1) Formula: \( \hat{y} = a + bx \), where

Slope: 
\[
b = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}
\]

\( y \) - intercept: 
\[
a = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2}
\]

2) Linear Correlation Coefficient: \( r \)

1) Measures the strength of a linear relationship
2) \(-1 \leq r \leq 1\)

\[
r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{n(\sum x^2) - (\sum x)^2} \sqrt{n(\sum y^2) - (\sum y)^2}}
\]

3) Coefficient of Determination: \( r^2 \)

1) Measures the amount of variation in \( y \) that is explained by the linear relationship between \( x \) and \( y \).
2) Write \( r^2 \) as percentage.
4) Standard error of estimate:
   1) Measures the differences between the observed sample \( y \) values and the predicted values \( \hat{y} \) obtained by using the regression equation.
   2) Find the equation of the regression line
   3) Compute \( S_e \):

\[
S_e = \sqrt{\frac{\sum y^2 - a \sum y - b \sum xy}{n-2}}
\]

5) Prediction Interval for an Individual \( y \) when a fixed value \( x_0 \) is given:
   1) Find the equation of the regression line
   2) Compute \( \hat{y} \) for the given fixed value of \( x_0 \).
   3) Compute the standard error of estimate \( S_e \).
   4) Find \( t \)-score with \( n - 2 \) degrees of freedom for the required confidence level.
   5) Compute \( \bar{x} \).
   6) Compute the margin of error \( E \) where

\[
E = t \cdot S_e \cdot \sqrt{1 + \frac{1}{n} + \frac{n(x_0 - \bar{x})^2}{n(\sum x^2) - (\sum x)^2}}
\]

Finally, the prediction interval for an individual \( y \) can be found by

\[
\hat{y} - E < y < \hat{y} + E
\]