Exercise 1:
Create a graph of $y = \cos 4x$ over $[0, \pi]$. To illustrate what happens when there are too few points in your domain, first try a step size of $\pi/10$ ($\text{pi}/10$).

a. Which command gives the desired values for $x$?
(1) Circle one:
1. $x=0: \text{pi}/10: \text{pi}$
2. $x=0: \text{pi}: \text{pi}/10$
3. $x=\text{linspace}(0, \text{pi})$

b. Which command gives the correct answer for $y$?
(2) Circle one:
1. $y = \cos(4x)$
2. $y = \cos4*\text{x}$
3. $y = \cos(4*\text{x})$

c. Plot your graph with the `plot` command. You don’t need to turn it in.

d. Redo your plot, this time using the command $\gg x=\text{linspace}(0, \text{pi})$ to define the $x$ array. Which plot looks more like the plot of a cosine curve?
(3) Circle one:
1. The first one
2. the second one
3. both of them
Exercise 2:
We wish to plot the function \( f(x) = e^{\cos(x)} \) over the interval \([0, 2\pi]\).

a. What command generates a sufficient number of values for \( x \)?
   (4) Circle one:
   1. \texttt{linspace(0,2*pi)}
   2. \texttt{linspace(0,100,2*pi)}
   3. \texttt{0:2*pi}
   4. \texttt{0:2*pi:0.01}

b. Which command will generate the corresponding \( y \) values:
   (5) Circle one:
   1. \texttt{exp^cos(x)}
   2. \texttt{e^cos(x)}
   3. \texttt{exp(cos(x))}
   4. \texttt{exp(x)cos(x)}

Exercise 3:
Define \( a, b \) and \( c \) by
\[
\texttt{>> a = 1:2:20; b = 1:10; c = 1:2:10;}
\]
Which of the following is defined?

a. \( b+c \)
   (6) Circle one:
   1. yes 2. no

b. \( a + b \)
   (7) Circle one:
   1. yes 2. no

c. \( a./ b \)
   (8) Circle one:
   1. yes 2. no

d. \( a * b \)
   (9) Circle one:
   1. yes 2. no
Exercise 4:
Let \( x=[1 \ 2 \ 3] \). Translate the following math statements into MATLAB commands. To help, the value for the function when \( x=[1 \ 2 \ 3] \) is given in parentheses.

a. Write MATLAB commands to compute:
\[
\cos(x)\sin(x)
\]
\[
\text{ans} = \\
0.4546 \ -0.3784 \ -0.1397
\]
(10)

b. Write MATLAB commands to compute:
\[
\sin(x)^2
\]
\[
\text{ans} = \\
0.7081 \ 0.8268 \ 0.0199
\]
(11)

c. Write MATLAB commands to compute:
\[
\sin(x^2)
\]
\[
\text{ans} = \\
0.8415 \ -0.7568 \ 0.4121
\]
(12)
d. Write MATLAB commands to compute:

\[ f(x) = 7x^2 \sin \left( \frac{1}{7x^2} \right) \]

\[ \text{ans} = \begin{array}{c} 0.9966 \\ 0.9998 \\ 1.0000 \end{array} \]

(13)

e. Write MATLAB commands to compute:

\[ f(x) = x - \cos(x) - \sin(x) \]
\[ \frac{\sin(x)}{\sin(x) + \cos(x)} \]

\[ \text{ans} = \begin{array}{c} 1.2180 \\ 4.6877 \\ 1.6675 \end{array} \]

(14)

f. Write MATLAB commands to compute:

\[ f(x) = \frac{1}{10} \left( x - \frac{x^{3/2}}{10} \right)^2 \]

\[ \text{ans} = \begin{array}{c} 0.0810 \\ 0.2949 \\ 0.6152 \end{array} \]

(15)
Exercise 5:
Graph the function \( f(x) = \sin((\pi/2)x) + \sin((2/5)\pi x) \) over the interval \([0, 40]\).

a. How many peaks (relative maxima) does the graph have?
   (16) Answer: __________________________

b. This function is periodic. How many periods are graphed in \([0, 40]\)?
   (17) Circle one:
   1. 2
   2. 3
   3. 4
   4. 5
   5. none of the above

c. Estimate from your graph the value of \( f(10) \) to at least 1 decimal point.
   (18) Answer: __________________________

d. Upload your graph.
   (19) Attach your graph to the worksheet.

Exercise 6:

a. Graph the function \( f(x) = \cos^2(x) - \sin^2(x) \) over the interval \([-2\pi, 2\pi]\). Use 100 points in the domain. (20) Attach your graph to the worksheet.

b. Does the graph resemble any graph that you are familiar with?
   (21) Circle one:
   1. \( \cos 2x \)
   2. \( \cos x/2 \)
   3. \( \cos x \)
Exercise 7:
For this exercise we look at the graph of the polynomial function \( f(x) = x^3 - 20x^2 + 10x - 1 \).

a. First plot the function over the interval \([-10, 10]\). What is the approximate range for the \(y\)-axis?
   
   \[ \text{(22) Circle one:} \]
   1. \([-10, 10]\]
   2. \((-10,10)\)
   3. \([-3100,0]\]
   4. \([0, 2\pi]\)

b. We wish to investigate when (if) this function is positive. We can’t readily tell from our graph so we will replot over a smaller domain. Which of these domains seems appropriate for this task?
   
   \[ \text{(23) Circle one:} \]
   1. \([0,50]\]
   2. \([0,10]\]
   3. \([-1,1]\]
   4. \([0, 2\pi]\)

c. Replot the graph over the selected domain. Turn on the grid by entering the command

\[
>> \text{grid}
\]

From your graph, which of these \(x\) values have \(f(x) > 0\)?

\[ \text{(24) Circle all that apply:} \]
1. 0
2. 0.25
3. 0.50
4. 0.75