1. H_0: $p_1 = p_2 = p_3 = p_4 = p_5 = p_6 = 1/6$

H_a: one probability is different from 1/6

$$\frac{(8-10)^2}{10} + \frac{(11-10)^2}{10} + \frac{(0-10)^2}{10} + \frac{(12-10)^2}{10} + \frac{(20-10)^2}{10} + \frac{(9-10)^2}{10}$$

$$= \frac{1}{10}\left(2^2 + 1^2 + 10^2 + 2^2 + 10^2 + 1^2\right)$$

$$= \frac{210}{10}$$

$$= 21$$

degrees of freedom are $6-1 = 5$

p-value < 0.01

we reject the null

2. H_0: tax opinion independent from income

H_a: tax opinion is not independent

$$\text{For low} = \frac{598(336)}{1000}$$

$$= 200.92$$

$$\text{For medium} = \frac{598(351)}{1000}$$

$$= 209.89$$

For High = $\frac{598(313)}{1000}$

$= 187.17$

Against Low = $\frac{402(336)}{1000}$

$= 135.07$

Against medium = $\frac{402(351)}{1000}$

$= 141.10$

Against High = $\frac{402(313)}{1000}$

$= 125.83$

$$\frac{(182-200.928)^2}{200.928} + \frac{(154-135.072)^2}{135.072} + \frac{(203-187.174)^2}{187.174}$$

$$+ \frac{(213-209.898)^2}{213.898} + \frac{(110-125.826)^2}{125.826}$$

$$+ \frac{(138-141.102)^2}{141.102}$$

$= 7.87821$

degree of freedom $(3-1)(2-1) = 2$

critical value = 9.21

Fail to reject the null as test value is less than critical value