Number Theory – 2022 GCE AS Additional Pure Further Mathematics A

1. June/2022/Paper_Y535/01/No.4

   Let $N = 10a + b$ and $M = a + 3b$, where a and b are integers such that $a \geqslant 1$ and $0 \leqslant b \leqslant 9$.

   (a) Prove that $29 \mid N$ if and only if $29 \mid M$. [5]

   (b) Use an iterative method based on the result of part **(a)** to show that $899\,364\,472$ is a multiple of 29. [3]