Jawaban Kuis 2 2019

1.

Quiz. Aljabar Geometry.

2a. Matrix transisi dari $B \to B'$.

$$\left[\begin{array}{ccc|ccc} 3 & 1 & -1 & 2 & 2 & 1 \\ 1 & 1 & 0 & 1 & -1 & 2 \\ -5 & -3 & 2 & 1 & 1 & 1 \end{array}\right] \overset{OBE}{\rightsquigarrow} \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 3 & 2 & 5/2 \\ 0 & 1 & 0 & -2 & -3 & -1/2 \\ 0 & 0 & 1 & 5 & 1 & 6 \end{array}\right]$$

$$\therefore P_{B \to B'} = \begin{bmatrix} 3 & 2 & 5/2 \\ -2 & -3 & -1/2 \\ 5 & 1 & 6 \end{bmatrix}$$

2b. Matrix transisi basis-standard di R^3 ke B.

$$\left[\begin{array}{ccc|ccc} 2 & 2 & 1 & 1 & 0 & 0 \\ 1 & -1 & 2 & 0 & 1 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 \end{array}\right] \overset{OBE}{\rightsquigarrow} \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 3/2 & 1/2 & -5/2 \\ 0 & 1 & 0 & -1/2 & -1/2 & 3/2 \\ 0 & 0 & 1 & -1 & 0 & 2 \end{array}\right]$$

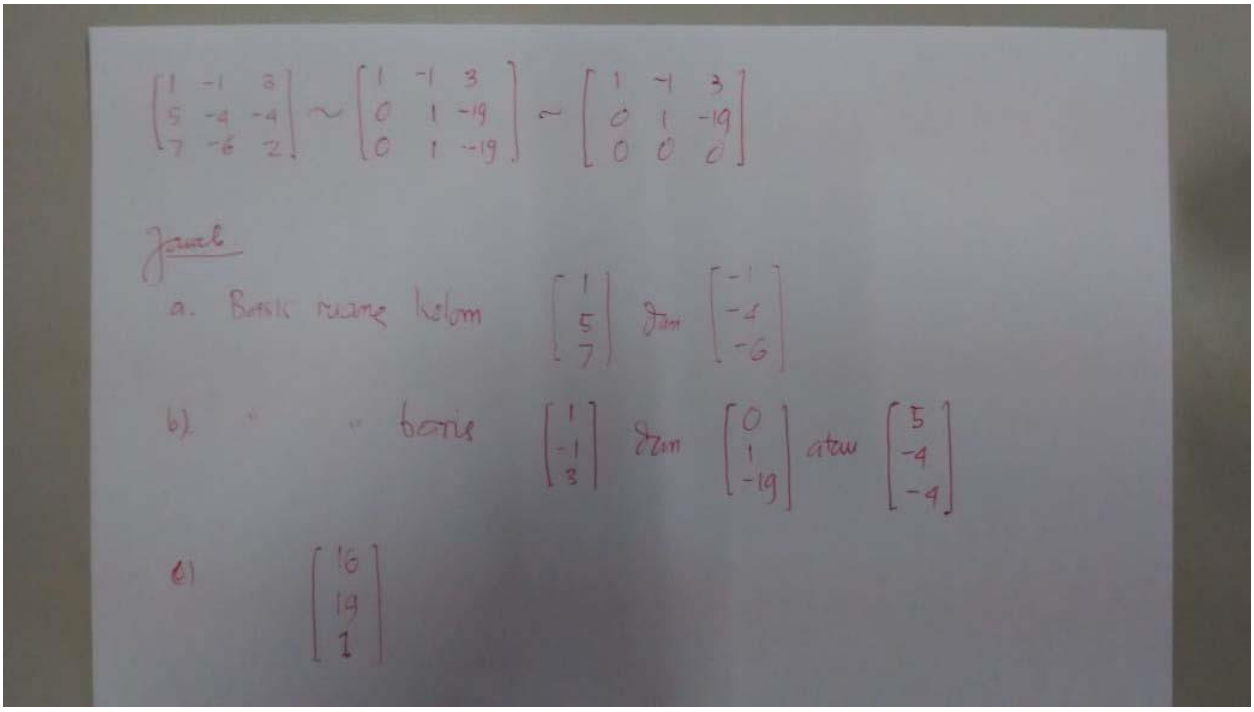
$$\therefore P_{E \to B} = \begin{bmatrix} 3/2 & 1/2 & -5/2 \\ -1/2 & -1/2 & 3/2 \\ -1 & 0 & 2 \end{bmatrix}$$

2c. Matrix transisi basis-standard di $R^3 \to B'$

$$\left[\begin{array}{ccc|ccc} 3 & 1 & -1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 & 0 \\ -5 & -3 & 2 & 0 & 0 & 1 \end{array}\right] \overset{OBE}{\rightsquigarrow} \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 1 & 1/2 & 1/2 \\ 0 & 1 & 0 & -1 & 1/2 & -1/2 \\ 0 & 0 & 1 & 1 & 2 & 1 \end{array}\right]$$

$$\therefore P_{E \to B'} = \begin{bmatrix} 1 & 1/2 & 1/2 \\ -1 & 1/2 & -1/2 \\ 1 & 2 & 1 \end{bmatrix}$$

2.



3.

(a) Nilai-nilai eigen dari matriks A adalah $\lambda = 0$ dan $\lambda = 1$

(b) Semua vektor eigen dari A adalah

$\lambda = 0 \rightarrow \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = s\begin{bmatrix} 1 \\ 0 \\ -3 \end{bmatrix} + t\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$, basis ruang eigen: $\mathbf{p}_1 = \begin{bmatrix} 1 \\ 0 \\ -3 \end{bmatrix}$, $\mathbf{p}_2 = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$

$\lambda = 1 \rightarrow \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = s\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ atau $\mathbf{p}_3 = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$, basis ruang eigen:

(c) Ya, bisa karena dimensi basis = 3, sesuai dengan ukuran matriks 3 x 3. Matriks diagonal dari A adalah

$D = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, $A^5 = A$ (tidak berubah)