

Question 1(a)

Question 1(b)

Question 1(c)

(0.84745, 2)

Question 1(d)

(0.85045, 4)

Question 1(e)

(0.851, 2)

Question 1(g)

Question 1(h)

Question 1(i)

Question 1(k)

Question 1(l)

93.6476569391

Question 3(a)

0.0

Question 3(b)

('Loss Train ', 0.3273194030573416)

('Acc Train ', 78.205)

('Acc Test ', 77.56)

('Loss Train ', 0.2386759748331194)

('Acc Train ', 82.655)

('Acc Test ', 82.27499999999999)

('Loss Train ', 0.23549726623157943)

('Acc Train ', 82.705)

('Acc Test ', 82.33500000000001)

('Loss Train ', 0.23366466515341075)

('Acc Train ', 82.775)

('Acc Test ', 82.38499999999999)

('Loss Train ', 0.23161968703035724)

('Acc Train ', 82.845)

('Acc Test ', 82.38499999999999)

('Loss Train ', 0.2295154465589587)

('Acc Train ', 82.915)

('Acc Test ', 82.42)

('Loss Train ', 0.227341910442355)

('Acc Train ', 82.975)

('Acc Test ', 82.505)

('Loss Train ', 0.22491426176082727)

('Acc Train ', 83.03)
('Acc Test ', 82.515)
('Loss Train ', 0.2219805344541399)
('Acc Train ', 83.1)
('Acc Test ', 82.60499999999999)
('Loss Train ', 0.2184331789469021)
('Acc Train ', 83.27)
('Acc Test ', 82.69999999999999)
('Loss Train ', 0.21458401163938962)
('Acc Train ', 83.315)
('Acc Test ', 82.83)
('Loss Train ', 0.2110319271084265)
('Acc Train ', 83.36)
('Acc Test ', 82.89999999999999)
('Loss Train ', 0.20807503328956564)
('Acc Train ', 83.43)
('Acc Test ', 82.975)
('Loss Train ', 0.2056145053847332)
('Acc Train ', 83.54)
('Acc Test ', 83.095)
('Loss Train ', 0.2034718809946082)
('Acc Train ', 83.60499999999999)
('Acc Test ', 83.1)
('Loss Train ', 0.20152246763860007)
('Acc Train ', 83.67)
('Acc Test ', 83.19)
('Loss Train ', 0.1996927183912745)
('Acc Train ', 83.75)
('Acc Test ', 83.23)

('Loss Train ', 0.19793818365194307)
('Acc Train ', 83.82)
('Acc Test ', 83.365)
('Loss Train ', 0.19622954186331582)
('Acc Train ', 83.895)
('Acc Test ', 83.46000000000001)
('Loss Train ', 0.19454801479820868)
('Acc Train ', 83.94500000000001)
('Acc Test ', 83.53)
('Loss Train ', 0.1928880871024847)
('Acc Train ', 84.00999999999999)
('Acc Test ', 83.59)
('Loss Train ', 0.19126370485322744)
('Acc Train ', 84.015)
('Acc Test ', 83.685)
('Loss Train ', 0.1897099930272163)
('Acc Train ', 84.08)
('Acc Test ', 83.81)
('Loss Train ', 0.18827262732149483)
('Acc Train ', 84.205)
('Acc Test ', 83.935)
('Loss Train ', 0.18698866434056785)
('Acc Train ', 84.245)
('Acc Test ', 84.04)
('Loss Train ', 0.1858735568260103)
('Acc Train ', 84.34)
('Acc Test ', 84.17999999999999)
('Loss Train ', 0.1849219644536072)
('Acc Train ', 84.385)

('Acc Test ', 84.24000000000001)
('Loss Train ', 0.18411626777667797)
('Acc Train ', 84.35000000000001)
('Acc Test ', 84.27)
('Loss Train ', 0.18343460078782026)
('Acc Train ', 84.37)
('Acc Test ', 84.28)
('Loss Train ', 0.18285558790901246)
('Acc Train ', 84.37)
('Acc Test ', 84.315)
('Loss Train ', 0.18236042790391274)
('Acc Train ', 84.385)
('Acc Test ', 84.36)
('Loss Train ', 0.18193349069611958)
('Acc Train ', 84.38)
('Acc Test ', 84.395)
('Loss Train ', 0.1815621988934692)
('Acc Train ', 84.43)
('Acc Test ', 84.39)
('Loss Train ', 0.18123661279175007)
('Acc Train ', 84.485)
('Acc Test ', 84.41)
('Loss Train ', 0.18094893710061363)
('Acc Train ', 84.5)
('Acc Test ', 84.45)
('Loss Train ', 0.18069305669998606)
('Acc Train ', 84.50999999999999)
('Acc Test ', 84.465)
('Loss Train ', 0.1804641451524921)

('Acc Train ', 84.54)
('Acc Test ', 84.515)
('Loss Train ', 0.18025835476373592)
('Acc Train ', 84.56)
('Acc Test ', 84.52)
('Loss Train ', 0.1800725803133418)
('Acc Train ', 84.575)
('Acc Test ', 84.53)
('Loss Train ', 0.17990428274301667)
('Acc Train ', 84.59)
('Acc Test ', 84.565)
('Loss Train ', 0.1797513588343058)
('Acc Train ', 84.61999999999999)
('Acc Test ', 84.565)
('Loss Train ', 0.17961204496924607)
('Acc Train ', 84.635)
('Acc Test ', 84.58)
('Loss Train ', 0.17948484568906814)
('Acc Train ', 84.64)
('Acc Test ', 84.60499999999999)
('Loss Train ', 0.17936848016545437)
('Acc Train ', 84.625)
('Acc Test ', 84.61999999999999)
('Loss Train ', 0.17926184162057224)
('Acc Train ', 84.615)
('Acc Test ', 84.655)
('Loss Train ', 0.17916396616721328)
('Acc Train ', 84.6)
('Acc Test ', 84.67)

('Loss Train ', 0.17907400857050693)

('Acc Train ', 84.6)

('Acc Test ', 84.655)

('Loss Train ', 0.17899122315642202)

('Acc Train ', 84.61)

('Acc Test ', 84.665)

('Loss Train ', 0.17891494859599896)

('Acc Train ', 84.625)

('Acc Test ', 84.67)

('Loss Train ', 0.17884459564463692)

('Acc Train ', 84.635)

('Acc Test ', 84.675)

('Loss Train ', 0.17877963716088496)

('Acc Train ', 84.64500000000001)

('Acc Test ', 84.695)

('Loss Train ', 0.1787195999024288)

('Acc Train ', 84.665)

('Acc Test ', 84.7)

('Loss Train ', 0.17866405772103958)

('Acc Train ', 84.665)

('Acc Test ', 84.695)

('Loss Train ', 0.17861262586838744)

('Acc Train ', 84.685)

('Acc Test ', 84.69)

('Loss Train ', 0.17856495619108434)

('Acc Train ', 84.67)

('Acc Test ', 84.685)

('Loss Train ', 0.17852073304298252)

('Acc Train ', 84.665)

('Acc Test ', 84.67)
('Loss Train ', 0.17847966978033167)
('Acc Train ', 84.66)
('Acc Test ', 84.675)
('Loss Train ', 0.17844150573411166)
('Acc Train ', 84.66)
('Acc Test ', 84.67)
('Loss Train ', 0.1784060035759829)
('Acc Train ', 84.675)
('Acc Test ', 84.675)
('Loss Train ', 0.17837294701146758)
('Acc Train ', 84.675)
('Acc Test ', 84.675)
('Loss Train ', 0.17834213874734722)
('Acc Train ', 84.665)
('Acc Test ', 84.685)
('Loss Train ', 0.17831339869073842)
('Acc Train ', 84.67)
('Acc Test ', 84.685)
('Loss Train ', 0.17828656234551915)
('Acc Train ', 84.685)
('Acc Test ', 84.69)
('Loss Train ', 0.17826147937824452)
('Acc Train ', 84.68)
('Acc Test ', 84.71499999999999)
('Loss Train ', 0.1782380123307807)
('Acc Train ', 84.685)
('Acc Test ', 84.705)
('Loss Train ', 0.17821603546091708)

('Acc Train ', 84.67)
('Acc Test ', 84.695)
('Loss Train ', 0.1781954336953953)
('Acc Train ', 84.665)
('Acc Test ', 84.69)
('Loss Train ', 0.17817610168233755)
('Acc Train ', 84.67)
('Acc Test ', 84.685)
('Loss Train ', 0.17815794293206585)
('Acc Train ', 84.665)
('Acc Test ', 84.69)
('Loss Train ', 0.1781408690369344)
('Acc Train ', 84.655)
('Acc Test ', 84.685)
('Loss Train ', 0.17812479896209585)
('Acc Train ', 84.655)
('Acc Test ', 84.685)
('Loss Train ', 0.1781096584001891)
('Acc Train ', 84.64)
('Acc Test ', 84.685)
('Loss Train ', 0.17809537918380502)
('Acc Train ', 84.63000000000001)
('Acc Test ', 84.675)
('Loss Train ', 0.1780818987503051)
('Acc Train ', 84.64500000000001)
('Acc Test ', 84.665)
('Loss Train ', 0.17806915965417253)
('Acc Train ', 84.635)
('Acc Test ', 84.655)

('Loss Train ', 0.17805710912258443)
('Acc Train ', 84.64)
('Acc Test ', 84.655)
('Loss Train ', 0.17804569865032557)
('Acc Train ', 84.64500000000001)
('Acc Test ', 84.665)
('Loss Train ', 0.17803488363054523)
('Acc Train ', 84.64500000000001)
('Acc Test ', 84.665)
('Loss Train ', 0.17802462301818398)
('Acc Train ', 84.64500000000001)
('Acc Test ', 84.66)
('Loss Train ', 0.1780148790231882)
('Acc Train ', 84.655)
('Acc Test ', 84.66)
('Loss Train ', 0.1780056168308897)
('Acc Train ', 84.64500000000001)
('Acc Test ', 84.66)
('Loss Train ', 0.17799680434715548)
('Acc Train ', 84.65)
('Acc Test ', 84.655)
('Loss Train ', 0.1779884119661261)
('Acc Train ', 84.65)
('Acc Test ', 84.64500000000001)
('Loss Train ', 0.17798041235854503)
('Acc Train ', 84.64500000000001)
('Acc Test ', 84.64500000000001)
('Loss Train ', 0.17797278027885832)
('Acc Train ', 84.65)

('Acc Test ', 84.65)
('Loss Train ', 0.17796549238941645)
('Acc Train ', 84.655)
('Acc Test ', 84.655)
('Loss Train ', 0.17795852710025875)
('Acc Train ', 84.65)
('Acc Test ', 84.665)
('Loss Train ', 0.17795186442308708)
('Acc Train ', 84.655)
('Acc Test ', 84.665)
('Loss Train ', 0.17794548583816144)
('Acc Train ', 84.665)
('Acc Test ', 84.665)
('Loss Train ', 0.17793937417295616)
('Acc Train ', 84.665)
('Acc Test ', 84.66)
('Loss Train ', 0.17793351349152137)
('Acc Train ', 84.67)
('Acc Test ', 84.66)
('Loss Train ', 0.17792788899358253)
('Acc Train ', 84.68)
('Acc Test ', 84.66)
('Loss Train ', 0.1779224869225025)
('Acc Train ', 84.685)
('Acc Test ', 84.66)
('Loss Train ', 0.17791729448130228)
('Acc Train ', 84.685)
('Acc Test ', 84.66)
('Loss Train ', 0.1779122997560127)

('Acc Train ', 84.685)
('Acc Test ', 84.66)
('Loss Train ', 0.17790749164569358)
('Acc Train ', 84.695)
('Acc Test ', 84.655)
('Loss Train ', 0.17790285979851675)
('Acc Train ', 84.7)
('Acc Test ', 84.65)
('Loss Train ', 0.17789839455336276)
('Acc Train ', 84.69)
('Acc Test ', 84.64)
('Loss Train ', 0.1778940868864342)
('Acc Train ', 84.7)
('Acc Test ', 84.645000000000001)
('Loss Train ', 0.1778899283624312)
('Acc Train ', 84.7)
('Acc Test ', 84.645000000000001)
('Final Test Accuracy', 84.645000000000001)

Question 3(c)

('Loss Train ', 0.24554888272030706)
('Acc Train ', 84.005)
('Acc Test ', 84.365)
('Loss Train ', 0.2474915919701656)
('Acc Train ', 84.27)
('Acc Test ', 84.53)
('Loss Train ', 0.24824826154360227)
('Acc Train ', 84.41)

('Acc Test ', 84.56)
('Loss Train ', 0.24839755992160867)
('Acc Train ', 84.41499999999999)
('Acc Test ', 84.6)
('Loss Train ', 0.24839933824354898)
('Acc Train ', 84.435)
('Acc Test ', 84.58)
('Loss Train ', 0.24837698772920752)
('Acc Train ', 84.435)
('Acc Test ', 84.61999999999999)
('Loss Train ', 0.24835678479294465)
('Acc Train ', 84.455)
('Acc Test ', 84.58)
('Loss Train ', 0.24834114951951772)
('Acc Train ', 84.465)
('Acc Test ', 84.59)
('Loss Train ', 0.2483285375933943)
('Acc Train ', 84.465)
('Acc Test ', 84.585)
('Loss Train ', 0.24831762537073213)
('Acc Train ', 84.465)
('Acc Test ', 84.59)
('Loss Train ', 0.24830773662182423)
('Acc Train ', 84.465)
('Acc Test ', 84.58)
('Loss Train ', 0.24829861449319457)
('Acc Train ', 84.47)
('Acc Test ', 84.58)
('Loss Train ', 0.2482902004701635)

('Acc Train ', 84.47)
('Acc Test ', 84.58)
('Loss Train ', 0.24828250501051058)
('Acc Train ', 84.48)
('Acc Test ', 84.575)
('Loss Train ', 0.24827554596587376)
('Acc Train ', 84.48)
('Acc Test ', 84.575)
('Loss Train ', 0.24826932508031682)
('Acc Train ', 84.48)
('Acc Test ', 84.575)
('Loss Train ', 0.24826382307851205)
('Acc Train ', 84.48)
('Acc Test ', 84.575)
('Loss Train ', 0.2482590025947833)
('Acc Train ', 84.48)
('Acc Test ', 84.57000000000001)
('Loss Train ', 0.2482548135636735)
('Acc Train ', 84.475)
('Acc Test ', 84.57000000000001)
('Loss Train ', 0.2482511986281218)
('Acc Train ', 84.475)
('Acc Test ', 84.57000000000001)
('Final Test Accuracy', 84.57000000000001)