**HW6: Correlation-- Regression**

1. A study is made relating aptitude test scores to productivity in a factory after three months of personnel training. The 12 pairs of scores later measuring their productivity.

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| Applicant | Aptitude Score (X) | Productivity (Y) |
| 1 | 11 | 22 |
| 2 | 12 | 32 |
| 3 | 20 | 29 |
| 4 | 16 | 33 |
| 5 | 19 | 33 |
| 6 | 25 | 43 |
| 7 | 8 | 14 |
| 8 | 10 | 21 |
| 9 | 12 | 25 |
| 10 | 15 | 24 |
| 11 | 21 | 42 |
| 12 | 20 | 40 |

1. Plot a scatter diagram for the above relationship. Use one block to equal 2 units on the productivity measure, and 1 unit on the aptitude score. (1 pt)
2. Calculate , , and . (Round to two digits after the decimal point) (Total: 3 pts)
3. If , , , calculable and interpret its meaning precisely in terms of the problem. (Round to four digits after the decimal point) (Total: 2 pts)
4. Calculate and interpret its meaning precisely in terms of the problem. (Round to four digits after the decimal point) (Total: 2 pts)
5. Calculate the correlation coefficient for the above relationship. Interpret its meaning. (Round to four digits after the decimal point) (Total: 2 pts)
6. Calculate the coefficient of determination. Interpret its meaning precisely in terms of the problem. (Round to four digits after the decimal point) (Total: 2 pts)
7. Is the correlation between aptitude and productivity statistically significant? (1 pt) Be sure to specify degrees of freedom (1 pt) and level of significance (1 pt). Use 0.05 level to determine significance. (Round to four digits after the decimal point)
8. Calculate and . (Round to four digits after the decimal point) (Total: 2 pts)
9. Given the equation for the straight line which can be used to predict productivity from aptitude score (Use an equation with coefficient round to four digits after the decimal point) (1 pt). Plot this line on the scatter diagram. (1 pt)
10. Given the equation of the regression line that will permit prediction of aptitude scores from productivity. (Use an equation with coefficient round to four digits after the decimal point) (1 pt) Plot this line on the scatter diagram. (1 pt)
11. What is the expected productivity of a worker who has an aptitude score of 16? (Use an equation with coefficient round to four digits after the decimal point) (1 pt)
12. What is the expected aptitude of a worker who has a productivity of 36? (Use an equation with coefficient round to four digits after the decimal point) (1 pt)