Q1.
1. Mean

$\sum Xi = 82 + 66 + 70 + 59 + 90 + 78 + 76 + 95 + 99 + 84 + 88 + 76 + 82 + 81 + 91 + 64 + 79 + 76 + 85 + 90 = 1621$

$N = 20$

$\text{Mean} = \sum Xi / N = 1621 / 20 = 81.05$
2. Median
Sort the data
59, 64, 66, 70, 76, 76, 76, 78, 79, 81, 82, 82, 84, 85, 88, 90, 90, 91, 95, 99
N = 20
Average the middle two numbers 81, 82

$\text{Median} = (81 + 82) / 2 = 81.5$
3. Mode
76 appears the most number of times
Mode = 76

4. Interquartile Range (IQR) Step 1: Use the sorted list again:
Sorted data
59, 64, 66, 70, 76, 76, 76, 78, 79, 81, 82, 82, 84, 85, 88, 90, 90, 91, 95, 99
N = 20
Find Q1
Q1 is the median of the first half
59, 64, 66, 70, 76, 76, 76, 78, 79, 81
$Q1 = (5\text{th} + 6\text{th}) / 2 = (76 + 76) / 2 = 76$
Step 3: Find Q3 (75th percentile)
Q3 is the median of the second half
82, 82, 84, 85, 88, 90, 90, 91, 95, 99
$Q3 = (5\text{th} + 6\text{th}) / 2 = (88 + 90) / 2 = 89$

Step 4: Calculate IQR
$IQR = Q3 - Q1 = 89 - 76 = 13$
Absolutely — here's Q.2 written in a clean, straight-to-the-point format with zero fluff:

Q.2:

1. Tool Analysis
a) Machine Learning for Kids
Target Audience: School students (K-12), beginner-level learners.

Usage: Helps kids build basic ML models using labeled text, images, or numbers. Often integrates with Scratch for project-based learning.

Benefits:
No coding needed
Intuitive, visual interface
Good for introducing core ML concepts

Drawbacks:
Limited to simple models
Doesn't explain what's happening under the hood

b) Teachable Machine
Target Audience: Educators, students, creatives, hobbyists

Usage: Lets users train real-time models using webcam, audio, or image input — all without code.

Benefits:
Extremely fast and easy
Real-time training
No install/setup needed

Drawbacks:
Black-box process
Not suitable for advanced ML tasks

2. Type of Analytics
Machine Learning for Kids: Predictive Analytic
Teachable Machine: Predictive Analytic

Reason:
Both tools train models to make predictions or classifications based on input data — the goal is to predict outcomes, not just summarize past data.

3. Type of Learning
Machine Learning for Kids: Supervised Learning
Teachable Machine: Supervised Learning

Reason:
Both tools require labeled data to train. You provide input-output pairs, and the model learns from those examples — classic supervised learning setup.

Q.3
1. Insights from the Articles
a) "What's in a chart? A Step-by-Step guide to Identifying Misinformation in Data Visualization" by Arthur Kakande
Key Takeaways:

Purpose Definition: Always question the intent behind a chart. Is it to inform, persuade, or mislead?

Data Integrity: Verify if the data source is credible and if the data has been manipulated.

Design Choices: Be wary of misleading design elements like truncated axes, inappropriate chart types, or exaggerated visuals.

b) "How bad Covid-19 data visualizations mislead the public" by Katherine Ellen Foley
Key Takeaways:

Inconsistent Scales: Charts with varying scales can distort the true impact of the data.

Cumulative vs. Daily Counts: Presenting cumulative data without context can exaggerate trends.

Color Misuse: Colors can evoke emotions; using alarming colors can create unnecessary panic.

2. Case Study: Misleading Visualization in COVID-19 Vaccine Data
Incident: Misrepresentation of COVID-19 vaccine effectiveness in England.
What Happened:
Certain social media posts claimed that COVID-19 vaccines were ineffective or harmful, citing data showing higher deaths among vaccinated individuals compared to the unvaccinated between July 2021 and May 2023.

How the Visualization Misled:
Lack of Context: The data didn't account for the fact that a significant majority of the population was vaccinated. Naturally, in a predominantly vaccinated population, absolute numbers of deaths might be higher among the vaccinated, but this doesn't indicate higher mortality rates.

Ignored Mortality Rates: When adjusted for population size, mortality rates per 100,000 were actually higher among the unvaccinated, indicating vaccine effectiveness.

Outcome:
The misleading presentation fueled vaccine hesitancy and misinformation.

Q4
Using svm:

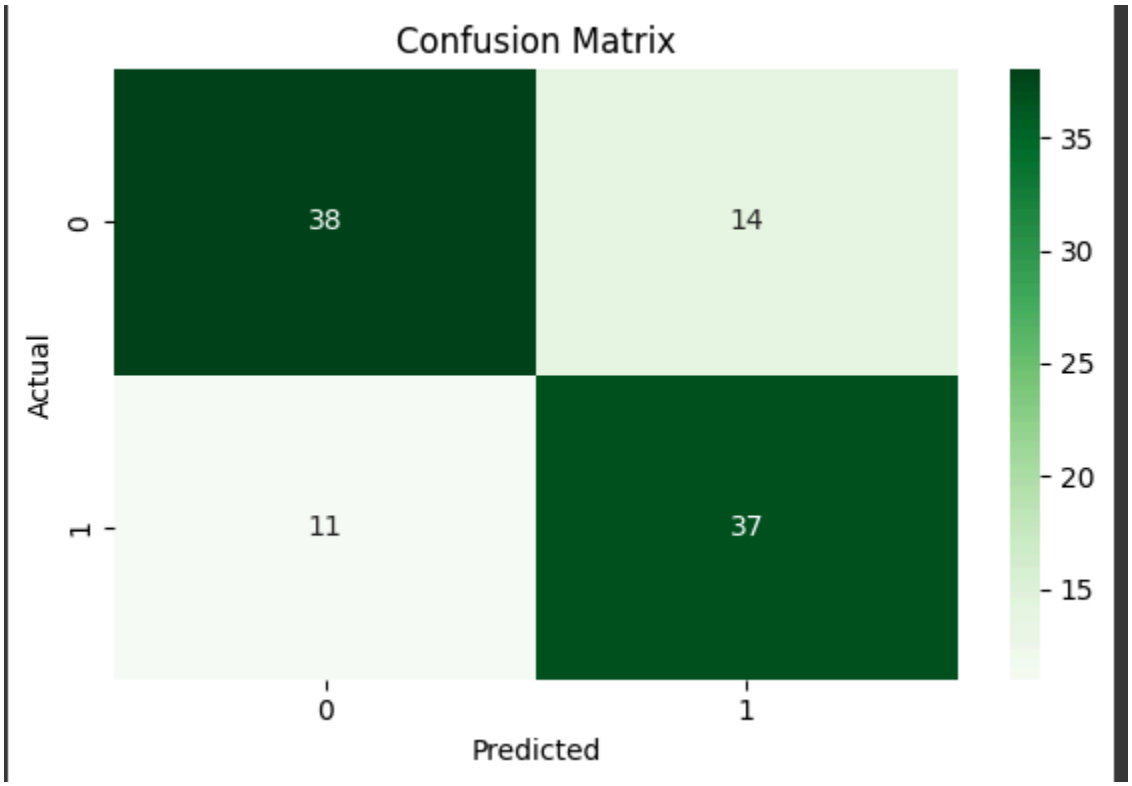
```
validation Accuracy: 0.805
```

```
test Accuracy: 0.75

 classification Report:
              precision    recall  f1-score   support

           0       0.78      0.73      0.75        52
           1       0.73      0.77      0.75        48

    accuracy                           0.75       100
   macro avg       0.75      0.75      0.75       100
weighted avg       0.75      0.75      0.75       100
```



Q5

```
Adjusted R2 Score: 0.9265034261899515
```

Q6
Key Features of the Wine Quality Dataset

Fixed acidity: Adds tartness; moderate impact.

Volatile acidity: High = vinegar taste; negative impact.

Citric acid: Freshness; mildly positive.

Residual sugar: Minimal effect unless extreme.

Chlorides: High salt = worse quality.

Free/Total sulfur dioxide: Too much = chemical taste.

Density: Tied to sugar/alcohol; indirect influence.

pH: Affects freshness; interacts with acidity.

Sulphates: Preservative; moderate importance.

Alcohol: Strongest positive impact on quality.