Command	Explanation	Notes
`sb.regplot()`	Plots regression line	import seaborn as sb
`ss.pearsonr()`	Calculates and tests correlation	import scipy.stats as ss
`smf.ols()`	runs OLS regression	import statsmodels.formula.api as smf
`ols.summary()`	summarizes regression `ols`	import statsmodels.formula.api as smf
`ols.resid()`	residuals of `ols`	import statsmodels.formula.api as smf
`ols.fittedvalues()`	fitted values of `ols`	import statsmodels.formula.api as smf
`ols.conf_int()`	confidence interval of `ols`	import statsmodels.formula.api as smf
`ols.predict()`	predictions using `ols`	import statsmodels.formula.api as smf

I plot some data and its regression line; test $H_0 : \rho_{xy} = 0$ against $H_a : \rho_{xy} \neq 0$; show regression results, fitted values, residuals, and the 99 percent confidence intervals for β_1 and β_2; and calculate fitted value when $x = 5$.

```
# Read in data
import pandas as pd
df = pd.read_csv(r'https://www.wimivo.com/data.csv')

# Scatter plot of the data will show at the end of script
import matplotlib.pyplot as plt
import seaborn as sb
plt.title("Scatter Plot and Regression Line")
plt.xlabel("var1")
plt.ylabel("var2")
sb.regplot(x='var1', y='var2', ci=None, data=df)

# Calculate correlation, test if it's different than zero
import scipy.stats as ss
corr, pVal = ss.pearsonr(df['var1'], df['var2'])
print(corr, pVal)

# Regress var2 on var1
import statsmodels.formula.api as smf
ols = smf.ols('var2 ~ var1', data=df).fit()
print(ols.summary())

# Show residuals and fitted values
olsValues = pd.DataFrame(zip(ols.resid, ols.fittedvalues),
                         columns=['residuals','fitted values'])
print(olsValues)

# Show 99 percent confidence interval of regression coefficients
confInf = ols.conf_int(alpha=0.01)
print(confInf)

# Predicts var2 value when var1 = 5
xPred = pd.DataFrame([5], columns=['var1'])
yPred = ols.predict(xPred)
print(yPred)

# Show the scatter plot drawn earlier
plt.show()
```