

STAT212 Assignment 9

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Answer to Question 1

$$\text{proportion of women who survived} = \frac{\text{count women survived}}{\text{total women on board}} = \frac{308}{462} = 0.67$$

$$\text{proportion of men who survived} = \frac{\text{count men survived}}{\text{total men on board}} = \frac{142}{851} = 0.17$$

Answer to Question 2

The parameters being tested are:

$$P_W = \text{proportion of women survived}$$

$$P_M = \text{proportion of men survived}$$

If the proportion of women survived and proportion of men survived is the same, then obviously $P_W = P_M$, in which case $P_W - P_M = \Delta_0 = 0$, the null value.

Consequently, writing Δ as $P_W - P_M$:

$$H_0 : P_W - P_M = 0 \text{ or } P_W = P_M \text{ (men didn't sacrifice themselves)}$$

$$H_A : P_W - P_M > 0 \text{ or } P_W > P_M \text{ (men did sacrifice themselves)}$$

Answer to Question 3

We first compute the value of the test statistic:

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}_p(1 - \hat{p}_p)}\sqrt{(1/n_1) + (1/n_2)}}$$

where $\hat{p}_p = (x_1 + x_2)/(n_1 + n_2)$.

We know:

$$x_1 = 308$$

$$n_1 = 462$$

$$\hat{p}_1 = 0.67$$

$$x_2 = 142$$

$$n_2 = 851$$

$$\hat{p}_2 = 0.17$$

Plugging these in:

$$z_0 = 18.22$$

The critical value is:

$$z_\alpha(\text{Right tailed})$$

We know:

$$\alpha = 0.05$$

Plugging it in:

$$z_{0.05} = 1.64$$

The rejection region is:

$$z > 1.64$$

The value of the test statistic does fall in the rejection region, we reject the H_0 .
Men gave women preference when boarding the lifeboats.