

Chapter 13 / Example 6

Poisson probabilities

- a** Assume that the number of goals scored in a football match can be modelled by the Poisson distribution with parameter 2.9. Let G be the number of goals in a particular match.
Find:
- i** $P(G = 4)$ **ii** $P(G \leq 3)$ **iii** $P(G \geq 4)$
- b** Let L be the number of goals scored in five matches. Write down the distribution of L and use it to find $P(L \leq 10 \mid L \geq 2)$.

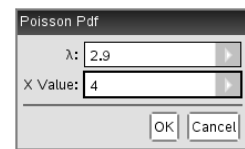
$G \sim Po(2.9)$. Find $P(G = 4)$.

Open a new document and add a Calculator page.

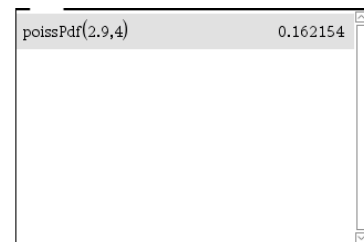
Press **menu** 5:Probability | 5:Distributions | J:Poisson Pdf...

Enter 2.9 as λ and 4 as the x value.

Press **enter** or click OK with the touchpad.



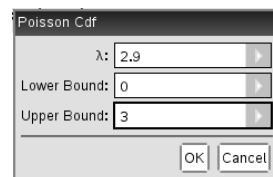
The GDC displays the solution $P(G = 4) = 0.162$.



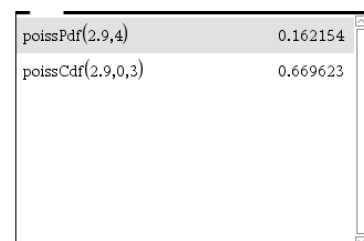
Press **menu** 5:Probability | 5:Distributions | K:Poisson Cdf...

Enter 2.9 as λ , 0 as the Lower Bound and 3 as the Upper Bound.

Press **enter** or click OK with the touchpad.



The GDC displays the solution $P(G \leq 3) = 0.670$.



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Poisson probabilities

Press **menu** 5:Probability | 5:Distributions | K:Poisson Cdf...

Enter 2.9 as λ , 4 as the Lower Bound and 100 as the Upper Bound.

100 is a large value of L used in place of ∞ .

Press **enter** or click OK with the touchpad.



Poisson Cdf

λ : 2.9

Lower Bound: 4

Upper Bound: 100

OK Cancel

The GDC displays the solution $P(G \geq 4) = 0.330$.

poissPdf(2.9,4)	0.162154
poissCdf(2.9,0,3)	0.669623
poissCdf(2.9,4,100)	0.330377

$L \sim Po(14.5)$. Find $\frac{P(2 \leq L \leq 10)}{P(L \geq 2)}$.

Enter the fraction template **ctrl** **÷** ($\frac{\square}{\square}$).

Enter the Poisson CDF functions using **menu** 5:Probability | 5:Distributions | K:Poisson Cdf...

$P(L \leq 10 | L \leq 2) = 0.145$.

poissPdf(2.9,4)	0.162154
poissCdf(2.9,0,3)	0.669623
poissCdf(2.9,4,100)	0.330377
$\frac{\text{poissCdf}(14.5,2,10)}{\text{poissCdf}(14.5,2,100)}$	0.144854