MTH 150 Test 5
Fall 2024

Name _____ **Elementary Statistics**

Please circle all answers. If you feel the answer is none of the choices given, indicate why you feel this is so. Also, remember to truncate all data to three places after the decimal point.

- An Archaeopteryx is an extinct animal having feathers like a bird but also having very prominent teeth. Five fossilized specimens of this creature have been found with the lengths of the femur (a leg bone) plotted against the lengths of the humerus (a bone in the upper arm).

Femur	Humerus
38	41
56	63
59	70
64	71
74	76

```
Correlation Results:
Correlation coeff, r: 0.9651518
Critical r:           ±0.8783393
P-value (two-tailed): 0.00777

Regression Results:
Y= b0 + b1x:
Y Intercept, b0:      5.582377
Slope, b1:            1.007176
Coeff of Det, R^2:     0.931518
```

Archeologists have long felt that there should be a positive linear correlation between the lengths of the femur and the lengths of the humerus in these extinct creatures.

1. What is the correlation coefficient for this sample? ____**0.965**_____

2. What would be the approximate length of the humerus for a femur of length 42?

(A) 46 **(B)** 42 **(C) 47** **(D)** 44

3. From your sample analysis, would you conclude that the lengths of the femur and humerus are indeed directly correlated?

(A) Yes **(B)** No

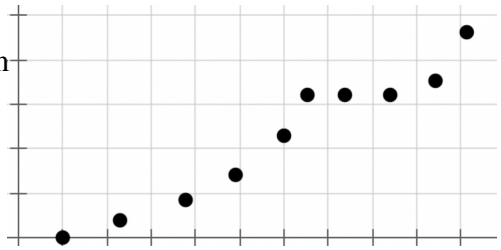
4. From your observations, does the length of the femur cause the humerus to be elongated?

(A) Yes **(B) No**

5. In problem **2.** you are not predicting a value, you are technically retrodicting, Another commonly used term for this process is -

(A) extrapolation **(B) interpolation**

6. The linear correlation process was developed by the statistician Karl Pearson. Spearman rank correlation is used when the data is not necessarily linear but is non-decreasing or non-increasing(as seen on the right). What term is used to describe this behavior?



(A) homogeneous

(B) **monotonic**

(C) trendy

(D) non-regressive

7. Correlation was developed from the gap observed from comparing very large matched data sets and their behavior when analyzed separately and when combined. This analysis is based on the

(A) Central Limit Theorem

(B) Two Way ANOVA

(C) **Law of Variances**

(D) McNemar's Test

8. In analyzing nonlinear data we can always develop a trend line by forming a polynomial regression formula. This will certainly allow the prediction/retrodiction of data but may not portray the true nature of the data behavior. This incorrect regression assignment is known as

(A) non-interaction

(B) scaffolding

(C) tweaking

(D) **over fitting**

- Use the cart at the right to answer questions **9** and **10**.

Correlation Coefficient	Relationship
0.0 ≤ 0.1	no correlation
0.1 ≤ 0.3	low correlation
0.3 ≤ 0.5	medium correlation
0.5 ≤ 0.7	high correlation
0.7 ≤ 1.0	very high correlation

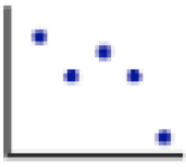
9. Describe the relationship of chirps to temperature.

Number of Chirps	Temperature
23	65
27	68
30	71
34	74
39	77

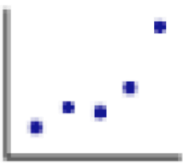
Relationship: very high 0.996

10. Which plot below would categorize as **no correlation** ?

(A)



(B)



(C)