Name _____

1. Write a function in Julia that only accepts 32 bit integers as a parameter and returns true if the input is a multiple of 5 or 7 and false otherwise. Write unit tests using Base.test that test your function.

2. What is multiple dispatch? Why is it important in Julia

3. Given a 10 by 200 matrix **A** and a 10 by 100 matrix **B** combine them in to a 10 by 300 matrix with the elements of a starting the first row of the resulting matrix.

4. Given the matrix **C** = [1 2 3; 4 5 6] using the map function in Julia to produce a matrix D of the same size where each element of b is the square of the corresponding element in a. That is D[k,j] = C[k,j] *C[k,j].

5. Given the vectors x = [10, 20, 30, 40] and y = [7, 11, 18, 21] show how to create a scatter plot of the two vectors.

6. What is a q-quantile? quartile?

7. What is a confidence interval? Why is it important?

8. What does the no free lunch theorems tell us about machine learning alogorithms like linear regression models and clustering?

9. What is Principle Component Analysis used for? Why is this important.

10. Why do we need to perform data normalization? Explain one way of normalizing data.

11. Explain how k-means algorithm finds clusters.

12. How does k-medoids algorithm differ from the k-means algorithm? Why is this difference important.

13. Explain how DBCSAN algorithm finds clusters.

14. What is the difference between supervised and unsupervised learning? Give an example of each.