#Attendance quiz

#Q-1: Who named their household name fractals?
#Ans-1: Benoit B. Mandelbrot was known as the Fractalist.

#Ans-2

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with(LinearAlgebra) :
x := Matrix([[-3/2, 3/2], [-3, 11/4]])
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$$x := \begin{bmatrix} -\frac{3}{2} & \frac{3}{2} \\ -3 & \frac{11}{4} \end{bmatrix} \quad (1)$$

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Eigenvectors(x)
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$$\begin{bmatrix} \frac{1}{2} \\ \frac{3}{4} \end{bmatrix}, \begin{bmatrix} \frac{3}{4} & \frac{2}{3} \\ 1 & 1 \end{bmatrix} \quad (2)$$

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for i from 100 to 110 do
print( evalf(x^i) )
od:
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$$\begin{bmatrix} -2.565761748 \times 10^{-12} & 1.924321311 \times 10^{-12} \\ -3.848642622 \times 10^{-12} & 2.886481967 \times 10^{-12} \end{bmatrix}$$

$$\begin{bmatrix} -1.924321311 \times 10^{-12} & 1.443240983 \times 10^{-12} \\ -2.886481967 \times 10^{-12} & 2.164861475 \times 10^{-12} \end{bmatrix}$$

$$\begin{bmatrix} -1.443240983 \times 10^{-12} & 1.082430738 \times 10^{-12} \\ -2.164861475 \times 10^{-12} & 1.623646106 \times 10^{-12} \end{bmatrix}$$

$$\begin{bmatrix} -1.082430738 \times 10^{-12} & 8.118230532 \times 10^{-13} \\ -1.623646106 \times 10^{-12} & 1.217734580 \times 10^{-12} \end{bmatrix}$$

$$\begin{bmatrix} -8.118230532 \times 10^{-13} & 6.088672899 \times 10^{-13} \\ -1.217734580 \times 10^{-12} & 9.133009348 \times 10^{-13} \end{bmatrix}$$

$$\begin{bmatrix} -6.088672899 \times 10^{-13} & 4.566504674 \times 10^{-13} \\ -9.133009348 \times 10^{-13} & 6.849757011 \times 10^{-13} \end{bmatrix}$$

$$\begin{bmatrix} -4.566504674 \times 10^{-13} & 3.424878506 \times 10^{-13} \\ -6.849757011 \times 10^{-13} & 5.137317758 \times 10^{-13} \end{bmatrix}$$

$$\begin{bmatrix} -3.424878506 \times 10^{-13} & 2.568658879 \times 10^{-13} \\ -5.137317758 \times 10^{-13} & 3.852988319 \times 10^{-13} \end{bmatrix}$$

$$\begin{bmatrix} -2.568658879 \times 10^{-13} & 1.926494159 \times 10^{-13} \\ -3.852988319 \times 10^{-13} & 2.889741239 \times 10^{-13} \end{bmatrix}$$

$$\begin{bmatrix} -1.926494159 \times 10^{-13} & 1.444870620 \times 10^{-13} \\ -2.889741239 \times 10^{-13} & 2.167305929 \times 10^{-13} \end{bmatrix}$$

$$\begin{bmatrix} -1.444870620 \times 10^{-13} & 1.083652965 \times 10^{-13} \\ -2.167305929 \times 10^{-13} & 1.625479447 \times 10^{-13} \end{bmatrix} \quad \textbf{(3)}$$

 # We see that after iterating many times the matrix converges to zero matrix

$r1 := \frac{1}{2}$

$$r1 := \frac{1}{2} \quad \textbf{(4)}$$

$r2 := \frac{3}{4}$

$$r2 := \frac{3}{4} \quad \textbf{(5)}$$

$v1 := Matrix\left(\left[\left[\frac{3}{4}\right], [1]\right]\right)$

$$v1 := \begin{bmatrix} \frac{3}{4} \\ 1 \end{bmatrix} \quad \textbf{(6)}$$

$v2 := Matrix\left(\left[\left[\frac{2}{3}\right], [1]\right]\right)$

$$v2 := \begin{bmatrix} \frac{2}{3} \\ 1 \end{bmatrix} \quad \textbf{(7)}$$

$M := Matrix\left(\left[\left[\frac{7}{2}, 0\right], [5, 0]\right]\right)$

$$M := \begin{bmatrix} \frac{7}{2} & 0 \\ 5 & 0 \end{bmatrix} \quad \textbf{(8)}$$

$2 \cdot v1 + 3 \cdot v2$

$$\begin{bmatrix} \frac{7}{2} \\ 5 \end{bmatrix} \tag{9}$$

$2^5 \cdot r1^5 \cdot v1 + 3^5 \cdot r2^5 \cdot v2$

$$\begin{bmatrix} \frac{20067}{512} \\ \frac{60073}{1024} \end{bmatrix} \tag{10}$$

 # I was confused on this question how to solve this as we had to prove M^n which isn't possible as M isn't a
#square matrix