

Feedback — V. Octave Tutorial

[Help](#)





You submitted this quiz on **Thu 27 Mar 2014 6:38 PM IST**. You got a score of **5.00** out of **5.00**.

Question 1

Suppose I first execute the following Octave commands:

```
A = [1 2; 3 4; 5 6];
B = [1 2 3; 4 5 6];
```

Which of the following are then valid Octave commands? Check all that apply. (Hint: A' denotes the transpose of A .)

Your Answer	Score	Explanation
<input type="checkbox"/> $C = A' * B;$	 0.25	A' is 2x3 and B is 2x3, so A' does not have the same number of columns as B has rows, and the product is not well defined.
<input checked="" type="checkbox"/> $C = A * B;$	 0.25	A is 3x2 and B is 2x3, so A has the same number of columns as B has rows, and the product is well defined.
<input checked="" type="checkbox"/> $C = B * A;$	 0.25	B is 2x3 and A is 3x2, so B has the same number of columns as A has rows, and the product is well defined.
<input type="checkbox"/> $C = B' * A;$	 0.25	B' is 3x2 and A is 3x2, so B' does not have the same number of columns as A has rows, and the product is not well defined.
Total	1.00 / 1.00	

Question 2

Let $A = \begin{bmatrix} 16 & 2 & 3 & 13 \\ 5 & 11 & 10 & 8 \\ 9 & 7 & 6 & 12 \\ 4 & 14 & 15 & 1 \end{bmatrix}$.

Which of the following indexing expressions gives $B = \begin{bmatrix} 16 & 2 \\ 5 & 11 \\ 9 & 7 \\ 4 & 14 \end{bmatrix}$? Check all that apply.

Your Answer	Score	Explanation
<input type="checkbox"/> $B = A(:, 0:2);$	✓ 0.25	The first element in Octave has index 1, so selecting columns 0 through 2 is invalid.
<input type="checkbox"/> $B = A(0:4, 0:2);$	✓ 0.25	The first element in Octave has index 1, so this expression is invalid.
<input checked="" type="checkbox"/> $B = A(:, 1:2);$	✓ 0.25	$A(:, 1:2)$ selects every row and the first two columns of A, giving the desired B.
<input checked="" type="checkbox"/> $B = A(1:4, 1:2);$	✓ 0.25	$A(1:4, 1:2)$ selects the first four rows and first two columns of A, giving the desired B.
Total	1.00 / 1.00	

Question 3

Let A be a 10x10 matrix and x be a 10-element vector. Your friend wants to compute the product Ax and writes the following code:

```
v = zeros(10, 1);
for i = 1:10
    for j = 1:10
        v(i) = v(i) + A(i, j) * x(j);
    end
end
```

How would you vectorize this code to run without any `for` loops? Check all that apply.

Your Answer	Score	Explanation
-------------	-------	-------------

<input checked="" type="checkbox"/>	✓	0.25	Octave will correctly perform the matrix-vector product equivalent to the for loop above.
<input type="checkbox"/>	✓	0.25	Octave does not implicitly multiply without * but instead will look for a variable called "Ax".
<input type="checkbox"/>	✓	0.25	The summation involved in the matrix-vector product occurs on its own without needing to call the sum function explicitly.
<input type="checkbox"/>	✓	0.25	This is a well-defined product to compute a 10-vector, but it computes a different set of values.
<hr/>			
Total		1.00 /	
		1.00	

Question 4

Say you have two column vectors v and w , each with 7 elements (i.e., they have dimensions 7×1). Consider the following code:

```
z = 0;
for i = 1:7
    z = z + v(i) * w(i);
end
```

Which of the following vectorizations correctly compute z ? Check all that apply.

Your Answer	Score	Explanation
<input checked="" type="checkbox"/> $z = w' * v;$	✓ 0.25	By taking the transpose of w , the product computes the sum of the element-wise product of w and v , just as the for-loop code does.
<input checked="" type="checkbox"/> $z = v' * w;$	✓ 0.25	By taking the transpose of v , the product computes the sum of the element-wise product of v and w , just as the for-loop code does.
<input type="checkbox"/> $z = v .* w;$	✓ 0.25	Recall that $.*$ computes the element-wise product, not the matrix product, so the result here is also a 7×1 vector.
<input type="checkbox"/>	✓ 0.25	v has dimension 7×1 and w' has dimension 1×7 , so their product is a

$z = v * w$

7x7 matrix.

';
;

Total	1.00 /
	1.00

Question 5

In Octave, many functions work on single numbers, vectors, and matrices. For example, the `sin` function when applied to a matrix will return a new matrix with the sin of each element. But you have to be careful, as certain functions have different behavior. Suppose you have an 7x7 matrix X . You want to compute the log of every element, the square of every element, add 1 to every element, and divide every element by 4. You will store the results in four matrices, A , B , C , D .

One way to do so is the following code:

```
for i = 1:7
    for j = 1:7
        A(i, j) = log (X(i, j));
        B(i, j) = X(i, j) ^ 2;
        C(i, j) = X(i, j) + 1;
        D(i, j) = X(i, j) / 4;
    end
end
```

Which of the following correctly compute A , B , C , or D ? Check all that apply.

Your Answer	Score	Explanation
<input checked="" type="checkbox"/> $A = \log(X);$	<input checked="" type="checkbox"/> 0.25	The log function acts element-wise on matrix inputs.
<input checked="" type="checkbox"/> $B = X.^2;$	<input checked="" type="checkbox"/> 0.25	The <code>.^</code> operator performs element-wise exponentiation.
<input checked="" type="checkbox"/> $C = X + 1;$	<input checked="" type="checkbox"/> 0.25	Adding a single number applies element-wise to a matrix.
<input type="checkbox"/> $B = X^2;$	<input checked="" type="checkbox"/> 0.25	The code X^2 is equivalent to $X * X$ which is only defined if X is a square matrix. To compute the square of each element, you need to write $X.^2$.

Total	1.00 /
	1.00