H1 (i) Prob of getting cold is lesser in vitamin c group than in the placebo group.

H2 (ii) prob of getting cold is higher in vitamin c group than in the placebo group.

$$E_{11} = \frac{139 \times 270}{270} = \frac{1112}{45}$$

$$E_{12} = \frac{139 \times 222}{270} = \frac{5143}{45}$$

$$E_{21} = \frac{131 \times 222}{270} = \frac{4847}{45}$$

$$E_{12} = \frac{131 \times 48}{270} = \frac{1048}{45}$$

$$x^2 = \frac{\left(17 - \frac{1112}{45}\right)^2}{\frac{1112}{45}} + \frac{\left(122 - \frac{5143}{45}\right)^2}{\frac{5143}{45}} + \frac{\left(31 - \frac{4847}{45}\right)^2}{\frac{4847}{45}} + \frac{\left(100 - \frac{1048}{45}\right)^2}{\frac{1048}{45}} = 310.2379$$

$x^2 = 3.841$.

$310.2379 > 3.841$ we reject the null hypothesis.

Question 8 B

	Got a cold	Did not get a cold	
Vitamin C	17	122	139
Placebo	31	to 109	140

$$P_1 = \frac{y_1}{r_1} = \frac{17}{139}$$

$$P_2 = \frac{y_2}{r_2} = \frac{31}{140}$$

$$RD = \frac{17}{130} - \frac{31}{140} = \frac{2082}{18209}$$

$$\text{Var}(P_1 - P_2) \frac{\frac{17}{130}\left(\frac{P-17}{139}\right)}{139} + \frac{31\left(1-\frac{31}{140}\right)}{131} = \frac{374}{75819} + 0.001878$$

$$= 0.001875285$$

$$C.I = \frac{-2082}{18209} \pm 1.96 \times \sqrt{0.001875285}$$

$$= \frac{2082}{18209} \pm 0.08487952$$

$$= 0.19922, -0.02946$$

(Q.) Questions 30 people

	Frequency
1 - 5	5
6 - 10	17
11 - 15	5
16 - 20	2
21 - 25	1

Histogram

(i) mean $= \frac{\Sigma fx}{f_i}$ $\frac{277}{30} = 9.233$

median $= L.c + \left(\frac{n}{2} - m\right) c_i$ / f

$5.5 + \frac{(15-5)}{5} \times 5 = 5.5 + \left(\frac{10}{2}\right)$

$= 5.5 + 10$

$= 15.5$

mode $= 8.5$

(ii) most people do exercise for 5 to 10 hours.

(iv) Frequency polygon

simple bar graph.