# Machine Learning Self-Study Worksheet

Worksheet: 2025001

**Level:** Easy
**Topics Covered:** Supervised Learning

## Part 1: Conceptual Questions

| Q. No. | Question | Points |
|---|---|---|
| 1. | **Supervised learning:**<br>• **a)** Briefly describe the main goal of supervised learning. (2 points)<br>• **b)** Provide key characteristics of supervised learning. (3 points) | 5(2+3) |
| 2. | **Label vs. Feature**<br>• **a)** Define what a "label" is in supervised learning. (2 points)<br>• **b)** What is meant by "feature" in this context? (3 points) | 5(2+3) |

## Part 2: Numerical Questions

| Q. No. | Question | Points |
|---|---|---|
| 3. | You are given a linear regression model:<br>**Y=2X+4**<br>Calculate the predicted value of Y for:<br>• X = 1<br>• X = 5<br>• X = -2 | 5 |
| 4. | Two classes of data points are given:<br>• Class 0: (2, 3), (3, 3), (3, 4)<br>• Class 1: (7, 6), (8, 5), (9, 6)<br>Use **Euclidean distance** to determine the **1-nearest neighbor class** of the point (5, 5). | 5 |

# Part 3: Coding Exercise

| Q. No. | **Complete & Run the Code** (Use your own Python IDE or Google Colab.)<br>Complete the KNN classification code for k = 3 and predict the class of a new point: | Points |
|---|---|---|
| 5. | from sklearn.neighbors import _____<br>import matplotlib.pyplot as plt<br><br># Data<br>X = [[1, 2], [2, 3], [3, 3], [6, 5], [7, 7]]<br>y = [0, 0, 0, 1, 1]<br><br># New point to classify<br>new_point = [[4, 4]]<br><br># KNN model<br>knn = KNeighborsClassifier(n_neighbors=___)<br>knn.fit(X, y)<br><br># Prediction<br>predicted = knn.predict(new_point)<br>print("Predicted class:", predicted[0]) | 5 |

# Notes & Disclaimer

- For quick notes or queries, visit: https://www.instagram.com/kparse_code/ or https://www.youtube.com/channel/UCGuhk1P1OA0X_7Ar2-xadEw .

- **Related Resources**:
  - Google Colab – to run Python code online without installing anything
  - StatQuest: https://www.youtube.com/@statquest/playlists
  - 3Blue1Brown: https://www.youtube.com/@3blue1brown/playlists
  - Numerical: https://www.youtube.com/@MaheshHuddar/playlists

- **Want more worksheets like this?**
  Try using **AI prompt** like:
  "Create a beginner-level machine learning worksheet with 2 conceptual questions(with sub-questions), 2 numerical, and 1 code-completion exercise on [topic(s)]"

- **How to Use This Worksheet**:
  - These worksheets are designed for **self-study and concept reinforcement**.
  - Try to solve without looking up the answers first.
  - Use a notebook or Python IDE to experiment — code is the best teacher!
  - Feel free to modify or extend questions as your understanding grows.

- **Disclaimer**:
  This worksheet is for self study & **educational purposes only**. Accuracy of content may vary depending on updates to libraries or definitions. Always refer to official documentation or textbooks for exam-level prep.