

EX 1

$$a) r_{bis} = \frac{\bar{X}_c - \bar{X}}{S_x} \sqrt{\frac{p}{q}} = \frac{3.33 - 3.1}{1.04} \sqrt{\frac{0.6}{0.4}} = \frac{0.23}{1.04} \sqrt{1.5} = 0.22 \cdot 1.22 = 0.27$$

	1	2	3	4	5	6	X	X-i	(X-i) ²
A	1	1	1	0	0	0	3	2.	4
B	1	0	0	0	0	1	2	2	4
C	1	0	1	0	1	1	4	3.	9
D	1	1	0	0	1	1	4	4	16
E	1	0	0	1	1	0	3	3	9
F	1	1	1	1	1	0	5	4.	16
G	1	1	1	1	1	1	6	5.	25
H	1	1	1	1	0	1	5	4.	16
I	1	1	1	0	0	0	3	2.	4
J	1	1	0	0	0	0	2	2	4
N=10								31	107

$$\bar{X}_c = \frac{2+3+4+5+4+2}{6} = \frac{20}{6} = 3.33$$

$$\bar{X}_r = \frac{31}{10} = 3.1$$

$$S_x = \sqrt{\frac{\sum X^2}{N} - \bar{X}^2} = \sqrt{\frac{107}{10} - 3.1^2} = \sqrt{10.7 - 9.61} = \sqrt{1.09} = 1.04$$

b) $0.2 < 0.27 < 0.29$ — The item discriminates slightly

EXERCISE 2

a) Item 1

$$b) X = R - \frac{w}{k-1} = 3 - \frac{2}{4-1} = 3 - \frac{2}{3} = 3 - 0.67 = 2.33$$

$$c) \frac{1}{k} = \frac{1}{4} = 0.25$$

EXERCISE 3

N=1000

	RED	FAVOURITE GREEN	BLUE
RED	—	200	750
GREEN	800	—	850
BLUE	250	150	—
	1050	350	1600

Order (highest to lowest)

	BLUE	RED	GREEN
BLUE	—	250	150
RED	750	—	200
GREEN	850	800	—
	1600	1050	350

Proportions matrix

	BLUE	RED	GREEN
BLUE	—	0.25	0.15
RED	0.75	—	0.2
GREEN	0.85	0.8	—

Z-scores matrix

	BLUE	RED	GREEN
BLUE	—	-0.67	-1.04
RED	0.67	—	-0.84
GREEN	1.04	0.84	—
Σz	1.71	0.17	-1.88
$\Sigma z^2 / k$	0.57	0.06	-0.63
	1.2	0.69	0

number of elements
(3)

a) 0.06 or 0.69

b) Blue and green (850 is the highest frequency)

EXERCISE 4

CAT.	1	2	3	4	5	6	7
f_i	16	30	24	40	35	35	20
F	16	46	70	110	145	180	200

$$AC = Q_3 - Q_1 = 5.64 - 2.67 = 2.97$$

$$Q_3 = L_i + \frac{1}{f_i} \left(\frac{3n}{4} - F_i \right) = 5.5 + \frac{1}{35} (150 - 145) = 5.5 + 0.14 = 5.64$$

$$\frac{3n}{4} = \frac{3 \cdot 200}{4} = \frac{600}{4} = 150$$

$$Q_1 = L_i - \frac{1}{f_i} \left(\frac{n}{4} - F_i \right) = 2.5 + \frac{1}{24} (50 - 46) = 2.5 + 0.17 = 2.67$$

$$\frac{n}{4} = \frac{200}{4} = 50$$

Med is located in category 4 (exactly in the middle), so we compare with 3

$$\frac{n}{2} = \frac{200}{2} = 100$$

$2.97 < 3$ — There is not ambiguity. We don't have to remove the item.