

A survey was given to randomly chosen high school students from years 9 to 12 on possible changes to the school's canteen.

The contingency table shows the results.

At a 5% significance level, test whether the student's canteen preference depends on the year group.

	Year group				
	9	10	11	12	
change	7	9	13	14	43
no change	14	12	9	7	42
	21	21	22	21	85

- 1.) $H_0 =$ The year group & canteen preference are Ind.
 $H_1 =$ The year group & canteen preference are dep.

2.)

	Exp.			
	9	10	11	12
Change	10.62	10.62	11.13	10.62
No Ch.	10.38	10.38	10.87	10.38

$$\frac{7}{21} + \frac{9}{21} + \frac{13}{22} + \frac{14}{21}$$

$$df = 3$$

	f_o	f_e	$f_o - f_e$	$(f_o - f_e)^2$	$\frac{(f_o - f_e)^2}{f_e}$
7	7	10.62	-3.62	13.10	1.24
9	9	10.62	-1.62	2.62	0.25
13	13	11.13	1.87	3.49	0.31
14	14	10.62	3.38	11.42	1.08
14	14	10.38	3.62	13.10	1.26
12	12	10.38	1.62	2.62	0.253
9	9	10.87	-1.87	3.49	0.32
7	7	10.38	-3.38	11.42	1.1

$$\chi^2_{calc} = 5.813$$