<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
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</table>

General instructions: You may not ask questions during the test. If you believe that there is something wrong with a question, write down what you think the question is trying to ask and answer that.
<table>
<thead>
<tr>
<th>Question</th>
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</tbody>
</table>
1. Which statement assigns the value 3 to the variable myNum and prints the value of myNum to the command window?
   (a) myNum == 2 + 1;
   (b) myNum = 2 + 1;
   (c) myNum == 3
   (d) myNum = 2 + 1
   (e) myNum = 3;

2. What is the value of oranges after the following code executes?
   ```
   apples = 8;
   oranges = 2;
   oranges = oranges + apples;
   apples = apples - 1;
   ```
   (a) 10
   (b) 9
   (c) 8
   (d) 7
   (e) 2

3. Which of the following is not a valid Matlab identifier?
   (a) MyNumber
   (b) my_array2
   (c) myArray
   (d) start
   (e) end

4. Indicate whether each statement is true or false.
   (T/F) A double precision number’s range is about 100 times greater than a single precision number’s range.
   (T/F) Following the assignment myNum = 4, the variable myNum will be of type int32.
   (T/F) Floating point numbers can represent larger numbers than unsigned integers.
   (T/F) Due to rounding error, it is not necessarily true that (a + b) + c = a + (b + c) for some floating points values a, b, c.
   (T/F) eps(number) will give the relative error associated with representing that number in floating point.
   (T/F) Computing 0/0 will yield the value Inf.
   (T/F) Computing Inf - Inf with yeild the value NaN.

5. Using the precedence rules for arithmetic operators, determine which statement is true.
   (a) 2 / 2 * 3 == 2 / 6
   (b) 2 ^ 2 * 2 == 16
   (c) 1 + 2 * 3 == 9
   (d) 4 / 2 + 2 == 4
   (e) 2 - 3 * 2 == -2
6. Consider the function definition,

```matlab
function [ apples, oranges ] = MyFunction( pears )
    apples = pears * 2;
    oranges = pears - 1;
end
```

and the following code that calls this function:

```matlab
apples = 1;
oranges = 2;
pears = 3;
[ oranges, pears ] = MyFunction( apples );
```

What will be the value of `apples`, `oranges`, and `pears` after the code executes?
(a) apples = 1, oranges = 0, and pears = 2
(b) apples = 6, oranges = 2, and pears = 3
(c) apples = 1, oranges = 2, and pears = 0
(d) apples = 6, oranges = 2, and pears = 3
(e) apples = 1, oranges = 2, and pears = 3

7. Which statement regarding functions and scripts is false?
(a) By default, variables defined in a script will be visible in the main workspace.
(b) By default, variables defined in a function will not be visible in the main workspace.
(c) Functions can be called with multiple input parameters.
(d) Scripts are terminated with the `end` keyword.
(e) Scripts are not called with input parameters.

8. For each `fprintf` statement in the left column, draw a line to the corresponding output in the right column.

<table>
<thead>
<tr>
<th><code>fprintf</code></th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>fprintf('-%4.2f--', 3.1415926)</code></td>
<td><code>--3.141593--</code></td>
</tr>
<tr>
<td><code>fprintf('-%5.2f--', 3.1415926)</code></td>
<td><code>--3.14--</code></td>
</tr>
<tr>
<td><code>fprintf('-%4.2e--', 3.1415926)</code></td>
<td><code>--3.14e+00--</code></td>
</tr>
<tr>
<td><code>fprintf('-%f--', 3.1415926)</code></td>
<td><code>-- 3.14--</code></td>
</tr>
</tbody>
</table>

9. Which statement regarding 1D arrays is true?
(a) `myArray = [ 1, 2, 3, 4 ]`; creates a row array of size 4 × 1.
(b) `myArray = [ 1, 2, 3, 4 ]'`; creates a row array of size 4 × 1.
(c) `myArray = [ 3:-1:0 ]`; creates a row array of size 1 × 3.
(d) `myArray = [ 1:2:4 ]`; creates a row array of size 1 × 3.
(e) `myArray = [ 1:7 ]'`; `myArray(6) = []`; results in an array of size 6 × 1.
10. Consider the following code:

```matlab
myArray = [ 1:10 ];
smallNumbers = myArray < 5;
smallNumbersArray = myArray(smallNumbers);
```

Indicate whether each statement is true or false.

(T/F) `smallNumbersArray` has length 5.
(T/F) `smallNumbers` is of class logical.
(T/F) The code above generates an error.
(T/F) The relational operation in the second line of code is evaluated elementwise.

11. Given `myArray = [ 10, 20, 30, 40, 50 ]`, match the statement in the left column with the resulting array in the right column.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>myArray(end-1:-1:1)</code></td>
<td>error</td>
</tr>
<tr>
<td><code>myArray(2,5)</code></td>
<td>empty matrix</td>
</tr>
<tr>
<td><code>myArray(myArray&lt;1)</code></td>
<td>[40, 30, 20, 10]</td>
</tr>
<tr>
<td><code>myArray(6)</code></td>
<td>error</td>
</tr>
</tbody>
</table>

12. Consider the following code:

```matlab
apples = 3;
oranges = 2;
pears = 1;
```

Indicate whether each statement is true or false.

(T/F) `apples <= oranges+1`
(T/F) `apples ~= oranges+1`
(T/F) `(apples > oranges) & (pears < 2)`
(T/F) `(apples < oranges) | (pears < 2)`
(T/F) `(pears & apples) < oranges`

13. Consider two floating point numbers, \( x \) and \( y \), whose values lie between 1 and 10. Which of the following might be a good way to test for equality of \( x \) and \( y \)?

(a) \( \text{abs}(x-y) < 1 \)
(b) \( x == y \)
(c) \( y-x < .00001 \)
(d) \( \text{abs}(x+y) < .00001 \)
(e) None of the above.

14. Fill in the following truth tables.

<table>
<thead>
<tr>
<th>( X )</th>
<th>( Y )</th>
<th>( \text{and}(X,Y) )</th>
<th>( X )</th>
<th>( Y )</th>
<th>( \text{xor}(X,Y) )</th>
<th>( X )</th>
<th>( Y )</th>
<th>( \text{or}(\neg(X),Y) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
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</tbody>
</table>
15. Let

\[ x = [ 1, 2, 3, 4 ]; \]
\[ y = [ -1, 0, 1, 2 ]; \]

For each expression below, use the space provided to write the value of the expression or error if the expression is not valid Matlab code.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x .* y )</td>
<td></td>
</tr>
<tr>
<td>( x .^ y )</td>
<td></td>
</tr>
<tr>
<td>( x * y )</td>
<td></td>
</tr>
<tr>
<td>( x * y' )</td>
<td></td>
</tr>
<tr>
<td>( x .\backslash y )</td>
<td></td>
</tr>
<tr>
<td>( x .+ y )</td>
<td></td>
</tr>
<tr>
<td>( x - 2 )</td>
<td></td>
</tr>
</tbody>
</table>

16. For each expression below, use the space provided to write the value of the expression or error if the expression is not valid Matlab code.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{not([0, 1, 1, 0])} )</td>
<td></td>
</tr>
<tr>
<td>([0, 1, 0] &amp; [1, 0, 0])</td>
<td></td>
</tr>
<tr>
<td>([0, 1, 0] \text{</td>
<td></td>
</tr>
<tr>
<td>(\text{not([0, 1, 0]) &amp; 1})</td>
<td></td>
</tr>
</tbody>
</table>

17. Given the array \( \text{myArray} = [ -1, 2, 0, 4, -5 ] \), which statement sets all of the negative elements of \( \text{myArray} \) to 0?

(a) \( \text{myArray} = (\text{myArray} >= 0) .* \text{myArray} \)
(b) \( \text{myArray} = (\text{myArray} < 0) .* \text{myArray} \)
(c) \( \text{myArray} = (\text{myArray} \sim= 0) .* \text{myArray} \)
(d) \( \text{myArray(myArray<0)} = \text{myArray} \& 0 \)
(e) None of the above.
18. Which code generated the figure shown?

(a) \( x = [0:1:2\pi]; \)
\[ \text{y} = \sin(x); \]
\[ \text{z} = \cos(x); \]
hold on
\[ \text{plot}(x,y,'-k'); \]
\[ \text{plot}(x,z,'-k'); \]

(b) \( x = [0:.01:2\pi]; \)
\[ \text{y} = \sin(x); \]
\[ \text{z} = \cos(x); \]
\[ \text{plot}(x,y,'-k'); \]
\[ \text{plot}(x,z,'-k'); \]

(c) \( x = [0:.05:2\pi]; \)
\[ \text{y} = \sin(x); \]
\[ \text{z} = \cos(x); \]
\[ \text{plot}(x,y,'-k'); \]
\[ \text{plot}(x,z,'-.k'); \]

(d) \( x = [0:.05:2\pi]; \)
\[ \text{y} = \sin(x); \]
\[ \text{z} = \cos(x); \]
hold on
\[ \text{plot}(x,y,'-k'); \]
\[ \text{plot}(x,z,'-.k'); \]

(e) \( x = [0:.05:2\pi]; \)
\[ \text{y} = \sin(x); \]
\[ \text{z} = \cos(x); \]
\[ \text{subplot}(1,2,1) \]
\[ \text{plot}(x,y,'-k'); \]
\[ \text{subplot}(1,2,2) \]
\[ \text{plot}(x,z,'-.k'); \]

19. Consider the following code.

\[ x = [1, 2, 3, 4]; \]
\[ y = 7; \]
\[ z = 1; \]
\text{save} \text{MyFile} \text{y} \text{z};

Which statement is true?

(a) All of the variables in the workspace are saved to a file \text{MyFile.mat}.
(b) \text{load} \text{MyFile} loads the value of \text{x} into the workspace.
(c) \text{load} \text{MyFile} \text{z} loads only the value of \text{z} into the workspace.
(d) The code above would generate an error.
(e) None of the above.
20. Indicate whether each statement is true or false.
   (T/F) `myName = 'Sam'; myName(4) = 'e'` results in `myName == 'Same'`.
   (T/F) The command `uint8('ABC')` will display the ASCII code for the letters A, B, and C.
   (T/F) `char('Hello', 'my', 'name', 'is', 'Sam')` will create another string by concatenating the input strings.
   (T/F) The code `lower('Sam') == 'sam'` generates true.

21. Consider the following code:
    ```matlab
    myString = 'Hello, how are you doing 2day?'
    isSpaceArray = isspace(myString);
    myString2 = myString(~isSpaceArray)
    myString3 = myString(isletter(myString))
    ```

Which statement is false after the code runs?

(a) `myString2 == 'Hello, how are you doing 2day?'`
(b) `myString3` has 22 elements.
(c) `strrep(myString2,'2','to')` results in the string 'Hello, how are you doing today?'
(d) `find(myString == 'h')` returns the array [1,8].
(e) `lower(myString2) == 'hello, how are you doing 2day?'.

22. Match the statement in the left column with the resulting value in the right column.

| myArray = [ 1, 2, 3; 5, 6, 7, 8 ] | [ 1 2 3 4 ]
|---------------------------------|-------------------|
| myArray = [ 1, 2, 3, 4; 5, 6, 7, 8 ] | [ 1 5 ]
| myArray = [ [1, 2]; [4, 5, 6] ] | [ 1 2 3 4 6 7 ]
| myArray = [ 1, 2, 3; 5, 6, 7, 8 ];myArray(2,1) = 4 | error |

23. For 2D arrays, which statement is false?
(a) Row-column indexing uses two numbers to index the array while linear indexing uses one number.
(b) If the linear index of element (m,n) is k, then the linear index of element (m,n+1) is k+1.
(c) The second column of a 3 × 2 array `myArray` would be accessed as `myArray(:,2)`.
(d) The first row of a 3 × 2 array `myArray` would be accessed as `myArray(1,:)`.
(e) For `x = [ 1, 2, 3 ]` and `y = [ 1, 2 ]`, `x' * y` yields a 3 × 2 array.
24. Let

\[
\text{myArray} = \begin{bmatrix}
1 & 2 & 3 & 4 \\
5 & 6 & 7 & 8 \\
9 & 10 & 11 & 12
\end{bmatrix}
\]

Which statement is false?

(a) \text{myArray(:,3)=[]} deletes the third column of \text{myArray}.
(b) \text{myArray(1:2,3:4)} gives the array \begin{bmatrix} 3 & 4; 7 & 8 \end{bmatrix}.
(c) \text{myArray([3:-1:1],1)} gives the array \begin{bmatrix} 9 & 5 & 1 \end{bmatrix}'.
(d) \text{myArray([1, 1, 1],1)} gives an error.
(e) \text{myArray([1:2:3],[1:2])} is equivalent to \text{myArray(1:2:3,1:2)}.

25. Let

\[
\text{myArray} = \begin{bmatrix}
10 & 20 & 30 & 40 \\
-5 & 6 & 0 & 1 \\
1 & -2 & 11 & 3
\end{bmatrix}
\]

Indicate whether each statement is true or false.

(T/F) \text{myArray2 = myArray(:)} results in \text{myArray2} having size 12 \times 1.
(T/F) \text{myArray2 = reshape(myArray,4,3)} results in \text{myArray2} having size 4 \times 3.
(T/F) \text{myArray2 = reshape(myArray,2,2)} results in \text{myArray2} having size 2 \times 2.
(T/F) The statement \text{myArray(:) = myArray(:) + [1:12]'} will change the shape of \text{myArray}.
(T/F) \text{reshape(myArray,12,1)} yields a 1D column array.