$$A^k b_0 = c_1 \cdot A^k \cdot v_1 + c_2 A^k v_2 + \cdots + c_k A^k \cdot v_k$$

$$= c_1 \cdot \lambda_1^k \cdot \left(v_1 + \frac{c_2}{c_1} \left(\frac{\lambda_2}{\lambda_1} \right)^k \cdot v_2 + \cdots \right)$$

error $= \frac{c_2}{c_1} \left(\frac{\lambda_2}{\lambda_1} \right)^k v_2 + \cdots$

Since A is rank 1, $\lambda_2 = \lambda_3 = \cdots = 0$.   ∴ error $= 0$

∴ 1 iteration is needed.