LESSON 10

Ex 1

	YES	NO	
HIGH	28 (75)	97 (50)	125
MEDIUM	242 (228)	138 (152)	380
LOW	330 (297)	165 (198)	495
	600	400	1000

125·600/1000
125·400/1000
380·600/1000
495·600/1000
380·400/1000
495·400/1000

χ^2 req:
- 2 obles qualitativas u ordinales
- Grupos independientes
- Valores esperados ≥ 5 in at least 20% of cells (table higher than 2x2)

$$\chi^2 = \sum \frac{(O-E)^2}{E} = \frac{(28-75)^2}{75} + \frac{(97-50)^2}{50} + \frac{(242-228)^2}{228} + \frac{(138-152)^2}{152} + \frac{(330-297)^2}{297} + \frac{(165-198)^2}{198} = 84.95$$

$df = (row-1)(column) = (3-1)(2-1) = 2 \cdot 1 = 2$

$\chi^2 = 84.95 > \chi^2_{(0.01,2)} = 9.21$ — H0 The attendance of a demonstration depends on the status of the worker

Ex 2

5·4/8 < 5

	(0) DID NOT SOLVE		(1) SOLVED		
CONTROL (0)	4 (2.5)	a	0	b	4
EXP (1)	1	c	3	d	4
	5		3		8

Fisher exact test because:
- Samples are independent
- Both variables are nominal
- Both variables are dichotomous
- χ^2 assumption is violated (expected value lower than 5).

$$z = \frac{(a/[a+b]) - (c/[c+d])}{\sqrt{p(1-p)\left[(1/[a+b]) + (1/[c+d])\right]}} = \frac{(4/[4+0]) - (1/[1+3])}{\sqrt{0.625(1-0.625)\cdot\left[(1/[4+0]) + (1/[1+3])\right]}} =$$

$$= \frac{4/4 - 1/4}{\sqrt{0.625 \cdot 0.375 \cdot [1/4 + 1/4]}} = \frac{1 - 0.25}{\sqrt{0.23 \cdot (0.25 + 0.25)}} = \frac{0.75}{\sqrt{0.23 \cdot 0.5}} = \frac{0.75}{\sqrt{0.12}} =$$

$$p = \frac{(a+c)}{N} = \frac{(4+1)}{8} = \frac{5}{8} = 0.625$$

$$= \frac{0.75}{0.35} = 2.14$$

$z = 2.14 > z_{\alpha/2} = 1.96$ → H0 There are statistically significant differences between the experimental and the control group

Ex 3

BEFORE	AFTER: ABS. (1)		AFTER: PRES. (0)	
PRESENT (0)	121	A	101	B
ABSENT (1)	33	C	59	D

McNemar test because:

- Samples are dependent
- Both variables are nominal
- Both variables are dichotomous

$$\chi^2 = \frac{(A-D)-1)^2}{A+D} = \frac{(121-59)-1)^2}{121+59} = \frac{(62-1)^2}{180} = \frac{3721}{180} = 20.67$$

$df = 1$

$\chi^2 = 20.67 > \chi^2_{(0.05,\,1)} = 3.84$ — the drug has an effect on the disease.