In a study of the relationship between amphetamine metabolism and amphetamine psychosis, twenty habitual amphetamine users were tested and given a psychosis intensity rating (PIR). Plasma amphetamine levels (mg/ml) were also measured for these patients. The data is summarized in the table below.

The Psychosis Intensity Rating and Plasma Amphetamine levels for 20 chronic amphetamine users in a psychiatric ward of a metropolitan hospital.

| Patient # | Psychosis Intensity  Rating (PIR) | Plasma Amphetamine  (mg/ml) |
| --- | --- | --- |
| 1 | 16 | 180 |
| 2 | 27 | 240 |
| 3 | 30 | 385 |
| 4 | 21 | 200 |
| 5 | 33 | 350 |
| 6 | 12 | 150 |
| 7 | 18 | 210 |
| 8 | 23 | 450 |
| 9 | 45 | 650 |
| 10 | 39 | 590 |
| 11 | 50 | 725 |
| 12 | 45 | 630 |
| 13 | 34 | 440 |
| 14 | 29 | 355 |
| 15 | 58 | 635 |
| 16 | 41 | 580 |
| 17 | 36 | 340 |
| 18 | 15 | 175 |
| 19 | 43 | 545 |
| 20 | 28 | 246 |

1. Provide a graphical summarization of the possible association between PIR and Plasma Amphetamine Level.
2. Conduct a test to evaluate if PIR is normally distributed. (Do not forget your interpretation, and use a type I error level of 0.10 for this test).
3. Conduct a test to evaluate if Plasma is normally distributed. (Do not forget your interpretation, and use a type I error level of 0.10 for this test).
4. Report the correlation coefficient based on your findings in part (b) and (c). Do we have sufficient evidence to support a linear association between PIR and Plasma Amphetamine? (Use a type I error level of 0.05 and interpret your results.)
5. Determine the least-squares regression line relating Plasma Amphetamine Levels (X) to PIR (Y). What are the resulting estimated values of the intercept and the slope coefficients?
6. Provide the interpretation for each regression coefficient estimate.
7. Provide the coefficient of determination for this least-squares regression line, and its interpretation.
8. Using your regression results, what would be the predicted or estimated PIR (Y) for a Plasma Amphetamine Level = 345 (X)?
9. Construct a 95% confidence interval for the predicted true mean value of PIR from part (h).
10. perform a diagnosis analysis of the residuals for this least-squares regression line.