	Tasks (use MATLAB or OCTAVE to solve the following problems, ALL SOLUTIONS Should be submitted in m files)
Task 1	**Hyperbolic Cosine** The hyperbolic cosine function is defined by the equation $$\cosh x = \frac{e^x + e^{-x}}{2}$$ Write a program to calculate the hyperbolic cosine of a user-supplied value `x`. Use the program to calculate the hyperbolic cosine of 3.0. Compare the answer that your program produces to the answer produced by the MATLAB intrinsic function `cosh(x)`. Also, use MATLAB to plot the function `cosh(x)`. What is the smallest value that this function can have? At what value of `x` does it occur?
Task 2	Plot the functions $f_1(x) = \sin x$ and $f_2(x) = \cos 2x$ for $-2\pi \leq x \leq 2\pi$ on the same axes, using a solid blue line for $f_1(x)$ and a dashed red line for $f_2(x)$. Then calculate and plot the function $f_3(x) = f_1(x) - f_2(x)$ on the same axes using a dotted black line. Be sure to include a title, axis labels, a legend, and a grid on the plot.
Task 3	Plot the function $f(x) = 2e^{-2x} + 0.5e^{-0.1x}$ for $0 \leq x \leq 20$ on a linear set of axes.
Task 4	Plot the function $y(x) = e^{-0.5x} \sin 2x$ for 100 values of x between 0 and 10. Use a 2-point-wide solid blue line for this function. Then plot the function $y(x) = e^{-0.5x} \cos 2x$ on the same axes. Use a 3-point-wide dashed red line for this function. Be sure to include a legend, title, axis labels, and grid on the plots.

Task 5	**1.** Create a 3×3 matrix of zeros. **2.** Create a 3×4 matrix of zeros. **3.** Create a 3×3 matrix of ones. **4.** Create a 5×3 matrix of ones. **5.** Create a 4×6 matrix in which all the elements have a value of pi. **6.** Use the `diag` function to create a matrix whose diagonal has values of 1, 2, 3. **7.** Create a 10×10 magic matrix. **a.** Extract the diagonal from this matrix. **b.** Extract the diagonal that runs from lower left to upper right from this matrix. **c.** Confirm that the sums of the rows, columns, and diagonals are all the same.
Task 6	Using the matrices below, perform the following operations in MATLAB®: $a = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ $b = [7 \quad 5 \quad 6]$ $c = \begin{bmatrix} 19 & 23 \\ 31 & 29 \\ 17 & 13 \end{bmatrix}$ **(a)** Create a matrix called **f** with the transpose of the first column of **c**. **(b)** Create a matrix **e** with the first row of **a,** second row of **b,** and transpose of second column of **c,** in that order. **(c)** Insert matrix **f** between the third and second row of **e** to create a matrix called **d**. **(d)** Create a 3×3 matrix **m** with the diagonal elements of matrix **a** and all other elements as 0. **(e)** In the previous matrix **m**, fill the other diagonal of **m** with elements of **b**, and the remaining elements with corresponding elements of **a**.

Task 7	1. Plot x versus y for $y = \sin(x)$. Let x vary from 0 to 2π in increments of 0.1π. 2. Add a title and labels to your plot. 3. Plot x versus y_1 and y_2 for $y_1 = \sin(x)$ and $y_2 = \cos(x)$. Let x vary from 0 to 2π in increments of 0.1π. Add a title and labels to your plot. 4. Re-create the plot from Exercise 3, but make the $\sin(x)$ line dashed and red. Make the $\cos(x)$ line green and dotted. 5. Add a legend to the graph in Exercise 4.

Task 8	Use the following commands, and see the difference in the plots on the same figure, and on 3 subplots. explain !
	
	x1 = 0:2:20;
	y1 = sin(2*x1);
	plot(x1, y1)
	
	hold on
	x2 = 0:1:20;
	y2 = sin(2*x2);
	plot(x2, y2)
	
	x3 = 0:0.1:20;
	y3 = sin(2*x3);
	plot(x3, y3)