Array and Matrix

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Ex. 1: Basic operations: Assign the content of an array/matrix

```
a = [2 12 25];
b = [3 7 4];
c = a + b
```

```
c = 1×3
     5    19    29
```

Ex. 2: Assign the content of a matrix: Addition of two matrices

```
a = [3 4; 1 6];
b = [5 2; 11 7];
c = a + b
```

```
c = 2×2
     8     6
    12    13
```

Ex. 3: Multiplication involving a scalar and an array

```
a = [3 5; 1 4];
b = 2 * a
```

```
b = 2×2
     6    10
     2     8
```

Ex. 4: Element-by-element multiplication involving two 1-D arrays or two matrices of the same dimension

```
a = [2 3 5];
b = [2 4 9];
c = a.* b % The period preceding the mathematical operation, "*", indicates that the
```

```
c = 1×3
     4    12    45
```

```
           % operation will be performed element-by-element.
```

Ex. 5: Element-by-element multiplication of two matrices

```
a = [2 3; 1 4];
b = [5 1; 7 2];
c = a.* b
```

```
c = 2×2
    10     3
     7     8
```

Ex. 6: Direct (not element-by-element) multiplication of two matrices

```
a = [2 3; 1 4];
b = [5 1; 7 2];
c = a * b
```

```
c = 2×2
    31     8
    33     9
```

Ex. 7: Elementary functions with a vectorial variable

```
a = [2 3 5];
b = sin(a);

a = [2 3 5];
b = (2 * (a.^2)) + ((3 * a) + 4)
```

```
b = 1×3
    18    31    69
```

Ex. 8: An efficient way to assign the content of an array

```
a = [0:0.5:4]; % start at 0, increment in 0.5, stop at 4
a
```

```
a = 1×9
         0    0.5000    1.0000    1.5000    2.0000    2.5000    3.0000    3.5000 ···
```

Ex. 9: Extracting the individual element(s) of a matrix

```
A = [3 5; 2 4];
c = A(2,2) + A(1,2);

A = [3 5; 2 4];
norm1 = 0;
for m = 1:2
    for n = 1:2
        norm1 = norm1+A(m,n)^2;
    end
end
norm1 = sqrt(norm1) % Euclidean norm of matrix 'A':
```

```
norm1 = 7.3485
```

```
                    % The Euclidean norm of a square matrix
                    % is the square root of the sum of all the
                    % squares of the. elements.
```

Ex. 10: Solving a system of linear equations

```
A = [4 1 2; 0 3 1; 0 1 2];
b = [17 ; 19 ; 13];
x = inv(A) * b % x = [A]^-1 * b
```

```
x = 3×1
     1
     5
     4
```

```
A = [4 1 2; 0 3 1; 0 1 2];
b = [17 ; 19 ; 13];
x = A \ b % solves the system of linear equations A*x = b.
```

```
x = 3×1
     1
     5
     4
```