Marco Reina 7066486
Samuele Serri 7069839

a) for class y=0 E[x1] = (1+1+2+3+3)/5 = 2 E[x2] = (1+1+2+2+3)/5 = 1.8 cov(x1,x2) = E[x1x2] - E[x1]E[x2] = (3+6+6+1+2)/5 - 3.6 = 0 for class y=1 E[x1] = (1+2+4+5+5)/5 = 3.4 E[x2] = (4+5+6+6+7)/5 = 5.6 cov(x1,x2) = E[x1x2] - E[x1]E[x2] = (30+24+20+10+7)/5 - 19.04 = 18.2-19.04 = -0.84 b) xT = (3.5,2) sigma = covariance matrix for y=0 var(x1) = E[x1^2] $- E[x1]^2 = (1 + 1 + 4 + 9 + 9)/5 - 4 = 0.8 var(x2) = (1 + 1 + 4 + 4 + 9)/5 - 3.6 = 0.2 for y = 1 var(x1) = (1 + 4 + 16 + 25 + 25)/5 - 11.56 = 14.2 - 11.56 = 2.64 var(x2) = (16+25+36+36+49)/5 - 31.36 = 32.4 - 31.36 = 1.04 sigma for y = 0 (0.8, 0)(0, 0.2) sigma for y = 1 (2.64, -0.84)(-0.84, 1.04)$

mu = vector of expected values

c) LDA assumes that the classes have different means and shared variance, while with QDA each class can have a different variance

d) ???

e) LDA is a much less flexible classifier than QDA. therefore LDA usually makes better predictions when there are relatively few training observations and reducing variance is crucial. QDA can be used with a bigger sample size, when the variance of the classifier is not a huge concern.

numver of features??