1. Create plots of the following functions from $x = 0$ to 10.

(a) $y = e^x$
(b) $y = \sin(x)$
(c) $y = ax^2 + bx + c$, where $a = 5$, $b = 2$, and $c = 4$
(d) $y = \sqrt{x}$

Each of your plots should include a title, an x-axis label, a y-axis label, and a grid.

Adjust the plot created

- Line 1 is red and dashed.
- Line 2 is blue and solid.
- Line 3 is green and dotted.
- Do not include markers on any of the graphs. In general, markers are included only on plots of measured data, not for calculated values.

2. When interest is compounded continuously, the following equation represents the growth of your savings:

$$P = P_0 e^{rt}$$

In this equation,

P = current balance,
P_0 = initial balance,
r = growth constant, expressed as a decimal fraction, and
t = time invested.

Determine the amount in your account at the end of each year if you invest \$1000 at 8% (0.08) for 30 years. (Make a table.)

Create a figure with four subplots. Plot time on the x-axis, and current balance P on the y-axis.

(a) In the first quadrant, plot t versus P in a rectangular coordinate system.
(b) In the second quadrant, plot t versus P, scaling the x-axis logarithmically.
(c) In the third quadrant, plot t versus P, scaling the y-axis logarithmically.
(d) In the fourth quadrant, plot t versus P, scaling both axes logarithmically.

Which of the four plotting techniques do you think displays the data best?

3. Use subplots to create the four plots in this problem. Let the vector

$$G = [68, 83, 61, 70, 75, 82, 57, 5, 76, 85, 62, 71, 96, 78, 76, 68, 72, 75, 83, 93]$$

represent the distribution of final grades in an engineering course.

(a) Use MATLAB® to sort the data, and create a bar graph of the scores.
(b) Create a histogram of the scores, using `histogram`.
(c) Assume the following grading scheme is used:

A > 90–100
B > 80–90
C > 70–80
D > 60–70
E > 0–60

Use the `histogram` function and an appropriate edges vector to create a histogram showing the grade distribution.

(d) Repeat part (c) but normalize the data using the countdensity option.

4. Create x and y vectors from -5 to $+5$ with a spacing of 0.5. Use the `meshgrid` function to map x and y onto two new two-dimensional matrices called `X` and `Y`. Use your new matrices to calculate vector Z, with magnitude

$$Z = \sin(\sqrt{X^2 + Y^2})$$

(a) Use the `mesh` plotting function to create a three-dimensional plot of Z.
(b) Use the `surf` plotting function to create a three-dimensional plot of Z. Compare the results you obtain with a single input (Z) with those obtained with inputs for all three dimensions (X, Y, Z).
(c) Modify your surface plot with interpolated shading. Try using different `colormaps`.
(d) Generate a contour plot of Z. Use handle graphics and the `clabel` function to label the contour lines.
(e) Generate a combination surface and contour plot of Z.