KUIS 2

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Subject : Computational Statistic

1. Mean of CP for Pokemons fire type is 281,67 while the standard deviation is 323,07. If the CP value is assumed as normally distributed, what is the probability of 100 Pokemons fire type have CP value below 290?

   (25 poin)

   Answer:

   - Known as:

     The CP value to calculate the probability = 290

     Standard deviation = 323.07

     Average CP for fire type Pokemon = 281.67

   - Converting the mean and standard deviation into the standard normal distribution:

     $$z = \frac{(x - \mu)}{\sigma}$$

     $$z\ score = \frac{observed\ values - mean}{standard\ deviation}$$

     $$z\ score = \frac{290 - 281.67}{323.07}$$

     z score = 0.0257

   - Find the probability using the standard normal distribution table

     The closest value to 0.0257 = 0.5096

   - **So, the chance of 100 fire type Pokemon having a CP value below 290 is about 50.96%.**

2. Suppose the caught pokemons have variance of HP is 1948,24. By choosing 25 pokemons randomly, the mean is 53,56. Determine the range of population average from the HP by using confidential level is 95%.

   (25 poin)

   Answer:

   - Known as:

     Mean = 53.56

     Population STD = $\sqrt{1948.24} \approx 44.13$

     Size = 25

     Confidential level = 95% (which corresponds to a t-value of about 2.064)

   - Formula for confidence interval for population mean:

     $$Confidential\ level = X \pm z \times \frac{\sigma}{\sqrt{n}}$$

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$$\text{Confidential level} = mean \pm \text{z value to desired level} \times \frac{population\ std}{\sqrt{\text{size}}}$$

$$\text{Confidential level} = 53.56 \pm 2.064 \times \frac{44.13}{\sqrt{25}}$$

$$\text{Confidential level} = 53.56 \pm 2.064 \times \frac{44.13}{5}$$

$$\text{Confidential level} = 53.56 \pm 2.064 \times 8.826$$

$$\text{Confidential level} = 53.56 \pm 18.195$$

$$\text{Confidential level} = 35.365 \quad , \quad \text{Confidential level} = 71.755$$

- **So, the population mean range of HP with 95% confidence is approximately (35.365, 71.755).**

3. Check the Pokemon data!
    a. Determine the standard deviation of caught Pokemon! (5 poin)
    b. Determine the standard deviation of flee Pokemon! (5 poin)
    c. Are the caught Pokemon and flee Pokemon groups homogen? Use Harley testing to justify your answer. (10 poin)

4. By using Pokemon data which caught from March 15th to March 22nd 2023, perform several activities, such:
    a. Use KS test to determine whether "Attack" attribute is normally distributed by using *p-value* = 0.05. Justify your answer by writing the calculation process! (10 poin)
    b. Make a histogram of "Attack" to justify your answer at point a! (5 poin)
    c. Use KS test to determine "Defence" is normally distributed or not by using confidential level = 99%. Justify your answer by writing the calculation process! (10 poin)
    d. Make a histogram of "Defence" to justify your answer at point c! (5 poin)

Answer number 3 and 4:
https://colab.research.google.com/drive/13K94kRFvdCRBKo0lEmpQm3KrHNuf45uh?usp=sharing