enter]$ to enter the second equation as Y_2 .

```
Plot1 Plot2 Plot3
Y1=1-poissoncdf(X,3)
Y2=0.53
Y3=
Y4=
Y5=
Y6=
Y7=
Y8=
Y9=
```

Modify the window settings to display the graphs.

Press $[F2]$ $[window]$ $[format]$

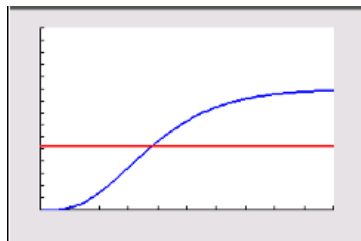
Set the axes to show $0 \leq x \leq 10$ with a scale of 1 and
 $0 \leq y \leq 1.5$ with a scale of 0.1.

You can leave the last three items as they are.

Press $[F5]$ $[graph]$ when you have finished.

```
WINDOW
Xmin=0
Xmax=10
Xscl=1
Ymin=0
Ymax=1.5
Yscl=.1
Xres=1
ΔX=.03787878787878
TraceStep=.07575757575757
```

The GDC displays the graphs in a suitable window.



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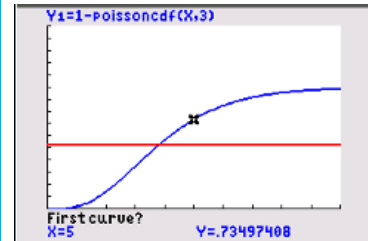
Finding the parameter from a Poisson distribution

Press **2nd** **[f4]** **[calc]** 5:intersect.

To find the intersection you need to choose the two lines that intersect.

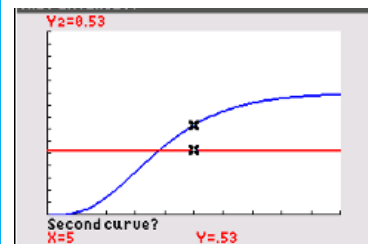
The GDC shows a cross on one of the lines and 'First curve?'.

Press **enter**.



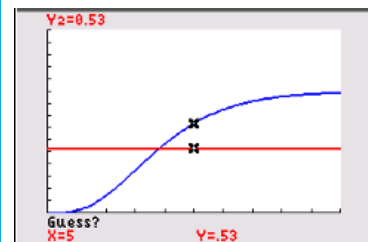
The GDC shows a cross on the other line and 'Second curve?'.

Press **enter**.



The GDC requires an initial guess for the position of the intersection. Choose the default position.

Press **enter**.



The GDC displays the intersection of the curve and the line at the point (3.82, 0.53)

Hence $\lambda = 3.82$.

Variance = 3.82.

