1. The slope of a linear regression line is 2.5 and the intercept is -1. What is the equation of the line? What would be the predicted value of Y when x = 4.3?
2. A researcher is interested in determining if there is a difference in yield among three different cultivars. Perform the appropriate test to determine if there is a significant difference in yield among them. Use the following dataset:

Crop Variety, Yield (kg/ha)

Wheat1, 3200

Wheat1, 2900

Wheat2, 2600

Wheat2, 2400

Wheat3, 2200

Wheat4, 2000

1. A researcher wants to determine if there is a significant difference in growth rate before and after a treatment. He collected data on growth rate for 6 individuals before and after the treatment. Perform the appropriate test to determine if there is a significant difference in growth rate before and after the treatment. Use the following dataset:

Plant, Treatment, Before, After

1, A, 10, 12

2, A, 8, 9

3, A, 12, 14

4, B, 11, 15

5, B, 9, 11

6, B, 15, 17

1. Standardize (make it a standard normal distribution) the following data and include the new values below.

c(9.58, 6.64, 6.75, 5.26, 19.07, 10.32, 17.62, 6.32, 14.75, 18.36, 11.97, 18.87, 6.01, 10.51, 12.41, 17.09, 18.12, 11.84, 7.63, 14.26)

1. Explain what each term is and give an example:
2. Pseudo-replication
3. True replication
4. Experimental unit
5. Observational unit
6. Dependent variable
7. A researcher is interested in determining if there is a significant difference in yield between an experimental fertilizer and a control fertilizer. He collected data on yield for 10 plots treated with the experimental fertilizer and 10 plots treated with the control fertilizer. The mean yield for the experimental fertilizer is 8 with a standard deviation of 2 and the mean yield for the control fertilizer is 7 with a standard deviation also 2. Determine the 95% confidence interval for the difference in means and interpret the results.
8. Answer the following:
9. What are the dimensions of **D** and **B** in the following equation? \_D\_ = 3**A**4 x \_**B\_** x 10**C**10
10. Which row and column would the item b1,3 = 24 go on matrix **B**?
11. What are the dimensions of A’A and AA’?
12. Define the following matrices:
13. diagonal matrix;
14. identity matrix (What R function do we use to create it?)
15. upper or lower triangular matrix;
16. square matrix
17. Given the following matrices:

**A** = [1 2 3] **B** = [ 7 8] **C** = [4 7 2] k = 10

[4 5 6] [ 9 10] [5 8 4]

[11 12] [6 9 5]

Calculate:

1. **A** x **B**
2. Inverse of **C**
3. **A** ⊗  **B** (Kronecker product of **A** and **B**)
4. Transpose of **B**
5. k**A**
6. Represent the following system of equations with matrix notation. Also show how to create the resulting matrix with R.

3x + 2y = 12

4x - y = 2