Name: _____ **Class Period:** _____ **Date:** _____

CALCULATING MEAN WEIGHT

In addition to girth, fish biologists and anglers are interested in the relationship between the length of a sturgeon and weight of a sturgeon. If the length and weight increase at the same rate, then there will be a one-to-one ratio between these two variables.

1. Based on your current knowledge of how organisms grow, do you think the length of a sturgeon and weight of a sturgeon will be a one-to-one ratio? Why or why not?

2. In addition to girth measurements, the Michigan Department of Natural Resources (DNR) and other state agencies closely monitor lake sturgeon by taking weight measurements. **

   Calculate the mean weight in pounds of five lake sturgeon caught by the DNR in Lake St. Clair, Michigan, in 2022. Two examples are done for you.

   EXAMPLE 1: Length of sturgeon: 20 inches
   Recorded weight measurements: 1, 1
   Number of data points: 2
   Your calculation: (1 +1) / 2 = 2/2
   Mean weight = 1

   EXAMPLE 2: Length of sturgeon: 55 inches
   Recorded weight measurements: 30, 32, 35, 37, 40, 42, 45, 48, 50, 59, 62, 66, 69
   Number of data points: 13
   Your calculation: (30 + 32 + 35 + 37 + 40 + 42 + 45 + 48 + 50 + 59 + 62 + 66 + 69) / 3 = 615 / 13
   Mean weight = 47.3

   YOUR TURN:

   a. **Length of sturgeon: 30 inches**

   Recorded weight measurements: 4, 5, 5, 6
   Number of data points:

   Your calculation:

   Mean weight:

b. Length of sturgeon: 45 inches

Recorded girth measurements: 17, 18, 19, 20, 22, 23
Number of data points:

Your calculation:

Mean weight:

c. Length of sturgeon: 53 inches

Recorded girth measurements: 29, 30, 32, 35, 37, 41, 44
Number of data points:

Your calculation:

Mean weight:

d. Length of sturgeon: 64 inches

Recorded girth measurements: 54, 55, 58, 61, 62, 69, 73, 75, 80, 91, 96, 101, 105, 110
Number of data points:

Your calculation:

Mean weight:

e. Length of sturgeon: 73 inches

Recorded girth measurements: 84, 89, 94, 100, 105, 111, 116, 122, 128, 134
Number of data points:

Your calculation:

Mean weight:

3. What are your conclusions about the relationship between length and weight of a sturgeon?

** To further explore lake sturgeon data, visit the Michigan Dept. of Natural Resources website: https://www.michigan.gov/dnr/-/media/Project/Websites/dnr/Documents/Fisheries/Research/StClair_weight_estimation.pdf

ANSWER KEY

CALCULATING MEAN WEIGHT

1. Based on your current knowledge of how organisms grow, do you think the length of a sturgeon and weight of a sturgeon will be a one-to-one ratio? Why or why not?

2. Calculate the mean weight in pounds of five lake sturgeon caught by the DNR in Lake St. Clair, Michigan, in 2022.

   a. **Length of sturgeon: 30 inches**

      Recorded girth measurements: 4, 5, 5, 6
      Number of data points: **4**
      Your calculation: **(4 + 5 + 5 +6) / 4 = 5**
      Mean girth: **5 pounds**

   b. **Length of sturgeon: 45 inches**

      Recorded girth measurements: 17, 18, 19, 20, 22, 23
      Number of data points: **6**
      Your calculation: **(17 + 18 + 19 + 20 + 22 + 23) / 6 = 19.83**
      Mean girth: **19.83 pounds**

   c. **Length of sturgeon: 53 inches**

      Recorded girth measurements: 29, 30, 32, 35, 37, 41, 44
      Number of data points: **7**
      Your calculation: **(29 + 30 + 32 + 35 + 37 + 41 + 44) / 7 = 35.42**
      Mean girth: **35.42 pounds**

   d. **Length of sturgeon: 64 inches**

      Recorded girth measurements: 54, 55, 58, 61, 62, 69, 73, 75, 80, 91, 96, 101, 105, 110
      Number of data points: **14**
      Your calculation: **(54 + 55 + 58 + 61 + 62 + 69 + 73 + 75 + 80 + 91 + 96 + 101 + 105 + 110) / 14 = 77.85**
      Mean girth: **77.85 pounds**

   e. **Length of sturgeon: 73 inches**

      Recorded girth measurements: 84, 89, 94, 100, 105, 111, 116, 122, 128, 13
      Number of data points: **10**
      Your calculation: **(84 + 89 + 94 + 100 + 105 + 111 + 116 + 122 + 128 + 134) / 10 = 108.3**
      Mean girth: **108.3 pounds**

3. What are your conclusions about the relationship between length and weight of a sturgeon?