Q1)

I. In probability & Statistics, a population is set of same items or events which is of interest for some questions or experiments, it can be in a group of existing objects or individually.

II. The sample in this research used is known as probability sample, because in this research, researcher has collected data of individual players.

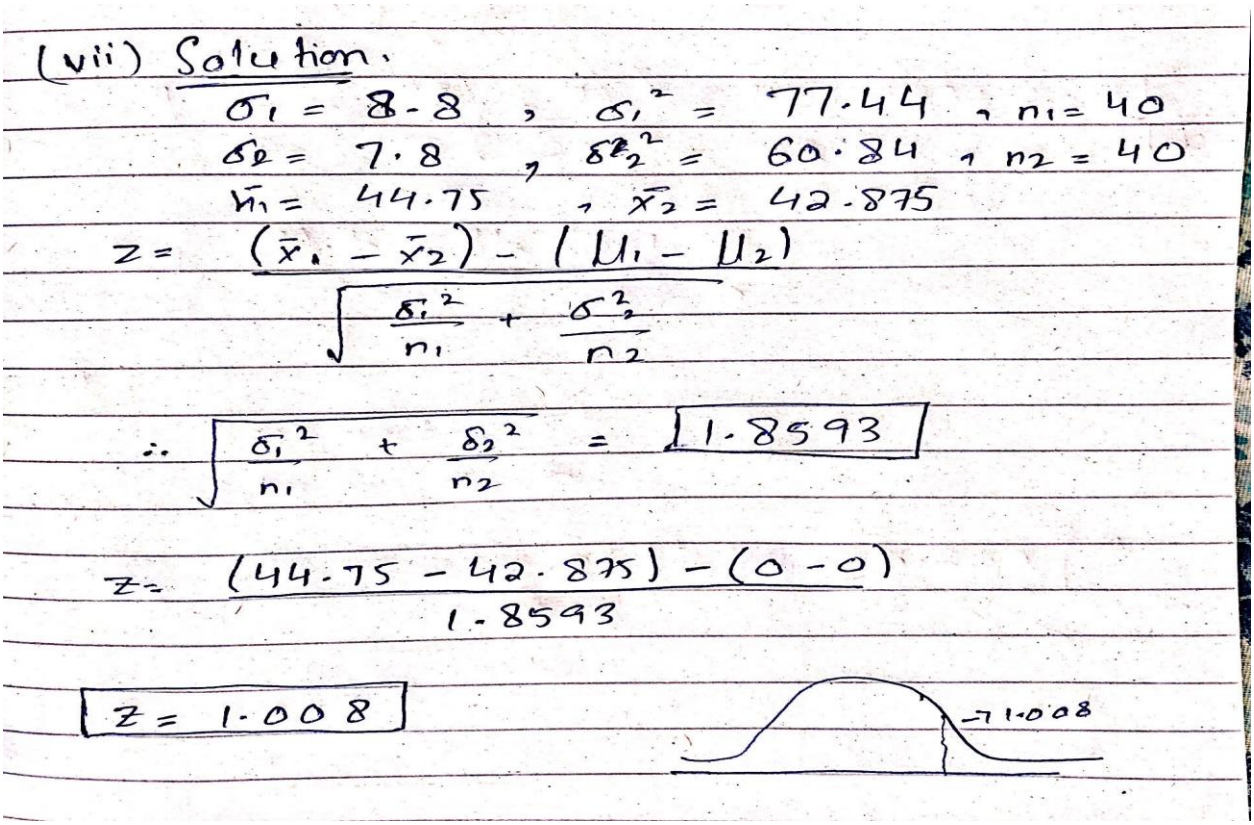
III. Yes, it is representative as the researcher has even divided the sample (home runs) in two categories, National League and American League and that of same size too, so it is a representative as each element has a chance to be picked.

IV. It is a Null Hypothesis.

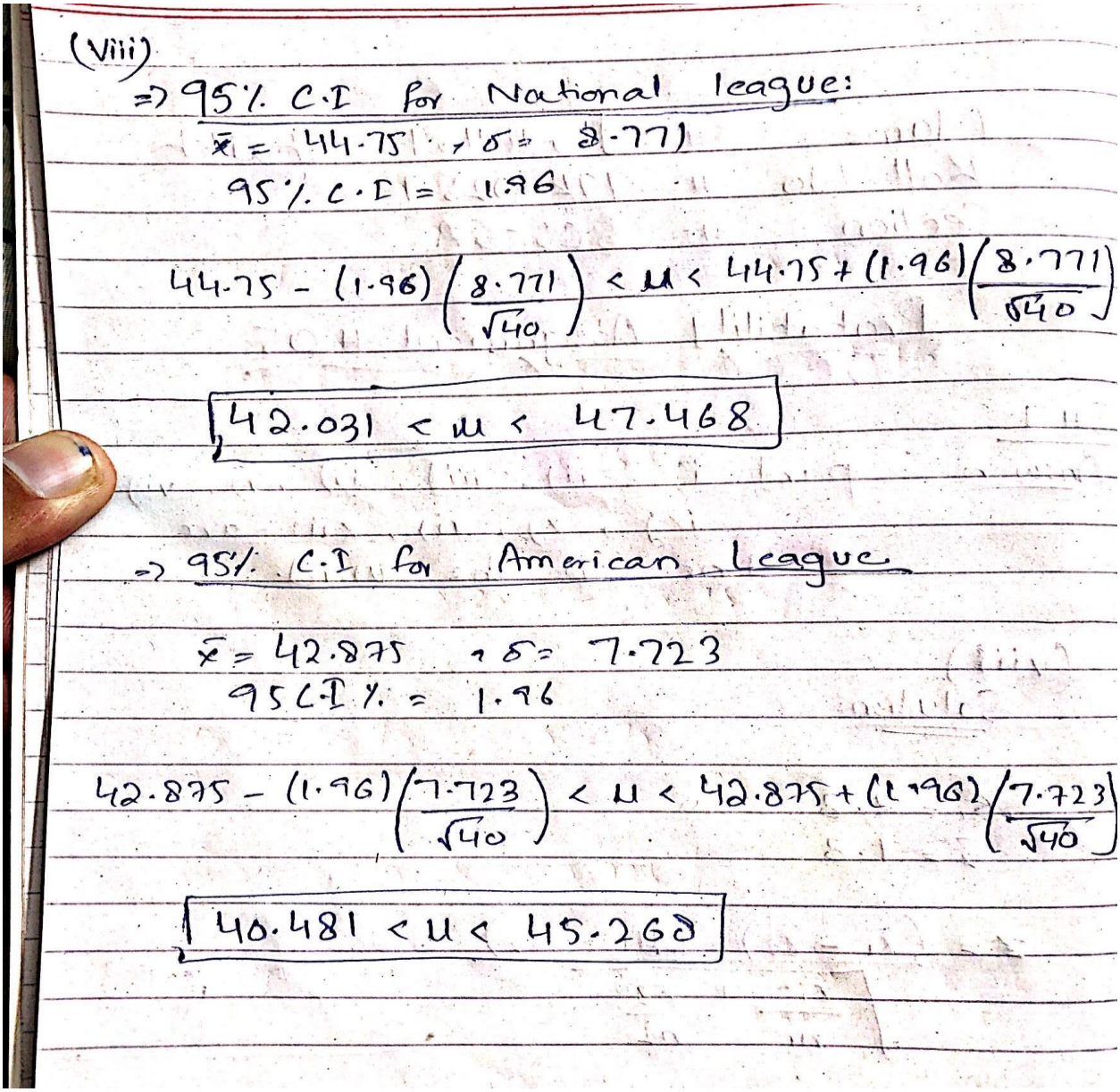
V. I will use confidence level.

VI. I will use Z- Test as sample is greater than 30.

VII.



VIII.



(viii)

⇒ 95% C.I for National league:

$\bar{x} = 44.75$, $\sigma = 8.771$

95% C.I = 1.96

$$44.75 - (1.96)\left(\frac{8.771}{\sqrt{40}}\right) < \mu < 44.75 + (1.96)\left(\frac{8.771}{\sqrt{40}}\right)$$

$$42.031 < \mu < 47.468$$

⇒ 95% C.I for American League

$\bar{x} = 42.875$, $\sigma = 7.723$

95 C.I % = 1.96

$$42.875 - (1.96)\left(\frac{7.723}{\sqrt{40}}\right) < \mu < 42.875 + (1.96)\left(\frac{7.723}{\sqrt{40}}\right)$$

$$40.481 < \mu < 45.268$$

IX. Ho Rejected.

X. From the above answers and test, I concluded that Null Hypothesis is rejected since it does not falls in the region expected to accept the hypothesis conducted.

XI. Yes, we can easily find the mean, standard deviation so the data was enough to answer the original questions asked.

XII. Mean, Median, Mode, and Quartiles might be used to answer the questions.

Q2)

Q#2

Solution:

(a) $n = 20$

$s = 2.45$

$\bar{x} = 11.3$

$t_{0.05} = 2.093$

$= \bar{x} \pm t_{\frac{0.05}{2}} \left(\frac{s}{\sqrt{n}}\right)$

$= 11.3 - (2.093)\left(\frac{2.45}{\sqrt{20}}\right) < \mu < 11.3 + (2.093)\left(\frac{2.45}{\sqrt{20}}\right)$

$\boxed{= 10.15 < \mu < 12.45}$

(b)

Variance $= \frac{\sigma^2}{n}$

$\frac{(2.45)^2}{20} = \boxed{0.300}$

Q3)

Q#3

Solution

$n = 1000$

$x_m = 250$

$x_F = 275$

C.I = 95%, $\alpha = 0.05$

$\hat{p}_M - \hat{p}_F = ?$, $z_{\frac{0.05}{2}} = 1.96$

$\hat{p}_M = \frac{250}{1000} = \boxed{0.250}$

$\hat{q}_M = 1 - 0.250 = \boxed{0.750}$

$\hat{p}_F = \frac{275}{1000} = 0.275$

$\hat{q}_F = 1 - 0.275 = \boxed{0.725}$

$= (\hat{p}_F - \hat{p}_M) \pm z_{\frac{0.05}{2}} \sqrt{\frac{\hat{p}_M \hat{q}_M}{n_M} + \frac{\hat{p}_F \hat{q}_F}{n_F}}$

$= (0.275 - 0.250) \pm (1.96) \sqrt{\frac{(0.2)(0.75) + (0.275)}{1000}}$

$\boxed{= -0.014 < p_F - p_M < 0.064}$