is another cycle of gen. eigenvectors and

$$\beta = \left\{ \begin{pmatrix} 0 \\ 6 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix}, \begin{pmatrix} 2 \\ 0 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 0 \\ 1 \\ 0 \end{pmatrix} \right\}$$ ← coordinate vectors [w.r.t. γ] for these polynomials

$$= \{ 6x, x^3, 2, x^2 \}$$

is a basis for $P_3(\mathbb{R})$ with respect to which

$$[T]^{\beta}_{\beta} = \begin{pmatrix} 2 & 1 & 0 & 0 \\ 0 & 2 & 0 & 0 \\ 0 & 0 & 2 & 1 \\ 0 & 0 & 0 & 2 \end{pmatrix}$$

(c) $$\delta = \left\{ \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1/6 \end{pmatrix}, \begin{pmatrix} 200 \\ 0 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 0 \\ 100 \\ 0 \end{pmatrix} \right\}$$

$$\updownarrow$$

$$\{ x, x^3/6, 200, 100x^2 \}$$

will do.