Chapter 14 / **Example 19**

Type I and type II errors

In order to satisfy quality control the mean number of flaws in aluminium sheets must be less than or equal to 0.6 flaws per metre length. A length of 7 m is inspected.
Assuming the number of flaws follows a Poisson distribution:

a state the distribution of the number of flaws (X) in the length sampled, assuming an average of 0.6 flaws per metre

b state the hypotheses for the test

c find the critical region for the test at the 5% significance level

d find the probability of

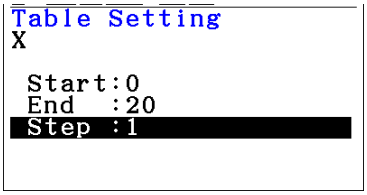
i a type I error

ii a type II error, given the mean is in fact 0.72 flaws per metre.

Press MENU 7 TABLE.

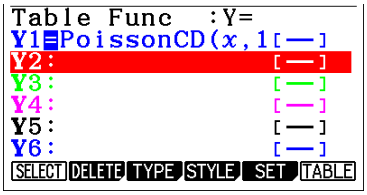
Press F5 SET and change the settings so that the table starts from 0 and ends at 20.

Press EXIT.



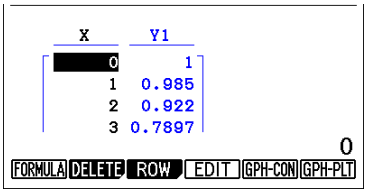
Press OPTN F6 ▷ F3 STAT F1 DIST F6 ▷ F1 POISSON F2 Pcd

Enter x as Lower and 100 as Upper and 4.2 as λ, separated by commas. Close the parentheses and press EXE.



Press F6 TABLE

The function is shown in the table.

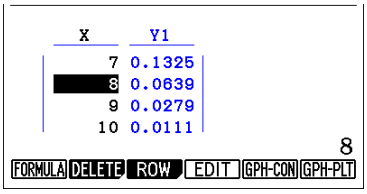


Scroll down the table using ▼

From the table, $P(X \geq 8) > 0.0639$ and $P(X \geq 9) > 0.0279$.

The critical region is $X \geq 9$

The probability of a type I error is 0.0279



Chapter 14 / **Example 19**

Type I and type II errors

Press MENU 1 RUN·MAT to display the Run-Matrix screen for arithmetical calculations.

Press OPTN F5 STAT F3 DIST F6 ▷ F1 POISSON F2 Pcd

Enter 0 as Lower and 8 as Upper and 5.04 as λ, separated by commas. Close the parentheses and press EXE.

$P(X \leq 8 \mid p = 5.04) = 0.929$

This is the probability of a type II error.