**Q1. Verify that Eigen value is 4 and Eigen Vector v = (1, 1) for given matrix A.**

**A =**

Let’s find the Eigen value of Matrix A.

| A – λI | = 0

= 0

(1-λ)(2-λ) – 6 = 0

2 – 3λ +λ² -6 = 0

λ²-3λ -4 = 0

(λ – 4)(λ +1) = 0

λ = 4 or λ =-1

Let’s find the Eigen vectors of matrix A

(λ I – A) v = 0

For any Eigen value (λ), the Eigen space (Eλ) = N(λ I – A)

For λ = 4, E4 = N(4\*I – A)

= N( = N()

v = O

= O

= O

= O

– = 0

=

E4 = =

**Q2. Verify that Eigen value is 3 and Eigen Vector v = (2, 1, -1) for given matrix A.**

**A =**

Let’s find the Eigen value of Matrix A.

| λI – A | = 0

- = 0

= 0

( = 0 --------(1)

2 = 0 --------(2)

-2 = 0 --------(3)

On (3) 🡪 (2) + (3)

- = 0

- +λ -2 + - 8 - = 0

(λ -3) +(λ -13)

**Q3. Given that v1 = (1, -2) and v2 = (1, 1) are eigen vectors of A, determine the eigen values of A.**

**A =**

**Q4. Determine all eigen values and corresponding eigen vectors of the given matrix A. If,**

1. **A =**
2. **A =**
3. **A =**