Engineering Plotting Techniques & Guidelines

Printing Suggestions

Goal: to arrange your Microsoft Excel printout into a readable document

Readable: concise, formatted, legible

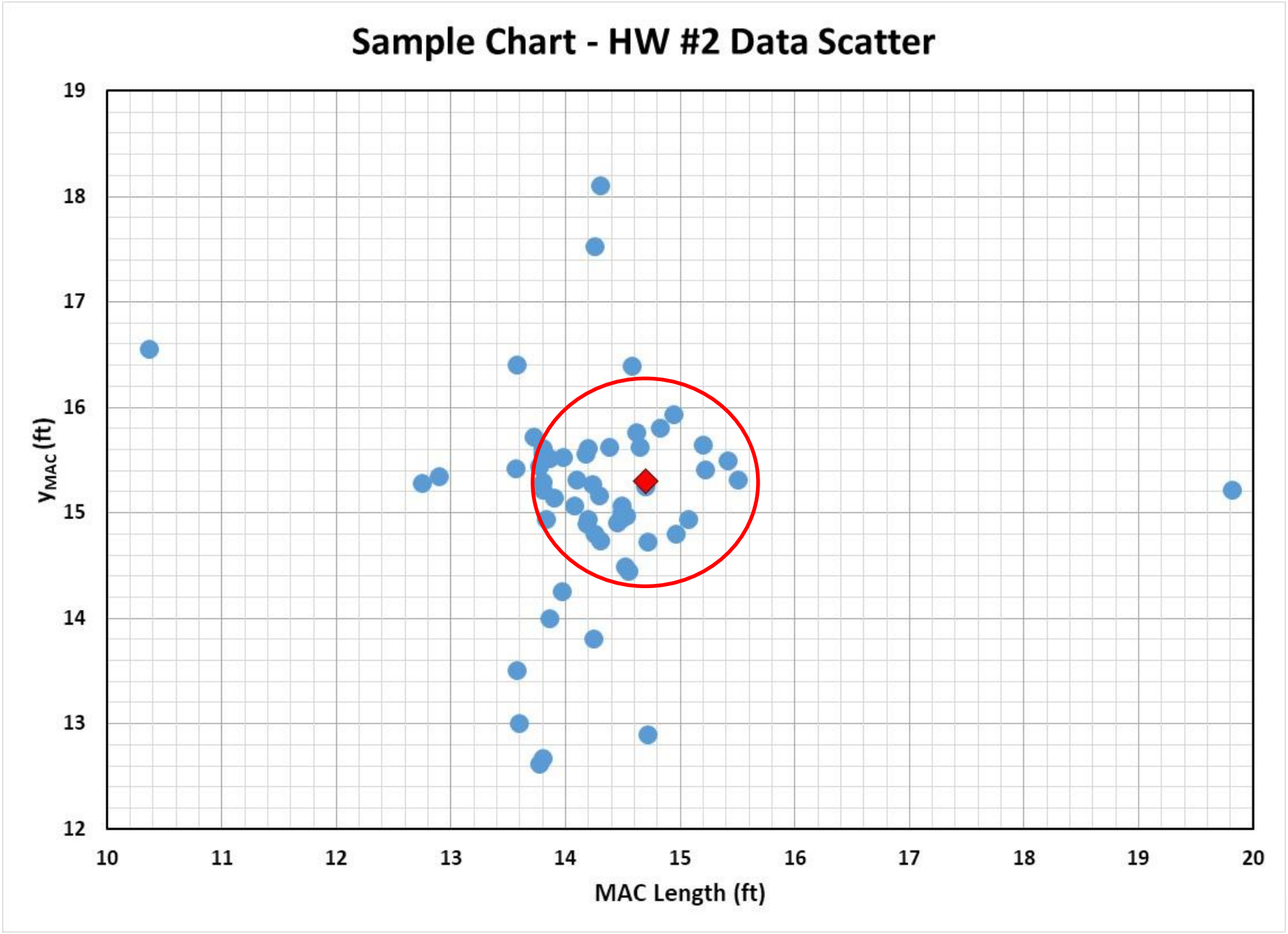
Example – atmospheric table should fit on a single piece of paper!

Engineering Plotting Guidelines

Plots and graphs should be well formulated to show important data easily and clearly

Chart title, legend, gridlines, axes, and scales should all be consistent in format and readable without making the chart appear cluttered

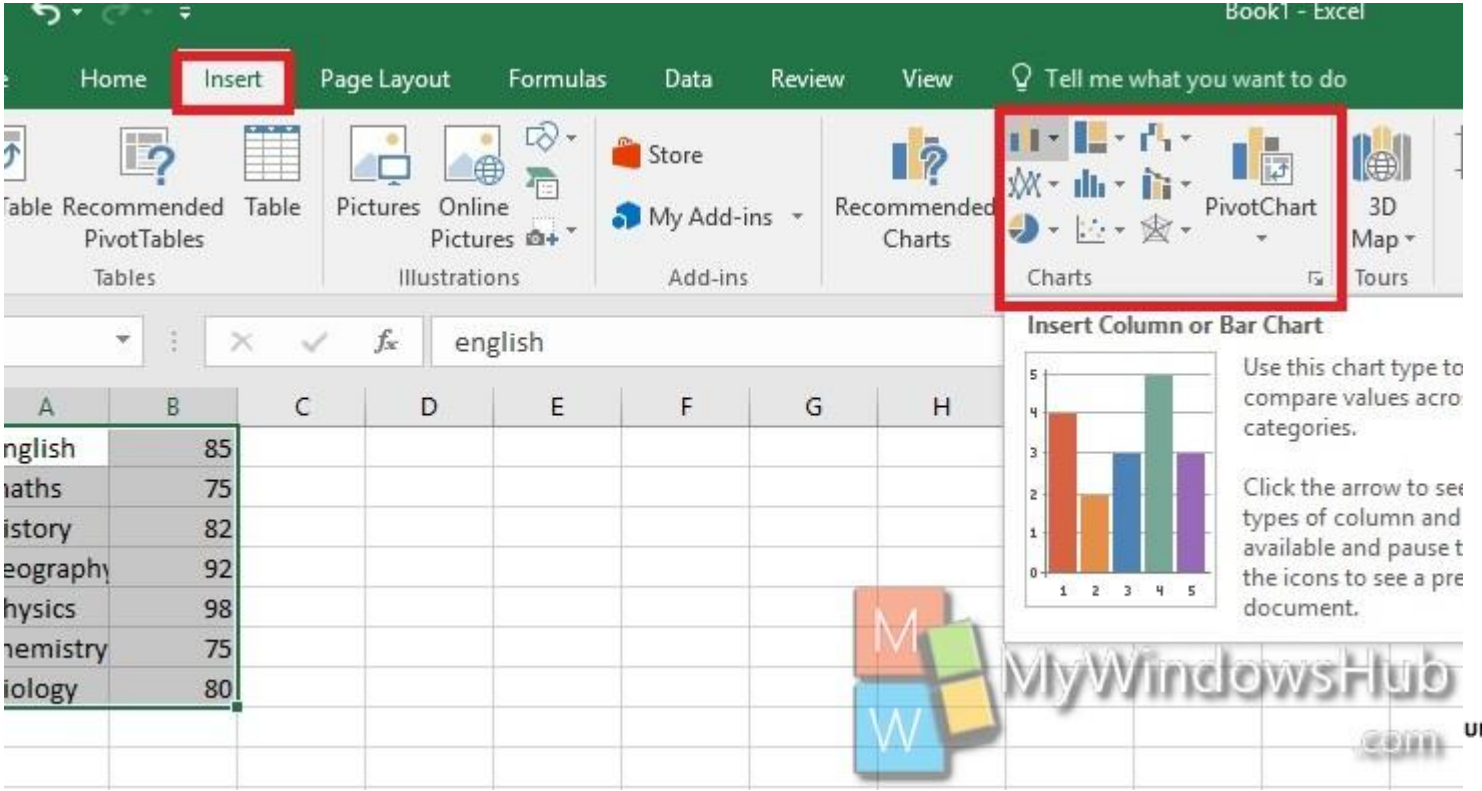
The data shown is the most important attribute of the chart!


Sample Chart - HW #2 Data Scatter
19
18
17
16
15
14
13
12
y_{MAC} (ft)
10
11
12
13
14
15
16
17
18
19
20
MAC Length (ft)

Engineering Plotting Guidelines

Microsoft Excel

Powerful plotting tool
Many plotting options
Has a few limitations



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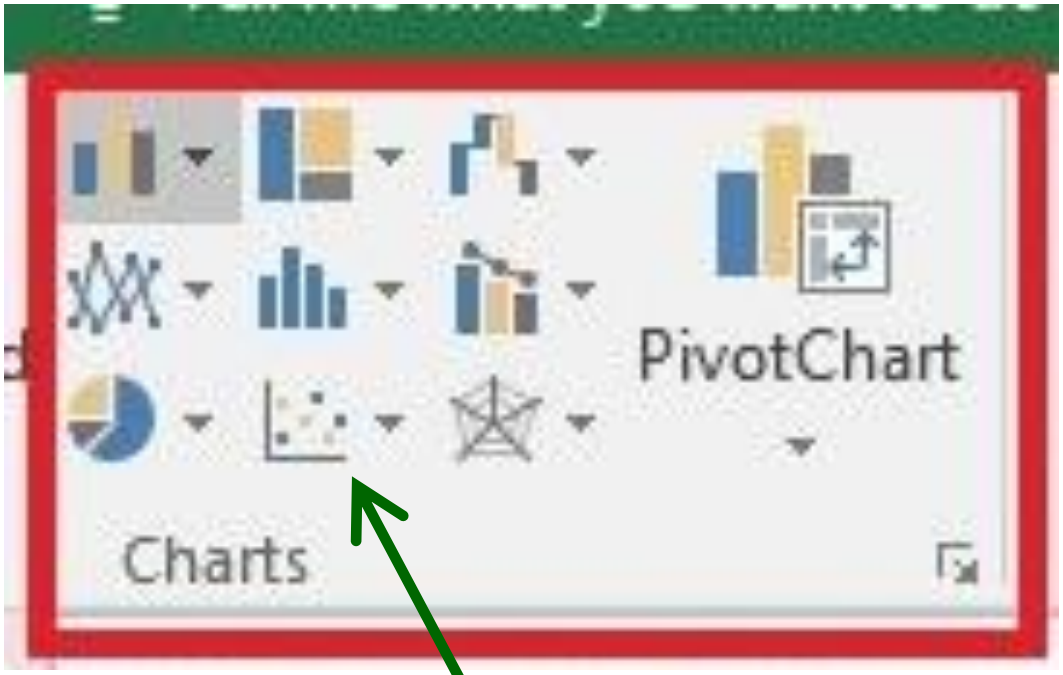
Engineering Plotting Guidelines



X-Y Scatter – good for engineering applications

Engineering Plotting Guidelines

Plotting options

X-Y Scatter – good for engineering applications

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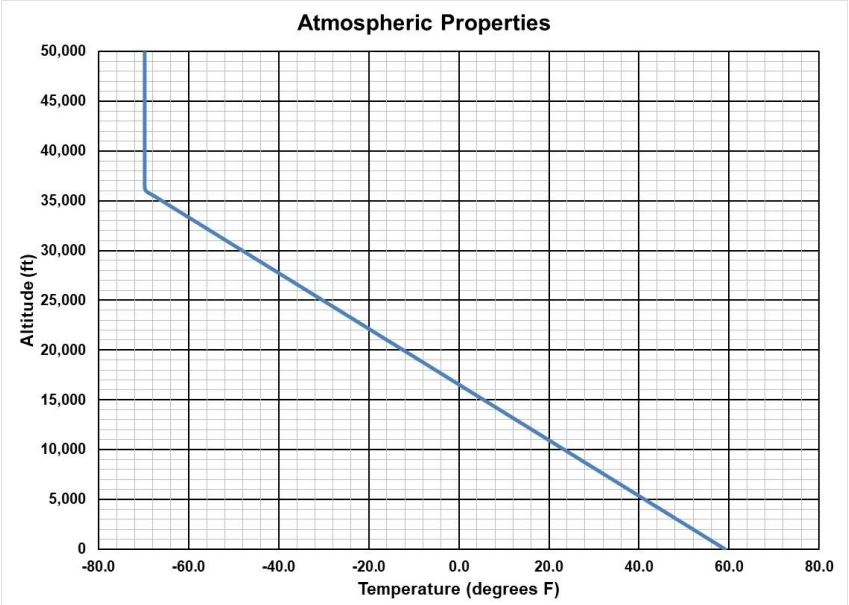
Engineering Plotting Guidelines

First steps: know what data you want to plot
set up x-axis and y-axis
format data table for easy plotting

3. Create the following three graphs in your Excel workbook:

- **Altitude (y-axis) vs Temperature (ºR, ºF, or ºC) (x-axis)**
- **Altitude (y-axis) vs Pressure (lbs/ft^2) (x-axis)**
- **Altitude (y-axis) vs Density (slugs/ft^3) (x-axis)**



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Engineering Plotting Guidelines

First steps: **know what data you want to plot**

set up x-axis and y-axis

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ALTITUDE	TEMPF	TEMPR	TEMPC
0	59.0	518.7	15.0
500	57.2	516.9	14.0
1000	55.4	515.1	13.0
1500	53.6	513.3	12.0
2000	51.8	511.5	11.0
2500	50.1	509.8	10.0
3000	48.3	508.0	9.0
3500	46.5	506.2	8.0
4000	44.7	504.4	7.1
4500	42.9	502.6	6.1
5000	41.1	500.8	5.1

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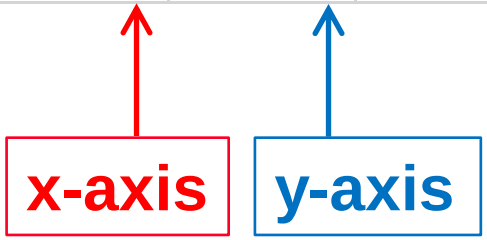

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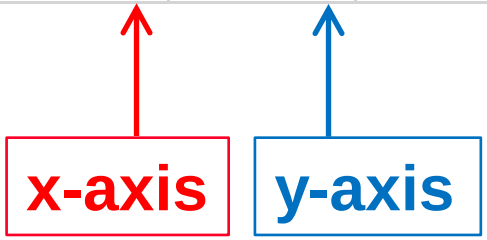

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Engineering Plotting Guidelines

Next steps: **select data in data table**
select type of Excel chart
move chart as a new sheet

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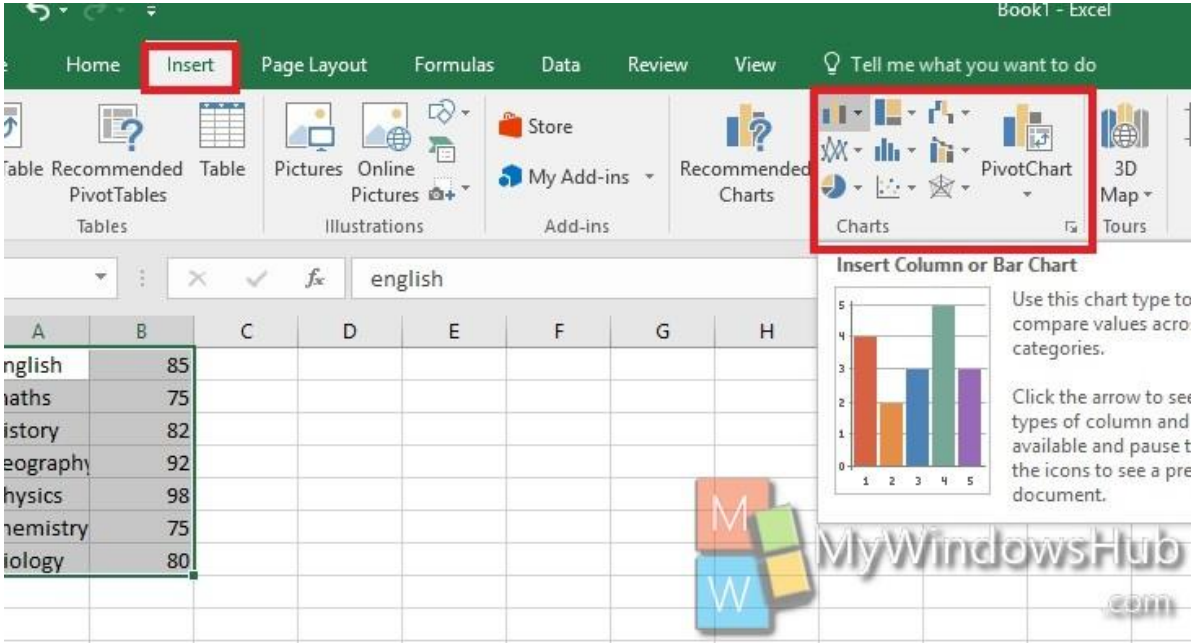

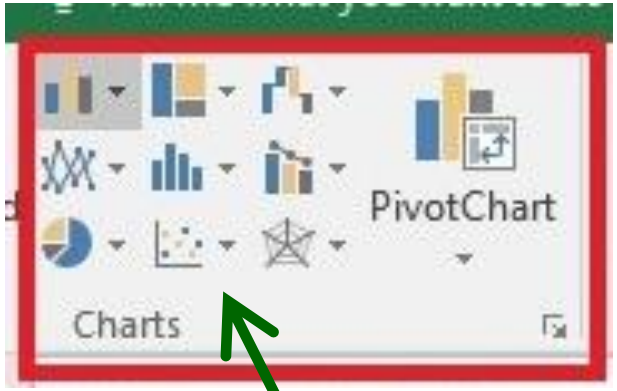

X-Y Scatter

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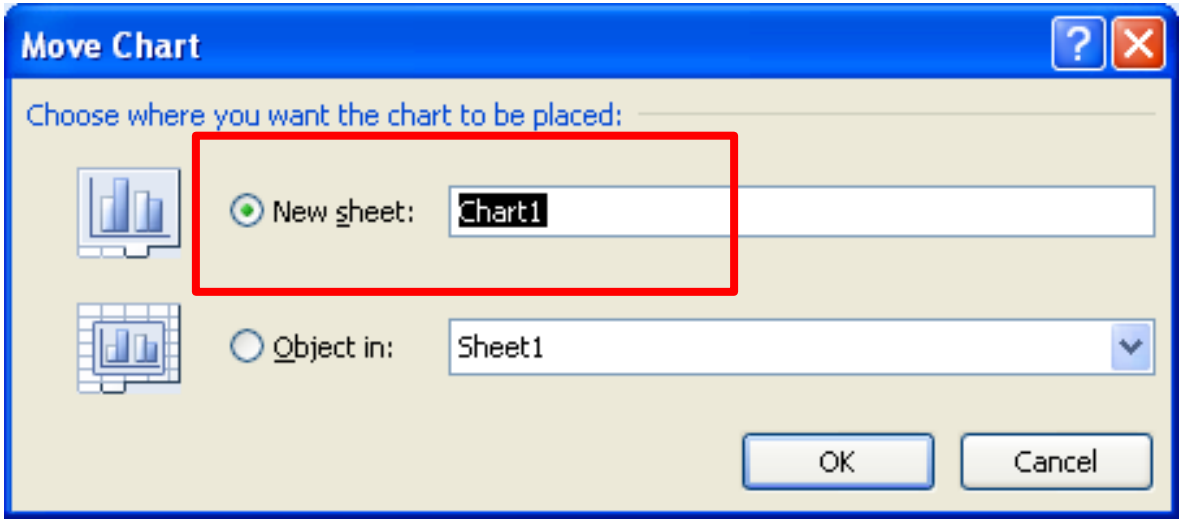
Engineering Plotting Guidelines

Next steps: select data in data table
select type of Excel chart
move chart as a new sheet

right-click on the chart, select “Move Chart”



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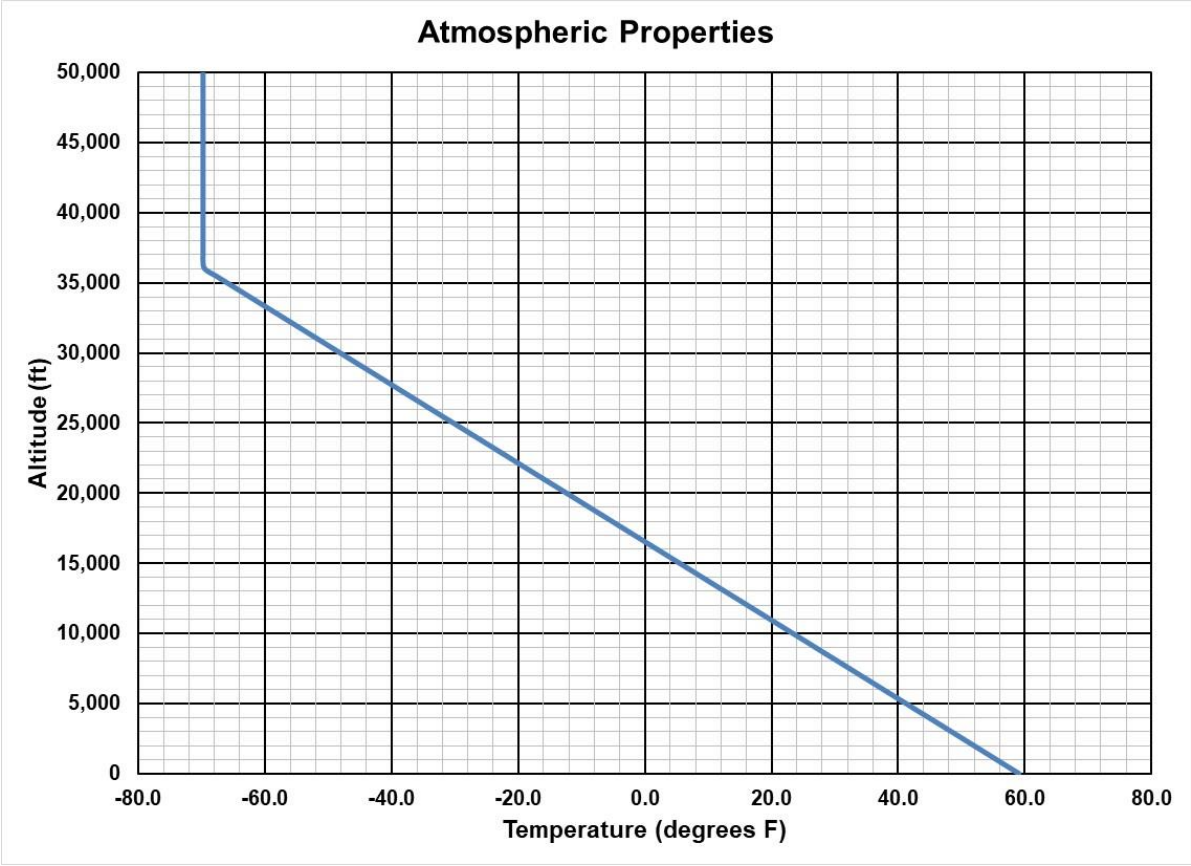
Engineering Plotting Guidelines

Final steps: format the data contours
format the axes scales and gridlines
format the axes labels and legend



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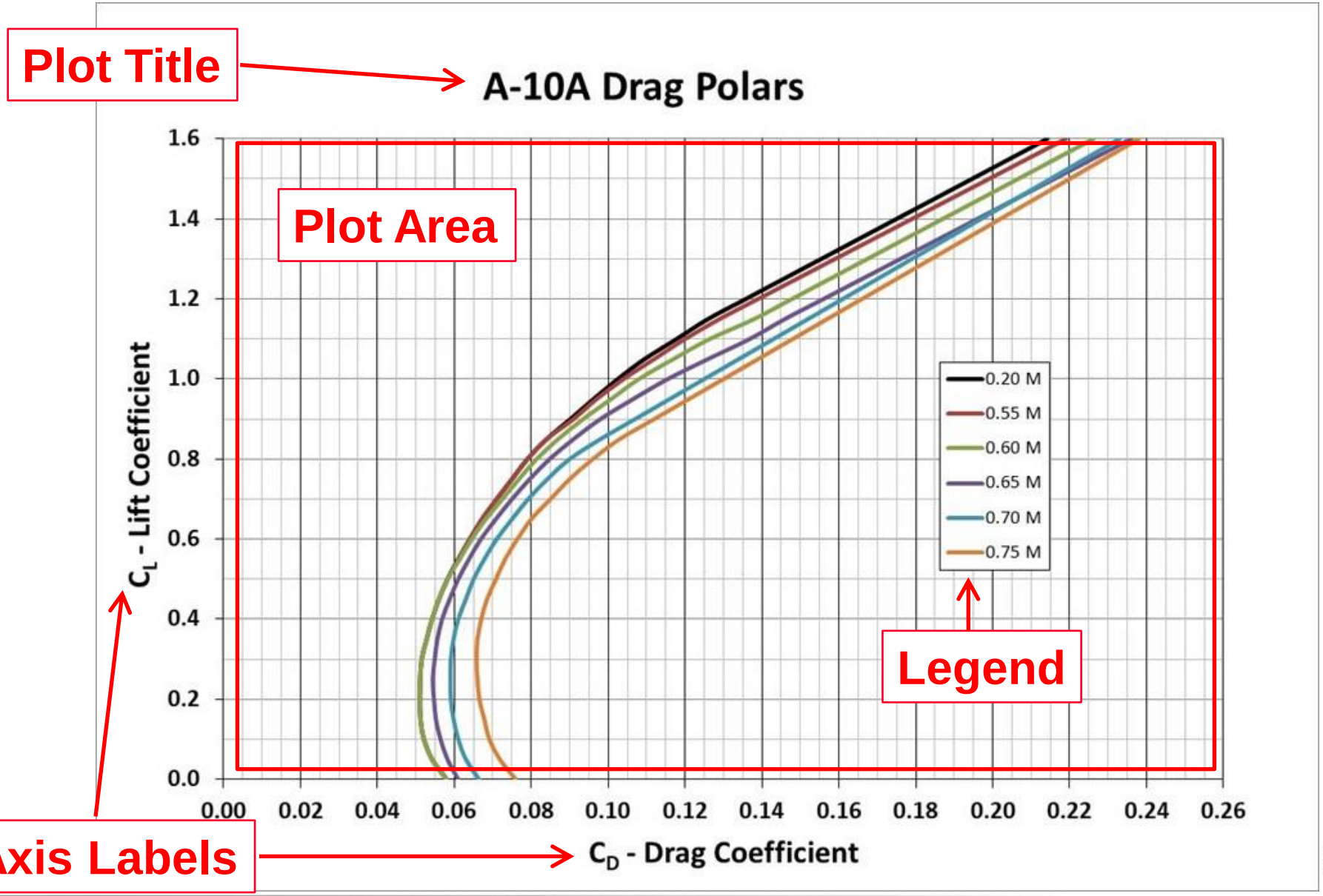
Typical Components of an XY Plot



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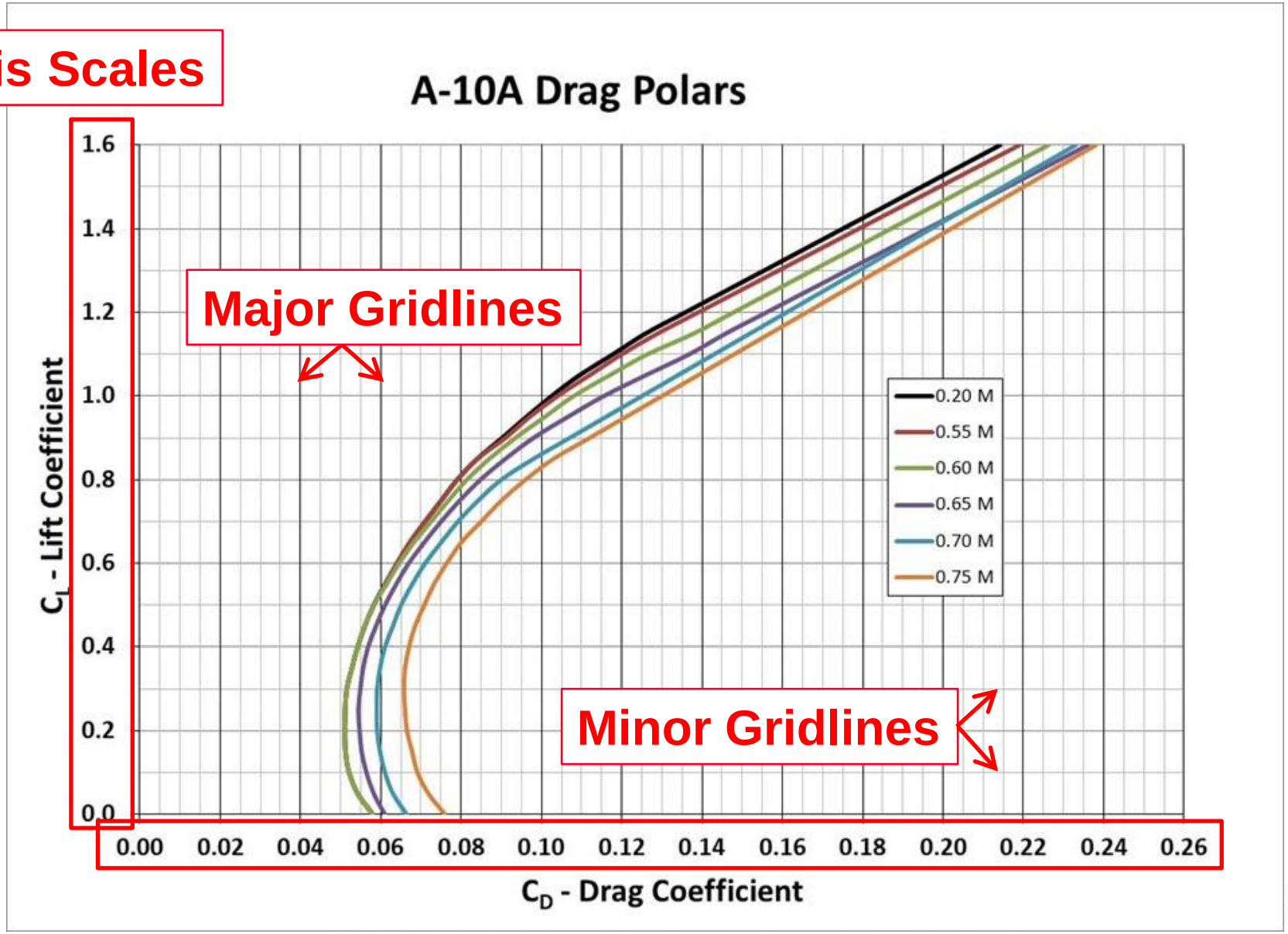


Typical Components of an XY Plot

Plot Title – Brief description that identifies the plot information concisely

Axis Labels – Indicate clearly what is plotted on each axis and include units

Labels should align with the major gridlines

Use minimum number of digits needed, unless convention dictates otherwise

(Examples: Mach Number should be X.XX; Drag Coefficient should be X.XXXX or X.XX)

Axis Scales – Selected to make full use of the plot area

Major divisions are labelled, minor divisions are not

Scales should make interpolation easy

Typical Components of an XY Plot

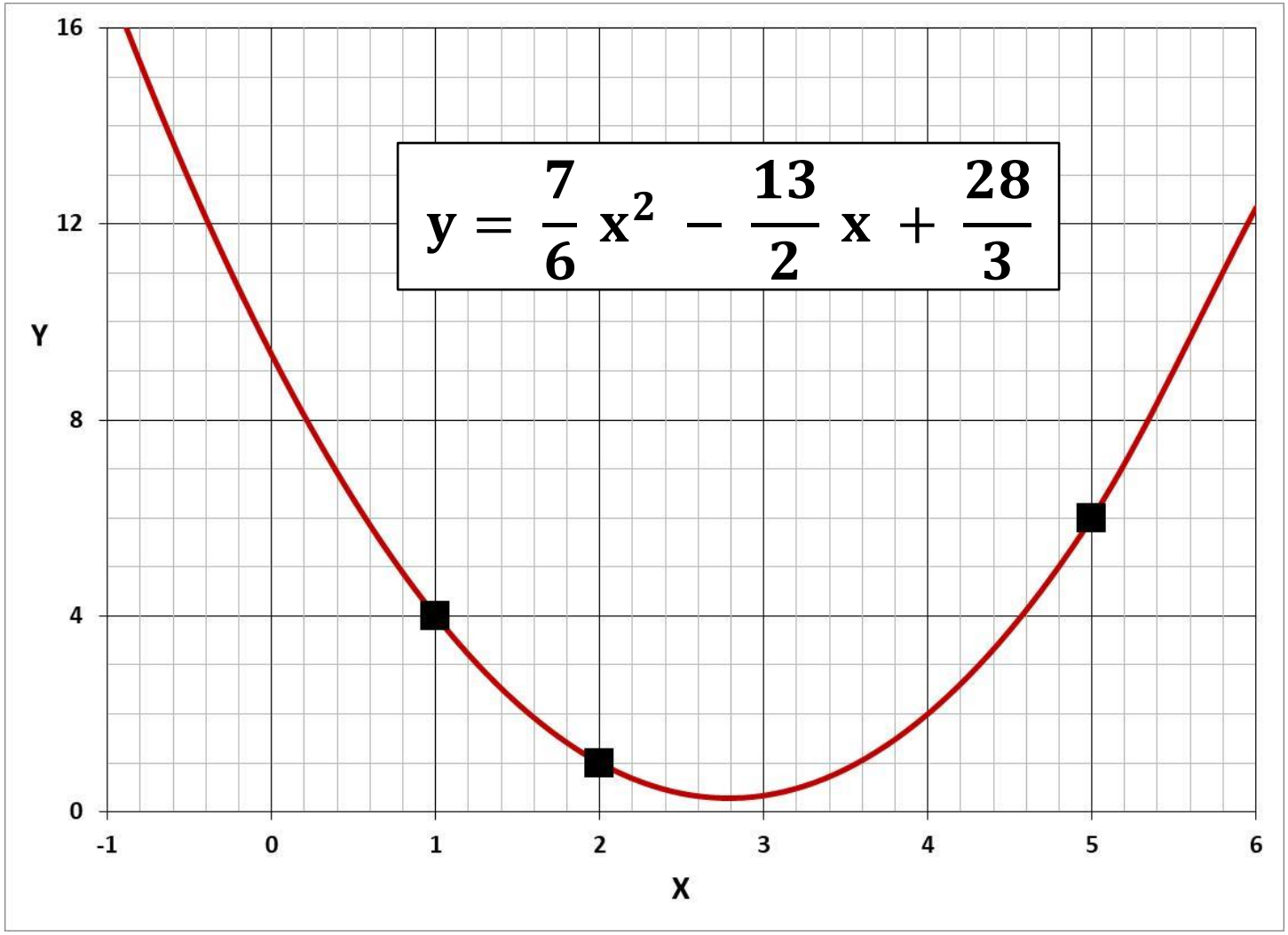
Gridlines – Helps the user read and interpolate the data
- Darker major gridlines, lighter minor gridlines

Legend – Add for multiple data sets
- Use various colors to differentiate data sets
- Locate so as to not obscure the data
- Locate in an open area

Plot Symbols and Lines
- Test data – use symbols with no line
- Calculated data – use smooth line with no symbols
- Trend Line – use only to show a pattern

Plot Area – Don’t use dark colors – hides data

Quadratic Lagrange Interpolating Polynomials



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Questions?