Question3)

eigenvslue1: 4

eigenvalue2: [1. 1. 1.]

eigenvslue1: 3.0

eigenvalue2: [1. 1. 1.]

eigenvslue1: 3.0

eigenvalue2: [1. 1. 1.]

eigenvslue1: 3.0

eigenvalue2: [1. 1. 1.]

eigenvslue1: 3.0

eigenvalue2: [1. 1. 1.]

eigenvslue1: 3.0

eigenvalue2: [1. 1. 1.]

Part Two

eigenvslue1: -8

eigenvalue2: [-0.5 0.25 1.]

eigenvslue1: -5.25

eigenvalue2: [1.   0.14285714 -0.71428571]

eigenvslue1: -5.571428571428572

eigenvalue2: [-0.84615385 0.07692308 1.   ]

eigenvslue1: -5.769230769230769

eigenvalue2: [1.   0.04 -0.92]

eigenvslue1: -5.88

eigenvalue2: [-0.95918367 0.02040816 1.   ]

eigenvslue1: -5.938775510204081

eigenvalue2: [1.   0.01030928 -0.97938144]

Question4) Output

Original size is=64000

size: 41040

size: 42080

size: 44160

size: 48320

size: 56640

size: 73280

when r increases the size and the clearity increase with it.