✅ Matplotlib PRACTICAL Mastery Test (100% Hands-On Tasks)

No theory. Only tasks you must code and execute.

□ SECTION 1 — PLOTTING BASICS

1. Create a line plot for:

```
x = [1, 2, 3, 4, 5]
y = [10, 30, 25, 40, 50]
```

2. Add:

- X-label
- Y-label
- Title

3. Plot the same line in:

- red color
- dashed style
- linewidth = 3
- marker = "o"

4. Create a scatter plot of 50 random points (use NumPy).

5. Increase your figure size to 14 × 7.

□ SECTION 2 — SUBPLOTS & MULTIPLE PLOTS

6. Create a 1×2 subplot:

- Left: Line chart
- Right: Bar chart

7. Create a 2×2 grid of subplots and plot 4 different charts:

- Line

- Bar
- Scatter
- Histogram

8. Plot two lines on the same chart with a legend.

9. Rotate x-axis labels by 60 degrees.

10. Add a grid with transparency 0.4.

🟤 SECTION 3 — BAR, HISTOGRAM, PIE CHARTS

11. Plot a bar chart of categories A, B, C, D with values 50, 30, 20, 10.

12. Change bar color to orange and border to black.

13. Create a grouped bar chart:

Sales vs Profit for Jan–Apr.

14. Create a stacked bar chart with 3 categories for 4 months.

15. Plot a histogram of 500 normally distributed values with 40 bins.

16. Create a pie chart with:

- explode
- percentage labels
- shadow
- startangle=90

🟤 SECTION 4 — ANNOTATIONS, TICKS, STYLING

17. Annotate a point (x=10, y=50) with "Peak Sales".

18. Add custom ticks:

- xticks = [0, 10, 20, 30, 40]

- labels = ["Zero", "Ten", "Twenty", "Thirty", "Forty"]

19. Change line style using rcParams globally:

- default linewidth = 2
- default fontsize = 14

20. Apply a Matplotlib style (`'ggplot'`) and replot a line chart.

□ SECTION 5 — DATAFRAME + MATPLOTLIB

21. Load a CSV using pandas and plot:

- Date (x) vs Sales (y)

22. Plot Sales, Profit, and Expense on one chart with markers.

23. Create a rolling mean (window=7) line over your Sales data.

24. Plot a bar chart of total sales per category from a DataFrame.

25. Create a line chart where x is a datetime column. Format x-axis dates.

● SECTION 6 — ADVANCED VISUALIZATIONS

26. Create a box plot for a salary list.

27. Create a violin plot for 3 department salary distributions.

28. Create a heatmap of a DataFrame correlation matrix (Matplotlib only, no seaborn).

29. Create a dual-axis chart:

- Revenue on primary axis
- Profit % on secondary axis

30. Display an image using `plt.imshow()` with no axes.

□ SECTION 7 — REAL-WORLD DASHBOARD COMPONENTS

31. Create a horizontal bar chart of expenses sorted from highest to lowest.

32. Add vertical and horizontal reference lines at x=10 and y=100.

33. Plot data using a colormap (viridis) for values 1–50.

34. Create a filled area chart (stackplot) for 3 time-series.

35. Plot a cumulative sum line chart for random values.

36. Create a subplot where all charts share the same X-axis.

37. Save a plot as:

- plot1.png
- plot1.pdf

38. Create a custom figure layout with `GridSpec` and place 3 plots of different sizes.

39. Create a bubble chart (scatter with varying sizes).

40. Plot a line chart with Y-axis in thousands (50,000 → 50K).
