

## Second stage / Matlab language

### Examples

Write the equations in Matlab language

$$1: \cos^2 \frac{x}{2} = \frac{\tan x + \sin x}{2 \tan x} \quad x = \frac{\pi}{5}$$

$$2: \tan 4x = \frac{4 \tan x - 4 \tan^3 x}{1 - 6 \tan^2 x + \tan^4 x} \quad x = 12^\circ$$

$$3: \sin^3 x = \frac{1}{4} (3 \sin x - \sin 3x) \quad x = 12^\circ$$

### Answers

$$1: \cos^2 \frac{x}{2} = \frac{\tan x + \sin x}{2 \tan x}$$

$$a = \cos(\pi / (5 * 2))^2 \quad \dots\dots\dots 0.9045$$

$$A = (\tan(\pi/5) + \sin(\pi/5)) / (2 * \tan(\pi/5)) \quad \dots\dots\dots 0.9045$$

Another answer

$$x = \pi/5$$

$$A = \cos(x/2)^2$$

$$2: \tan 4x = \frac{4 \tan x - 4 \tan^3 x}{1 - 6 \tan^2 x + \tan^4 x}$$

$$b = \tand(4 * 12)$$

$$B = (4 * \tand(12) - 4 * (\tand(12))^3) / (1 - 6 * (\tand(12))^2 + (\tand(12))^4)$$

$$3: \sin^3 x = \frac{1}{4} (3 \sin x - \sin 3x)$$

$$c = \text{find}(12)^3$$

$$C = 1/4 * (3 * \text{find}(12) - \text{find}(3 * 12))$$

## *Creating Array*

One dimensional array  $\longrightarrow$  Vector

Two dimensional array  $\longrightarrow$  Matrix

Examples :-

1- Create a row vector that has the following elements :

$$\frac{54}{3+4.2^2} \quad 32 \quad 6.3^2 - 7.2^2 \quad 54 \quad e^{3.7} \quad \text{and} \quad \sin 66^\circ + \cos \frac{3\pi}{8}$$

Answer

$$V = [54/(3+4.2^2) \quad 32 \quad (6.3^2-7.2^2) \quad 54 \quad \exp(3.7) \\ (\text{find}(66)+\cos(3*\pi/8))];$$

2-Create a column vector that has the following elements :

$$\frac{8^3}{1.7^2} \quad \sqrt{\sin 35^\circ} \quad 5.89 \quad 0.0846 \quad \text{and} \quad \left(\frac{\pi}{5}\right)^2$$

Answer

$$C = \left[ \left( \frac{8^3}{1.7^2} \right); \sqrt{\sin(35)}; 5.89; 0.0846; \left( \frac{\pi}{5} \right)^2 \right]$$

3- Create the row vector which have the first element 1.5 and the last element 2.1 with spacing 0.1.

Answer

$$Y = [1.5:0.1:2.1]$$

4- Create the column vector which have 11 elements the first one 30 and the last element 10.

Answer

$$Z = \text{linspace}(30, 10, 11)$$

$$S = Z'$$

5- Create the row vector which have the first element is 49.5 and the last element 0.5.

Answer

`U= linspace(49.5,0.5)`

## *For loop*

### ***EXAMPLES***

*1- write a program in Matlab language that create a matrix (M\*N) for each element it consists of the line number multiplied by the column number.*

```
M=5; N=6;
```

```
for i=1:M
```

```
for j=1:N
```

```
C(i,j)= i*j;
```

```
end
```

```
end
```

```
C
```

***2- find the summation of all elements in the matrix A (3\*3) by using Matlab language***

```
A=[1 5 3;5 7 2;8 7 6]; S=0;
```

```
For i=1:3
```

```
For j=1:3
```

```
S=S+A(i,j);
```

```
end
```

```
end
```

```
S
```

*3-write a program in Matlab language that create a matrix (3\*3) whose elements start with number 1 and end with number 9 then the program collects the elements of the main diameter and collects the elements of the secondary diameter also prints the results.*

```
k=1;n=0;m=0;
```

```
for i=1:3
```

```
for j=1:3
```

```
A(i,j)=k;
```

```
k=k+1;
```

```
if i==j
```

```
n= n+ A(i,j);
```

```
end
```

```
if i+ j==4
```

m= m+ A(i,j);

end

end

end

n

m

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