Question **2**

Correct

Marked out of 45

(*Taylor Series/Polynomials, Exponential Function*). (i) Find the representation of $e^{3.29}$ in the FPA_6 by generating a suitable number of terms of the sequence (Z_n) recursively defined by $Z_0 = 1$ and

$$Z_n = Z_{n-1} \oplus 3.29^n/n!,$$

where $n \geqslant 1$ is a natural number. As we did during the lectures, first try to estimate the number of steps to obtain the representation in question, and then carry out the calculations till the condition

$$Z_k = Z_{k-1}$$

will become true at some step k. The number Z_k will then be the required representation $e^{3.29}$ in the FPA_6.

(ii) Show your work by entering the terms Z_n, suitable 6-digit floating-point numbers, you have calculated in (i) in the input fields below; if a particular input field is not necessary, please enter an asterisk $*$ in it:

$Z_0 =$ 1 ✔

$Z_1 =$ 4.29 ✔

$Z_2 =$ 9.70205 ✔

$Z_3 =$ 15.6373 ✔

$Z_4 =$ 20.519 ✔

$Z_5 =$ 23.7311 ✔

$Z_6 =$ 25.4925 ✔

$Z_7 =$ 26.3203 ✔

$Z_8 =$ 26.6608 ✔

$Z_9 =$ 26.7852 ✔

$Z_{10} =$ 26.8262 ✔

$Z_{11} =$ 26.8384 ✔

$Z_{12} =$ 26.8418 ✔

$Z_{13} =$ 26.8426 ✔

$Z_{14} =$ 26.8428 ✔

$Z_{15} =$ 26.8428 ✔

$Z_{16} =$ * ✔

$Z_{17} =$ * ✔

(iii) Consequently, the required representation of $e^{3.29}$ in the FPA_6 is

26.8428 ✔

Check