

STA 3190 - Classification Practice Problems

Solutions



1. a) $H_0: \beta_{\text{smoke}} = 0$ $TS: z = 6.305$ $P < .0001$ Reject H_0

b) smokers: .027842 non-smokers: .023166

c) 1.207630

d) $H_0: \beta_{\text{smoke}} = 0$ $TS: z = 12.25$ $P < .0001$

e) $H_0: \beta_{\text{age}} = 0$ $TS: z = 32.61$ $P < .0001$

f) .015892, .010983, .058772, .041167

g) 1.454204 h) 1.094343

i) $H_0: \beta_{\text{SA}} = 0$ $TS: z = -2.233$ $P = .02554$

j) .016452, .010150, .056653, .042901

2. a) $H_0: \beta_{\text{NA}} = 0$ $TS: z = 3.483$ $P = .0005$

b) Increasing c) 8.909

d) $H_0: \beta_{\text{K}} = 0$ $TS: z = 2.467$ $P = .0136$

e) Increasing f) 5.815

g) $H_0: \beta_{\text{NA}} = 0$ $TS: z = 3.201$ $P = .0014$

h) $H_0: \beta_{\text{K}} = 0$ $TS: z = 2.384$ $P = .0171$

2 i) Case 1: 0.026517 (classified as original)

Case 42: -2.016364 (classified as fake)

j) sensitivity = 0.84 specificity = 0.96 PPV = $\frac{21}{22}$ NPV = $\frac{24}{28}$ OA = .90

3. a) 23.94 b) 20.79 c).6628 d).6628 e).9798 .1112

f)

		Actual	
		NBA	WNBA
P r e d	N	331	169
	W	169	331
		500	500

sens = spec = .6628 (up to random)
PPV = NPV = .662 = overall accuracy

g)

		Actual	
		NBA	WNBA
P r e d	N	784	178
	W	16	22
		800	200

sens = .98 Spec = .11
PPV = .815 NPV = .58
OA = .806

3.a)

\hat{y}	NHL	NBA	EPL
22	142.217	145.743	147.525*
23	158.489	160.919	161.764*
24	174.761	176.095*	176.003
25	191.033	191.271*	190.242

b) EPL/NBA: 23.902
NBA/NHL: 25.217

c) i).628 ii).844 iii).782 iv).639

d) i).640 ii).864 iii).798 iv).679

e)

	NHL	NBA	EPL
22	.030	.245	.725*
23	.084	.346	.577*
24	.200	.406*	.395
25	.387	.394*	.219

f) i).627 ii).844 iii).786 iv).635
g) i).641 ii).864 iii).794 iv).677