~~2409.0012~~

13.0006

$$A = \begin{pmatrix} 0 & 4 & 2 \\ 0 & 2 & 0 \\ 2 & -8 & -4 \end{pmatrix}$$

$$A^2 = \begin{pmatrix} 4 & -8 & -8 \\ 0 & 4 & 0 \\ -8 & 24 & 20 \end{pmatrix}$$

$$A^3 = \begin{pmatrix} -16 & 64 & 40 \\ 0 & 8 & 0 \\ 40 & -144 & -96 \end{pmatrix}$$

$$12A = \begin{pmatrix} 0 & 48 & 24 \\ 0 & 24 & 0 \\ 24 & -96 & -48 \end{pmatrix}$$

Donc $A^3 + 2A^2 - 12A = -8I_3$