------------------ Question 1--

Question 1(a):

[[0.78463923 0.32183739 0.9548667]

 [0.74565723 0.58265815 0.25771947]

 [0.36527612 0.94268703 0.79235751]

 [0.07160973 0.64565317 0.80047946]]

Question 1(b):

[[0.41792584]

 [0.41862773]

 [0.08454547]

 [0.04479782]]

Question 1(c):

[[0.78463923 0.32183739 0.9548667 0.74565723 0.58265815 0.25771947]

 [0.36527612 0.94268703 0.79235751 0.07160973 0.64565317 0.80047946]]

Question 1(d):

[[1.20256507 0.73976323 1.37279254]

 [1.16428496 1.00128588 0.6763472]

 [0.44982159 1.0272325 0.87690298]

 [0.11640755 0.69045099 0.84527728]]

Question 1(e):

[0.41792584 0.41862773 0.08454547 0.04479782]

Question 1(f):

[[0.41792584 0.32183739 0.9548667]

 [0.41862773 0.58265815 0.25771947]

[0.08454547 0.94268703 0.79235751]

 [0.04479782 0.64565317 0.80047946]]

Question 1(g):

[[1.37279254 0.32183739 0.9548667]

 [0.6763472 0.58265815 0.25771947]

 [0.87690298 0.94268703 0.79235751]

 [0.84527728 0.64565317 0.80047946]]

Question 1(h):

[[1.37279254 0.32183739]

 [0.6763472 0.58265815]

 [0.87690298 0.94268703]

 [0.84527728 0.64565317]]

Question 1(i):

[1.37279254 0.32183739 0.9548667]

[0.87690298 0.94268703 0.79235751]

Question 1(j):

9.069578910731876

Question 1(k):

1.3727925412621045

Question 1(l):

0.7557982425609896

Question 1(m):

[[0.63369403 -2.2674177 -0.09236705]

 [-0.78209744 -1.08030925 -2.7117672]

 [-0.26271783 -0.11804187 -0.46548517]

 [-0.33618113 -0.87498562 -0.4450888]]

Question 1(n):

[[0.96886792]

 [0.4870448]

 [0.60980196]]

------------------ Question 2--

Question 2(c):

mymeasure(200)

0.00799989700317

9.91600012779

2.7284841053187847e-12

mymeasure(2000)

0.572000026703

10766.4039998

2.9103830456733704e-09

------------------ Question 4--

Question 4(f):

best-fitting w: [-61.53882763 -10549.55566559   4063.78680233 16096.66588126

  -6484.81659134   1311.64720066   9698.18002227 -13217.21905886

   -776.23779436]

Value of M: 8

Training Error 2.1884741652085773

Test Error 7.128180382255042

------------------ Question 5--

Question 5(c):

Optimal w: [-189.08308506 -6.02497484 116.47591273 -65.83057251 -92.35189119

  -15.0334197 122.03691355 10.56762624 151.07418224 -140.73588153

  176.2007272 249.75636451 -66.60177347 -37.4439507 31.05436252

  112.38296288]

Optimal alpha -6

Training Error: 2.2733851338221616

Validation Error: 7.6706983126990425

Test Error: 9.828733576810318

------------------ Question 6--

Question 6(c)

Mean Training Error: 9.759819237417751

Mean Validation Error: 14.638913409958764

Question 6(d)

Training Error: 3.3718353110832404

Mean Validation Error: 7.808237315151857

Test Error: 6.92545777851871

------------------ Question 7--

w: [-54.00923238 6.86608903 2.13415233 15.60406712 8.49046415

  14.11254973 6.71531103 15.41208099 10.05518519 -1.05068933

  5.83223631 16.41404589 18.42321602 18.46844227 5.19156209

  2.34580499]

Training Error: 3.8657004394685988

Test Error: 5.985760386310134

w-w2 Magnitud: 1.8430266486291202e-05

Learning Rate: 0.01

Alpha: 0.01