

Name: Answers

Checkpoint Quiz:

1. Write *any* correct matlab code to create a matrix M that is a 5 x 5 array of zeros with a 1 in the middle of it.

Option 1

$$M = [0 \ 0 \ 0 \ 0 \ 0; 0 \ 0 \ 0 \ 0 \ 0; 0 \ 0 \ 1 \ 0 \ 0; 0 \ 0 \ 0 \ 0 \ 0; 0 \ 0 \ 0 \ 0 \ 0]$$

Option 2

$$M = \text{zeros}(5) \quad \text{or} \quad M = \text{zeros}(5,5)$$

$$M(3,3) = 1$$

2. Suppose Q is a vector. Write *any* correct matlab code to change all the 1's in Q to be 2's. That is, if Q starts off as [0 1 4 1 3.3], then it should become [0 2 4 2 3.3].

Option 1

$$Q_{\text{ones}} = \text{find}(Q == 1)$$

$$Q(Q_{\text{ones}}) = 2$$

Option 2

$$Q(Q == 1) = 2$$

Name: Answers

Checkpoint Quiz 3 (with make up questions for Quiz 1):

(The first two questions are "replacement questions". If you correctly answered the corresponding question on the first quiz, you do not need to answer them here).

1.1 Write *any* correct matlab code to create a matrix M that is a 5 x 5 array of ones with a 2 in the middle of it.

$M = \text{ones}(5,5)$ $M(3,3) = 2$	or	$M = \text{zeros}(5,5)$ $M = M + M$ $M(3,3) = 2$	or	$M = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 2 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix}$
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1.2 Suppose Q is a vector. Write *any* correct matlab code to change all the 0's in Q to be 1's. That is, if Q starts off as [0 1 4 1 0], then it should become [1 1 4 1 1]. Your code should work with *any* vector Q, not just the example values above.

$Q(Q == 0) = 1$	or	$n = \text{find}(Q == 0)$ $Q(n) = 1$	or	<pre>for ix = 1 : size(Q, 2) if Q(ix) == 0 Q(ix) = 1 end end</pre>
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3.1 Suppose that n is a positive integer already defined in your workspace. (for instance, n might be 7). Write a for-loop that calculates n factorial (1 * 2 * 3 * ... n). Indicate which variable contains the value of n-factorial when your loop is finished.

```
fact = 1
for k = 1 : n
    fact = fact * k
end
```

variable "fact" contains answer

Your Name: Answers

Code Name under which your grades could be posted online: _____

Checkpoint Quiz 4 (with make up questions for Quiz 1,3):

(The first two questions are "replacement questions". If you correctly answered the corresponding question on the first quiz, you do not need to answer them here). Everyone has now gotten the first question correct, so the make-up questions start with the second question on the first quiz.

1.2 Suppose Q is a vector. Write *any* correct matlab code to change all the 4's in Q to be 5's. That is, if Q starts off as [0 1 4 1 0], then it should become [0 1 5 1 0]. Your code should work with *any* vector Q, not just the example values above.

```
idx = find(Q == 4)
Q(idx) = 5
```

3.1 Suppose that n is a positive integer already defined in your workspace. (for instance, n might be 7). Write a for-loop that calculates the sum of the numbers from 1 to n. (1 + 2 + 3 + ... n). Indicate which variable contains the final sum when your loop is finished. You may not use the matlab "sum" command, nor may you use multiplication (to compute this directly).

```
k = 0
for ix = 1:n
    k = k + ix
end
k has value 1+2+3...+n
```

4.1 Suppose that you have defined the function foo as follows:

```
function y = foo(x)
z = 2*x
y = 2*z
z = y - 4
```

What are the values returned from the following calls:

>> foo(10)

40

>> foo(foo(2))

32

Your Name: Answers

Checkpoint Quiz 5 (with make up questions for Quiz 1,3,4):

1.2 Suppose Q is a vector. Write *any* correct matlab code to change all the 0's in Q to be 2's. That is, if Q starts off as [0 1 4 1 0], then it should become [2 1 4 1 2]. Your code should work with *any* vector Q, not just the example values above.

```

Q(Q==0)=2
idx = find(Q==0)
Q(idx)=2

```

← options ↑

3.1 Suppose that n is a positive integer already defined in your workspace. Write a for-loop that calculates the product of the numbers from 1 to 2 * n: (1 * 2 * 3 * 4 * ... * n * (n+1) * ... * 2n). (For example, if n was 3, you need to calculate 1*2*3*4*5*6.) Indicate which variable contains the final answer when your loop is finished. You may not use the matlab "product" command.

```

a=1
for k=1:2*n
    a=a*k
end

```

answer in a

4.1 Suppose that you have defined the function bar as follows:

<pre>function c = bar(a) b = a + 2; c = a * 2; d = b + c;</pre>	<p>What are the values returned from the following calls?</p> <pre>>> bar(10) 20</pre> <pre>>> bar(bar(4)) 16</pre>
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5.1 Define a function foo that takes an array of sample values of a function as returns the "zero-crossings" of the function. You may assume that the input is never exactly zero. Examples of what the function should return:

<pre>>>foo([-3 -1 1 2 -1]) [2, 4]</pre> <p><i>Because the function changes sign after the 2nd and 4th entry in the array.</i></p>	<pre>>>foo([4 3 1 -1]) [3]</pre> <p><i>Because the function changes sign after the 3rd entry</i></p>	<pre>>>foo([4 2 0 -2])</pre> <p><i>I will accept any answer because you can assume there are no zeros.</i></p>
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I will get you started:

```

function zeroCrossings = foo(A)
zC = 0.*A
for k = 1: length(A) - 1
    if A(k)*A(k+1) < 0
        zC(k) = 1
    end
end
zeroCrossings = find(zC)

```

```

P = A(1:end-1) .* A(2:end)
zeroCrossings = find(P < 0)

```

```

zC = 0
for k = 1: size(A,2) - 1
    if A(k) > 0 & A(k+1) < 0
        zC(k) = 1
    else if A(k) < 0 & A(k+1) > 0
        zC(k) = 1
    end
end

```