Matlab/Octave Programming

Practice Quiz, 14 questions

11/14 points (78%)

✖ Try again once you are ready.

Required to pass: 80% or higher

You can retake this as many times as you'd like.

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Retake

1 / 1 points

Matlab/Octave Programming

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1. Practice Quiz, 14 questions

The purpose of this homework quiz is to introduce you to programming in Matlab and Octave. You can skip this quiz if you are already adept at programming in either Matlab or Octave.

Since this quiz is **optional**, your score in this quiz will have **no effect** on your course grade.

If you are new to MATLAB or Octave, please go over the Matlab/Octave tutorials on the Course Resources page before attempting this quiz.

For each multiple-choice question, select **all** answers that apply. Correct answers and explanations will be revealed after your attempt.

To answer questions in this quiz, you may find it helpful to open Matlab or Octave and get a window with Matlab or Octave running in it. You can then type or copy and paste commands from the quiz question to explore the results.

Some Tips: MATLAB and Octave have an extraordinarily large set of pre-implemented functions (library). In many cases, you'll find that an operation that you want has already been implemented. For this reason, it is often best to search the library of functions before trying to implement something yourself. To do this, use the 'lookfor' command: Ex:

```
1  lookfor plot
```

If you ever come across a command that you're unfamiliar with, you may use the 'help' command to view the documentation for the command. Ex:

help plot

Okay, here's your first question...

Which of the following expressions generates the column vector $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$? Select all the correct answers.

- [ ] [1, 2, 3]

Un-selected is correct

- [ ] [1; 2; 3]

Correct

- [ ] [1 2 3]

Un-selected is correct

- [ ] [1 2 3]'

Correct

This option is correct but not preferred since it requires an extra operation (transposition)

2.

Given a matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 4 & 5 \\ 4 & 5 & 6 \end{bmatrix}$

which of the expressions would give the matrix $\begin{bmatrix} 2 & 3 \\ 3 & 4 \\ 4 & 5 \\ 5 & 6 \end{bmatrix}$? Select all the correct answers.

- [ ] A(:,:)

Un-selected is correct

- [ ] A(2:3,:)

Un-selected is correct

- [ ] A(:,2:3)

Correct

- [ ] A(:,2)

Un-selected is correct

3.

Suppose $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 2 \\ 3 & 3 \\ 4 & 4 \end{bmatrix}$, C = eye(3), $d = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$, E = zeros(3,3). Which of the following commands will NOT give an error? Select all the correct answers.

- [ ] A * B

Un-selected is correct

- [ ] A - B

Un-selected is correct

- [ ] C * E

This should be selected

- [ ] A * B'

Correct
This command will work. The ' operator transposes B, turning it from a 3x2 matrix to a 2x3 matrix. Then it can right-multiply A, which is 2x2.

- [ ] d * B

Correct
This command will work.

- [ ] C .* E

Correct
This command will work.

4.

Suppose $B = \begin{bmatrix} 2 & 2 \\ 3 & 3 \\ 4 & 4 \end{bmatrix}$, $d = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$, $f = \begin{bmatrix} 8 \\ 9 \end{bmatrix}$. Which of the following commands will NOT give an error? Select all the correct answers.

- [x] B - [d' d'*2]

Correct
This command will work. Making a matrix out of d in this way gives something with the same dimensions as B.

- [ ] B + [f; f; f]

This should not be selected
The dimensions of the matrices/vectors do not match, so this command will not run.

- [ ] B + repmat(f',3,1)

This should be selected

- [ ] B - repmat(f,1,3)

This should not be selected
The dimensions of the matrices/vectors do not match, so this command will not run. Note that B is 3x2, and this repmat command will give a 2x3 matrix.

5.

Suppose we wish to generate a 4x1 vector that contains the number 5 in every position. Which of the following expressions will accomplish this task? Select all the correct answers.

- [ ] fives(4,1)

Un-selected is correct

- [ ] eye(4) * 5

Un-selected is correct

- [ ] ones(4,1) * 5

Correct
This command creates a 4x1 vector of ones and multiplies each element by 5, resulting in a 4x1 matrix of fives.

- [ ] ones(4,1)

Un-selected is correct

- [ ] ones(4) * 5

Un-selected is correct

6.

Given a matrix $A = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 \\ 2 & 3 & 4 & 5 & 6 \\ 3 & 4 & 5 & 6 & 7 \\ 4 & 5 & 6 & 7 & 8 \\ 5 & 6 & 7 & 8 & 9 \end{bmatrix}$, which of these expressions will generate the matrix $\begin{bmatrix} 1 & 3 & 5 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \\ 4 & 6 & 8 \\ 5 & 7 & 9 \end{bmatrix}$? Select all the correct answers.

- [x] [A(:,1) A(:,3) A(:,5)]

Correct
This is a correct answer - it slices out columns 1, 3, and 5 and assembles them into a matrix.

- [ ] A(1:2:5,:)

Un-selected is correct

- [ ] A(:,1:3)

Un-selected is correct

- [x] A(:,1:2:5)

Correct
This is a correct answer. It slices out columns which are in the set 1:2:5, which translates to $\begin{bmatrix} 1 & 3 & 5 \end{bmatrix}$.

- [ ] [A(1,:) A(1,:) A(1,:)]

Un-selected is correct

7.

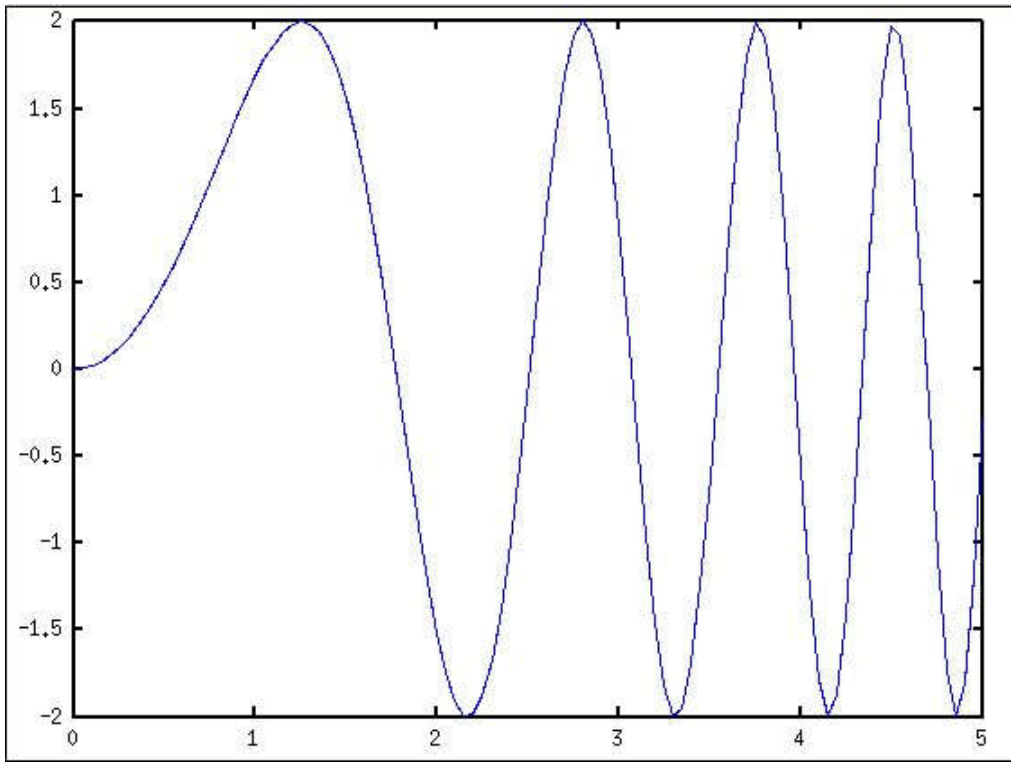
Suppose you enter the following commands:

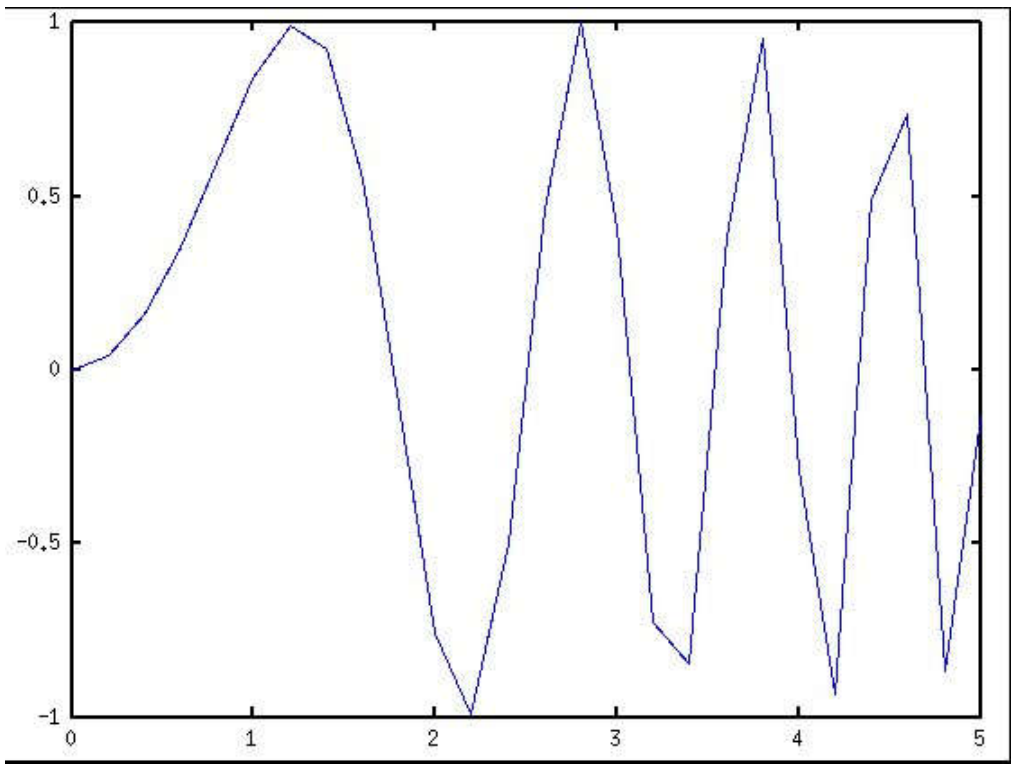
```
x = 0:0.05:5;

y = sin(x.^2);

plot(x,y);
```

Which of the following matches the resulting plot?





8.

What is the vector b equal to after this block of code is executed?

```
A = [1 0 -4 8 3; 4 -2 3 3 1];

b = zeros(1,5);

for index = 1:size(A,2)

if A(1,index) > A(2,index)

b(index) = A(1,index);

else

b(index) = A(2,index);

end

end
```

- None of these
- $\begin{bmatrix}1 & 0 & -4 & 8 & 3\end{bmatrix}$
- $\begin{bmatrix}4 & -2 & 3 & 3 & 1\end{bmatrix}$
- $\begin{bmatrix}4 & 0 & 3 & 8 & 3\end{bmatrix}$

Correct

- $\begin{bmatrix}1 & -2 & -4 & 3 & 1\end{bmatrix}$

9.

What is the value (rounded to three significant figures) of x after this block of code is executed?

```
x = 1;

while x > 1e-5

x = x / 2;

end
```

- 1
- 7.63e-05
- 3.81e-06
- 1.53e-05
- 7.63e-06

Correct

10.

Suppose we wish to generate a 2x3 matrix that contains only zeros. Which of the following expressions would achieve this goal? Select all the correct answers.

- [ ] zeros(2)

Un-selected is correct

- [ ] zeros(3)

Un-selected is correct

- [ ] zeros(3,2)

Un-selected is correct

- [ ] eye(2,3)

Un-selected is correct

- [ ] zeros(2,3)

Correct

- [ ] [0 0 0; 0 0 0]

Correct

This is technically correct, but zeros(2,3) is preferred because it's easier to read and allows for the creation of arbitrarily large matrices.

- [ ] [0 0; 0 0; 0 0]

Un-selected is correct

11.

Suppose $A = \begin{bmatrix} 5 & -2 & 3 \\ 2 & -3 & 4 \\ 3 & 4 & -8 \end{bmatrix}$

Which of the following expressions could be used to set all of the negative entries in A to zero?

- A ‹ 0 = 0
- (A ‹ 0) = 0
- A(A ‹ 0) = 0

Correct
This expression uses logical indexing to first find all elements of A that are less than 0 and then set them all to 0.

- A(:) = 0

---

1 / 1 points

12.

Suppose $A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ and $B = \begin{bmatrix} -1 \\ -2 \\ -3 \end{bmatrix}$. Which expression would you use to compute the element-wise product vector $C = \begin{bmatrix} -1 \\ -4 \\ -9 \end{bmatrix}$?

- C = A' * B
- C = A .* B

Correct
The .* operator computes element-wise products. Similarly, the .^ operator computes element-wise exponentiation.

- C = A * B

---

1 / 1 points

13.

Suppose $x = \begin{bmatrix} 1 & 1 & 2 & 2 & 1 & 3 & 2 & 2 & 3 & 1 \end{bmatrix}$.

Which expression returns the index of the first element of x equal to 3?

- x == 3
- find(x == 3)
- find(x == 3, 1)

Correct
This returns the index of only the first element of x that is equal to 3.

- x = 3

0 / 1 points

14.

What does the keyboard command do when placed inside a MATLAB script

(for example:

x = 5;

y = [3 5 7];

z = x * y;

keyboard;

w = z .^ 2;

)?

- Halts the program until the user presses a key on the keyboard.
- Stops execution of program and gives control to the keyboard.
- Collects character input from the user and stores it in the most recently referenced variable.

This should not be selected
In order to collect user input, use the input command.

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