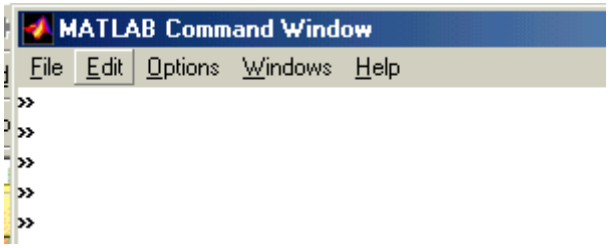
MATLAB TANITIMI

1- MATLAB programini baslatin.



MATLAB satirlari >> ile baslar. Diger satirlar aciklama satirlaridir.

>>

2- Basit Hesaplari asagidaki sekilde yapabilirsiniz.

>>a=5; b=6; c=a*b; d=a/b; e=sin(a);

>>a=5, b=6, c=a*b,

3- Karisik hesaplamalar.

>> a=5; b=6; c=7;

>> y=2*a+3*b+log(c)

y=2a+3b+ln(c)

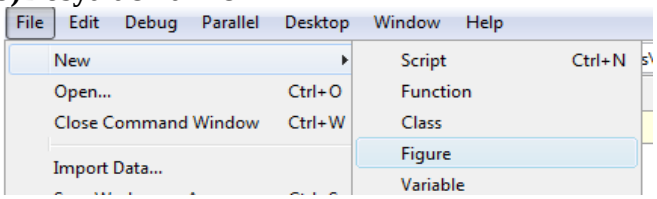
>>z=a^2+b^3+exp(c)

$z=a^2+b^3+e^c$

4. a) islemleri ekrandaki pencereye yazip anlik hesaplar yapabilirsiniz.

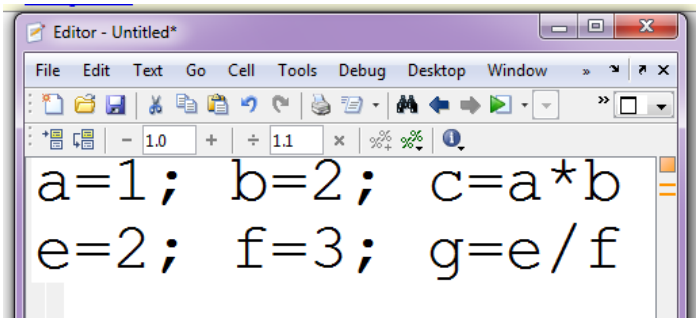
4. b) islemleri bir dosyaya yazip dosyadaki tum islemleri bir anda yaptirabilirsiniz.

5)Dosya acmak icin



File-New-Script butonlarina basiniz.

Ekrana gelen editor pencereye yazmak istediginiz komutlari yazin



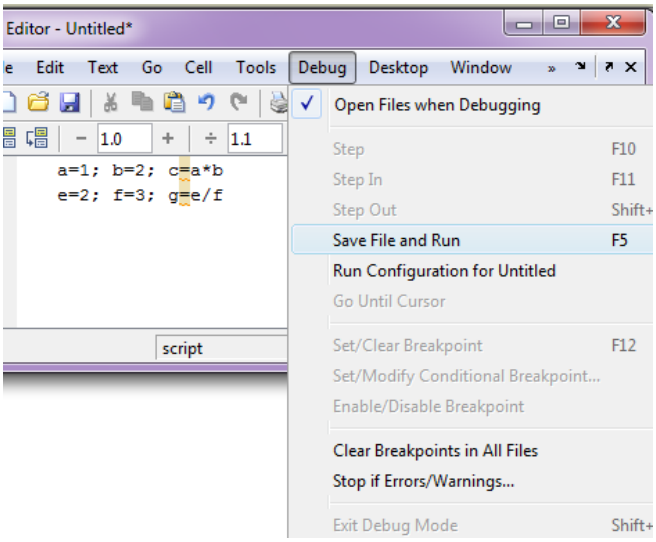
File-Save butonlarina basarak yazdiginiz dosyayi kaydedin. dosya adina herhangibir isim yazabilirsiniz. Ornek olarak **deneme1** yazin.

Bu sekilde kaydedilmis dosya 3 sekilde **run** edilebilir (kosturulabilir.). Uc metod ayni islevi gorur.

1.)yazdiginiz editor penceresinde.

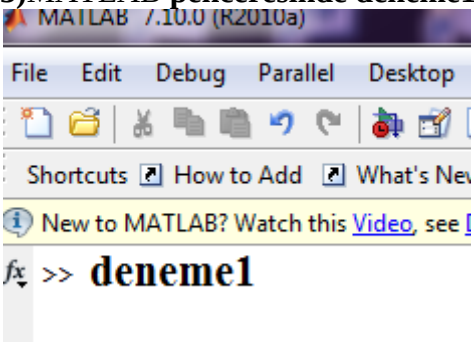
Debug

Save File and Run butonlarina basarak



2) klavyedeki **F5** tusuna basarak.

3)MATLAB **penceresinde deneme1** yazarak



Bu uc metoddan birisi yazdiginiz programi kosturmak icin yeterlidir.

Yazdiginiz dosyayi (deneme1) bilgisayari kapatip tekrar actiktan sonra yeniden kosturabilirsiniz. Yada deneme1 dosyasini baska bir bilgisayara tasiyip o bilgisayardaki MATLAB da kosturabilirsiniz.

Ozetle:

1)Programinizi bir dosyaya yazrsiniz

2)Dosyayi kadedersiniz

3)Programi (yukarida anlatilan 3 metoddan birisi ile) kosturursunuz.

MATLAB CALISMA

Ln(x)	e tabanina gore logaritma	log(x)
Log(x)	10 tabanina gore logaritma	log10(x)
e^x	exponensiyel fonksiyon	exp(x)
sin(x)	sinus fonksiyonu	sin(x)
cos(x)	kosinus	cos(x)
$\sin^{-1}$(x)	arc sin(x)	asin(x)
$\cos^{-1}$(x)	arc cos(x)	acos(x)
$\sqrt{x}$	Karekok	sqrt(x)

1)x=2 icin asagidaki fonksiyonun degerini hesaplayin

$$f(x) = 4x^3 - 10\cos(2x) + \sqrt{x^2+1}$$

fx=4*x^3-10*cos(2*x)+sqrt(x^2+1)

2)x=2 icin asagidaki fonksiyonun degerini hesaplayin

$$f(x) = \frac{x + \sqrt{x^2+1}}{4x^3 - 10\cos(2x)}$$

fx= (x+sqrt(x^2+1))/(4*x^3-10*cos(2*x))

3)x=0 icin $f(x) = \frac{1}{x}$ degerini hesaplayin

4)x=-1 icin $\sqrt{x}$ degerini hesaplayin

5)x=-4 icin $\sqrt{x}$ degerini hesaplayin

6)x=-10 icin $\sqrt{x}$ degerini hesaplayin

7)Ln(10), Log(10), Ln(0) degerlerini hesaplayin

8)Ln(-10) degerlerini hesaplayin

9)cos(60^0) yi hesaplayin

10)arc cos(0.5) i hesaplayin.

11) arc cos(2) , arc sin(2) i hesaplayin.

Dosyaya Yazma

1)deneme1.m dosyanin icine asagidaki formulu yazin.

$$ff = x^3 - 4x + 10$$

a)Matlab ekraninda
>>x=1; deneme1
yazarak x=1 icin ff i hesaplayin
b) >>x=2; deneme1
b) >>x=3; deneme1
b) >>x=4; deneme1
yazarak x=2,3,4 icin ff i hesaplayin

2)deneme2.m dosyanin icine asagidaki formulu yazin.

$$hip = \sqrt{a^2 + b^2}$$

a)Matlab ekraninda
>> a=3; b=4; deneme2
yazarak a=3; b=4; icin hipotenusu hesaplayin
>> a=4; b=4; deneme2
>> a=7; b=2; deneme2
>> a=30; b=10; deneme2
yazarak degisik a,b degerleri icin hipotenusu hesaplayin

3)deneme3.m dosyanin icine asagidaki formulleri yazin.

$$kok1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a}, \qquad kok2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a},$$

Matlab ekraninda
>>a=1; b=3; c=2; deneme3
>>a=1; b=6; c=5; deneme3
>>a=1; b=2; c=1; deneme3
>>a=1; b=4; c=13; deneme3

yazarak cesitli a,b,c degerleri icin, ikinci derece denklemin koklerini bulun.

MATLAB da Fonksiyon Tanimi

---------- ----------

A)
1)Bir yeni dosya acin (file new)
2)Asagidaki satirlari dosyanin icine yazin.
(----- ile baslayan satirlari yazmayin)
3)Dosyaya hipotenus ismi vererek kaydedin. (save)

---------- ----------

```
function  cc=hipotenus(x,y)
cc=sqrt(x^2+y^2)
```

---------- ----------

```
>>hipotenus(3,4)
>>hipotenus(1,2)
>>hipotenus(10,20)
```

yazarak degisik degerler icin programi kosturun.

B)
1)Bir yeni dosya acin (file new)
2)Asagidaki satirlari dosyanin icine yazin.
(----- ile baslayan satirlari yazmayin)
3)Dosyaya hipveaci ismi vererek kaydedin. (save)

---------- ----------

```
function  [aci, genlik]=hipveaci(x,y)
genlik=sqrt(x^2+y^2)
aci=180*atan(y/x)/pi
```

---------- ----------

```
>>[aa,bb]= hipveaci (3,4)
>> [aa,bb]=hipveaci (1,2)
>> [aa,bb]=hipveaci (10,20)
```

yazarak degisik degerler icin programi kosturun.

C)
1)Bir yeni dosya acin (file new)
2)Asagidaki satirlari dosyanin icine yazin.
3)Dosyaya kok2bul ismi vererek kaydedin. (save)

---------- ----------

```
function  [kok1, kok2]=kok2bul(a,b,c)
delta=b^2 - 4*a*c
if delta<0,
  disp(' Kokler Komplex ');
  disp(' MATLAB  Komplex koku de hesaplar');
end;

kok1=(-b+sqrt(delta))/2
kok2=(-b - sqrt(delta))/2
```

---------- ----------

```
>>kok2bul(1,3,2)
>>kok2bul(1,4,2)
>>kok2bul(1,4,4)
```

yazarak degisik degerler icin programi kosturun.

D)
1)Bir yeni dosya acin (file new)
2)Asagidaki satirlari dosyanin icine yazin.
3)Dosyaya shacim ismi vererek kaydedin. (save)

---------- ----------

```
function  hh=shacim(r,h)
hh=pi*r^2*h
```

---------- ----------

```
>>shacim(2,3)
>>shacim(5,5)
```

yazarak degisik degerler icin programi kosturun.

E)
1)Bir yeni dosya acin (file new)
2)Asagidaki satirlari dosyanin icine yazin.
3)Dosyaya alanvehacim ismi vererek kaydedin. (save)

---------- ----------

```
function  [alan, hacim]= alanvehacim (r,h)
hacim=pi*r^2*h
alan=pi*r^2+2*pi*h
```

---------- ----------

```
>> [aa,bb]=alanvehacim (2,3)
>> [aa,bb]=alanvehacim (5,10)
>> [aa,bb]=alanvehacim (100,200)
```

yazarak degisik degerler icin programi kosturun.

F)
1)Bir yeni dosya acin (file new)
2)Asagidaki satirlari dosyanin icine yazin.
3)Dosyaya maxbul ismi vererek kaydedin. (save)

---------- ----------

```
function  qq= maxbul(aa,bb)
qq=aa
if bb>qq, qq=bb;  end;
```

---------- ----------

```
>> mm= maxbul(2,3)
>> mm= maxbul(3,2)
>> mm= maxbul(20,300)
>> mm= maxbul(-20,3)
```

yazarak degisik degerler icin programi kosturun.

VECTORLER

```
>> a = [ 7  2   5 ],    b = [ 9   0 3 ]
>>c=1:5
   c=  1  2  3  4  5

>>d=5:8
    d=  5   6   7   8

>>e=0:2:10
    0  2  4   6  8   10

>>f=0:0.1:0.6
   0   0.1   0.2    0.3   0.4  0.5   0.6

>>g=zeros(1,6)
  0   0   0   0   0   0

>>h=zeros(1,4)
      0   0   0   0

>>k=ones(1,7)
      1   1   1   1   1  1   1

>>m=ones(1,3)
      1    1    1
```

TOPLAMA ve CIKARMA

```
>>a=[ 2   8   10],   b=[  1  4  3]

>> c= a + b
       2     8     10
+      1     4      3
--------------------
        3     12    13

c=[  3    12     13]


>>d=10*a
   d=[  20   80   100]

>>e=5*b
       5    20   15

>>f=10*a + 5*b
       25    100   115

>>g= a-b
    2     4    7
```

VEKTORLERIN IC ICE KONULMASI

```
>>h = [ 1:5 ]
   1  2   3  4  5

>>k = [ 1:5     1:3 ]
   1   2  3  4   5     1   2  3

>>m = [ 0:2:10   10:3:22 ]
0  2  4   6  8    10   13   16   19    22

>> a = [ 8 10 3 ],  b= [4  7  8]
>> c= [ a  b ]
  8  10  3   4  7  8

>> d = [ a a  a ]
  8  10  3     8  10  3     8  10  3
```

Komplex vectors

```
>> a = [ 3+4*j    -6 +9j        2+5j      -7j    30]

>> w = abs(a)
          5     10.81       5.38     7    30
```

$\sqrt{3^2+4^2}$ =5, $\sqrt{6^2+9^2}$ =10.81 …

```
>> p=angle(a)
            0.92   2.15    1.19   -1.57     0

>> s=angle(a)*180/pi
       53.13     123.69     68.19     -90       0
```

$$\tan^{-1}(\frac{4}{3})=0.92^{\text{radian}} = 53.13^0$$

$$\tan^{-1}(\frac{9}{-6})=2.15^{\text{radian}} = 123.69^0$$

MATRISLER:

Asagidakileri yazin

```
>> a=[10 20 30; 40 50 60;  100 80 90];
>> b=[ 1 2 3;  4 5 6; -2 8 9];
c=[15 25 35];
```

$$a=\begin{bmatrix}10 & 20 & 30\\ 40 & 50 & 60\\ 100 & 80 & 90\end{bmatrix}, b=\begin{bmatrix}1 & 2 & 3\\ 4 & 5 & 6\\ -2 & 8 & 9\end{bmatrix},$$

$$c=[15 \quad 25 \quad 35],$$

Toplama, Cikarma, Carpma, Bolme, normal islemler gibi yapilir.

```
>>qq=a+b,  ww=a-b;  ee=a*d;
```

$$qq=\begin{bmatrix}11 & 22 & 33\\ 44 & 55 & 66\\ -98 & 88 & 99\end{bmatrix},\ ww=\begin{bmatrix}9 & 18 & 27\\ 36 & 45 & 54\\ 102 & 72 & 81\end{bmatrix},\ ee=\begin{bmatrix}200\\ 440\\ 710\end{bmatrix}$$

' isareti matris transpozesi icin kullanilir.

```
>>m=[1 2 3; 4 5 6],  n=a',   d=[1  2  5]'
```

$$m=\begin{bmatrix}1&2&3\\4&5&6\end{bmatrix} \qquad n=\begin{bmatrix}1&4\\2&5\\3&6\end{bmatrix}, \qquad d=\begin{bmatrix}1\\2\\5\end{bmatrix}$$

Satir ve Sutun islemleri

Asagidaki ifadeleri yazin ve G matrisini ekranda gorun

>> G=[10 20 30 40; 210 220 230 240 ; 310 320 330 340; 410 420 430 440];

$$G=\begin{bmatrix}10&20&30&40\\210&220&230&240\\310&320&330&340\\410&420&430&440\end{bmatrix}$$

Asagidaki ifadeleri yazin ve sonuclari ekranda gorun
>>h=G(:,1), k= G(:,2), m= G(:,4), n=G(1,:), p=G(2,:),

$$h=\begin{bmatrix}10\\210\\310\\410\end{bmatrix},\ k=\begin{bmatrix}20\\220\\320\\420\end{bmatrix},\ m=\begin{bmatrix}40\\240\\340\\440\end{bmatrix},$$

$$n=\begin{bmatrix}10&20&30&40\end{bmatrix}$$

,

$$p=\begin{bmatrix}410&420&430&440\end{bmatrix}$$

Ayrica , r=G(1:2,:), t=G(:,1:2), s=G(1:2,1:2)

$$r=\begin{bmatrix}10&20&30&40\\210&220&230&240\end{bmatrix},\ t=\begin{bmatrix}10&20\\210&220\\310&320\\410&420\end{bmatrix},$$

$$s=\begin{bmatrix}10&20\\210&220\end{bmatrix},$$

>> aa=1:10

$$aa=[1\quad 2\quad 3\quad 4\quad 5\quad 6\quad 7\quad 8\quad 9\quad 10]$$

>> aa=1:7, bb=sin(aa),
bb=[0.84 0.9 0.14 -0.75 -0.95 -0.27 0.65]
her elemanin ayri ayri sinusu alinir
bb=[sin(1) sin(2) sin(3) sin(4) sin(5) sin(6) sin(7)];

Matrices can be nested into each other. Examine the following examples.
>>a=[1 2 3]; b=[10 100 200]; c=[11 22 33]; d=[a; b; c]; e=[a b c];

$$d=\begin{bmatrix}1&2&3\\10&100&200\\11&22&33\end{bmatrix},$$

$$e=[1\quad 2\quad 3\quad 10\quad 100\quad 200\quad 11\quad 22\quad 33]$$

>>a=[1 2; 3 4]; b=[a [10 20]'; 7 8 9]

$$a=\begin{bmatrix}1&2\\3&4\end{bmatrix},\quad b=\begin{bmatrix}1&2&10\\3&4&20\\7&8&9\end{bmatrix}$$

MATLAB da tanimlanmis fonksiyoanlar
zeros(n,m) n x m boyutlu, tum elemanlari sifir matrix
ones(n,m) n x m boyutlu, tum elemanlari 1 matrix
eye(n) n x n boyutlu birim matris. tum elemanlari 0 sadece kosegen elemanlari 1.
size(qq) Bir matrisin boyutlarini verir. m ve n yi verir
qq' Transpose of the matrix qq
inv(qq) matris tersi (inversi)
diag(qq) diagonal of the matrix qq
sum(qq) sutunlarin toplami
det(qq) determinant of the matrix qq.

Example 1)

>>ww=ones(2,3), ff=zeros(3,4), gg=eye(3),

$$ww=\begin{bmatrix}1&1&1\\1&1&1\end{bmatrix},\quad ff=\begin{bmatrix}0&0&0&0\\0&0&0&0\\0&0&0&0\end{bmatrix},$$

$$gg=\begin{bmatrix}1&0&0\\0&1&0\\0&0&1\end{bmatrix}$$

Example 2)
>>[wrow wcolumn]=size(ww),
wrow=2 wcolumn=3

>>[frow fcolumn]=size(ff),
frow=3 frow=4

Example 3)

>>q=[1 2; 3 4], p=[10 20; 30 40];

r=[[q zeros(2,2)] [ones(2,2) p]]

$$q=\begin{bmatrix}1&2\\3&4\end{bmatrix},\ q=\begin{bmatrix}10&20\\30&40\end{bmatrix},$$

$$r=\begin{bmatrix}1&2&0&0&1&1&10&20\\3&4&0&0&1&1&30&40\end{bmatrix}$$

Example 4)
>> e = [zeros(1,4) ones(1,3)]
0 0 0 0 1 1 1

>> e = [zeros(1,4) ones(1,3)]
0 0 0 0 1 1 1

```
>> f = [ ones(1,3)    10*ones(1,4)  ]
   1   1   1     10   10   10  10
```

```
>> g = 10*[1:3]
      10   20  30
```

```
>> h = [ ones(1,3)   10:2:20]
 1  1   1    10  12  14  16  18  29
```

```
>> k =[ 10*ones(1,3)  17   10:3:19 ]
    10  20  30    17  10   13   16  19
```


```
>> f = [ ones(1,3)    10*ones(1,4)  ]
   1   1   1     10   10   10  10
```

```
>> g = 10*[1:3]
      10   20  30
```

```
>> h = [ ones(1,3)   10:2:20]
 1  1   1    10  12  14  16  18  29
```

```
>> k =[ 10*ones(1,3)  17   10:3:19 ]
    10  20  30    17  10   13   16  19
```


Example 5)

```
>>  aa=[4 6 0  0 2   2   40    60]
 >>bb=sum(aa)
   bb=114
```

vektorun tum elemanlari toplandi.
4 + 6 + 0 + 0 + 2 + 2 + 40 +60=114

Example 6)

Most built-in functions (sin,cos,tan, exp..) also works for matrices.

```
>>a=[1 2;    3 4];

   >> b=sin(a);
```

$$b=\begin{bmatrix}\sin(1) & \sin(2)\\ \sin(3) & \sin(4)\end{bmatrix}=\begin{bmatrix}0.841 & 0.909\\ 0.141 & -0.756\end{bmatrix},$$

```
>> c=exp(a);
```

$$c=\begin{bmatrix}e^1 & e^2\\ e^3 & e^4\end{bmatrix}=\begin{bmatrix}2.718 & 7.389\\ 20.08 & 54.59\end{bmatrix}$$

MATRISLERDE SCALAR CARPMA VE BOLME

x=a.*b , a ve b vectorlerinin scalar carpimini verir.

Normal carpmada kullanilan * yerine **.*** kullanildigina dikkat ediniz.

```
>> a = [ 15  16   12   20 ],   b =[ 10   4    6   5 ],  x=a.*b
x =  [ 150  64 72  100]
15 * 10 = 150
16 * 4  = 64
12 * 6 = 72
20 * 5 =100
```

```
>> a = [15  16   12   20 ],  b =[ 10   4    6   5 ], y=a./b
```

Normal bolmede kullanilan / yerine **./** kullanildigina dikkat ediniz.

```
y = [  1.5   4  2  4 ]
15 / 10 = 1.5
16 / 4  = 4
12 / 6 =  2
20 / 5 =  4
```

```
>>q=[1 2;  3 4],    p=[10 20;  30 40];   w=p+q
```

$$p=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix},\quad q=\begin{bmatrix}10 & 20\\ 30 & 40\end{bmatrix},\quad w=\begin{bmatrix}11 & 22\\ 33 & 44\end{bmatrix}$$

```
>>q=[1 2;  3 4],  p=[10  20;  30 40];    z=q.*p,    k=p./q
```

$$z=\begin{bmatrix}10 & 20\\ 90 & 160\end{bmatrix}, k=\begin{bmatrix}10 & 10\\ 10 & 40\end{bmatrix}$$

MATRIS CARPIMLARI

$$\begin{bmatrix}b_{11} & b_{12}\\ b_{21} & b_{22}\\ b_{31} & b_{32}\end{bmatrix}$$

$$\begin{bmatrix}a_{11} & a_{12} & a_{13}\\ a_{21} & a_{22} & a_{23}\end{bmatrix}\qquad \begin{bmatrix}a_{11}b_{11}+a_{12}b_{21}+a_{13}b_{31} & a_{11}b_{12}+a_{12}b_{22}+a_{13}b_{32}\\ a_{21}b_{11}+a_{22}b_{21}+a_{23}b_{31} & a_{21}b_{12}+a_{22}b_{22}+a_{23}b_{32}\end{bmatrix}$$

$$\begin{bmatrix}2 & 3 & 4\\ 5 & 6 & 7\end{bmatrix}\begin{bmatrix}10 & 20\\ 30 & 40\\ 50 & 60\end{bmatrix}=\begin{bmatrix}310 & 400\\ 580 & 760\end{bmatrix}$$

```
>>aa=[2 3 4; 5 6 7],   bb=[10 20; 30 40; 50 60], x=aa*bb
```

$$x=\begin{bmatrix}310 & 400\\ 580 & 760\end{bmatrix}$$

$$\begin{bmatrix}2 & 3 & 4\end{bmatrix}\begin{bmatrix}10\\ 20\\ 30\end{bmatrix}=200$$

>>a=[2 3 4], b=[10 20 30]', x=a*b
x=200

$$\begin{bmatrix}10\\20\\30\end{bmatrix}\begin{bmatrix}2 & 3 & 4\end{bmatrix}=\begin{bmatrix}20 & 30 & 40\\40 & 60 & 80\\60 & 90 & 120\end{bmatrix}$$

>>a=[2 3 4], b=[10 20 30]', x=b*a

$$x=\begin{bmatrix}20 & 30 & 40\\40 & 60 & 80\\60 & 90 & 120\end{bmatrix}$$

$\begin{bmatrix}2 & 3 & 4\end{bmatrix}\begin{bmatrix}10 & 20 & 30\end{bmatrix}$ = HATALI ISLEM

>>a=[2 3 4], b=[10 20 30], x=a*b
??? Error using ==> mtimes
Inner matrix dimensions must agree.

Matris boyutlari uyusmazsa carpma tanimsizdir.

DIMENSION ERROR

>> a = [2 5 4], b = [8 3 12 5]
>>x = a + b

?? Error using ==> plus
Matrix dimensions must agree.

eleman eleman yapilan islemlerde a ve b ayni boyutta olmalidir.

x = a*b, y = a.*b, z = a/b w=a./b
hepsi hatalidir.

Ornek 431 : x=0; x=1; x=8 x=5; icin $y=3x^2+5x+7$ degerini hesaplayin bir matris halinde gosterin.

```
Method  1.
    a1=0;  b1=3*a1^2 + 5*a1 +7

    a2=1;  b2=3*a2^2 + 5*a2 +7

    a3=8;  b3=3*a3^2 + 5*a3 +7

    a4=5;  b4=3*a4^2 + 5*a4 +7

tt=[a1 b1;  a2 b2;  a3 b3; a4 b4]
    tt=
     0     7
     1    15
     8   239
     5   107
---------------------------------
Method  2.
    aa=[0 1 8  5]
    aa_Length=length(aa);
 for kk=1:aa_Length,
bb(kk)= 3* aa(kk) ^2 + 5*aa(kk) +7
 end;
bb=[7    15   239   107]

tt=[aa' bb']

 tt=
     0     7
     1    15
     8   239
     5   107
----------------------
  Method  3.
    aa=[0 1 8  5]
    bb=3*aa.^2 + 5*aa +7
----------------------
  Method  4.

    aa=[0 1 8  5]
    pol_coef =[3 5 7]



  b1=polyval(pol_coef,0)

  b2=polyval(pol_coef,0)

  b3=polyval(pol_coef,0)

  b4=polyval(pol_coef,0)
bb=[ b1 b2 b3 b4]
-------------------------
   Method  5.
  aa=[0 1 8  5]
  pol_coef =[3 5 7]
  bb=polyval(pol_coef,aa)
-----------------------------
```

Problem: $y = 3x^2 + e^{0.1x} - 20\sin(x)$
Calculate y for x=0, x=0.5 , x=1, and x=2

Long method:
>> x=0, y = 3*x^2 + exp(0.1*x) -20*sin(x)
1
>> x=0.5, y = 3*x^2 + exp(0.1*x) -20*sin(x)
-7.78

>> x=1, y = 3*x^2 + exp(0.1*x) -20*sin(x)
-12.72

Short method
>> x=[0 0.5 1 2],
>> y = 3* x.^2 + exp(0.1*x) - 20*sin(x)
1 -7.78 -12.72 -4.96
Notice **the dot .** in x.^2

for

```
  >> for kk=1:4,  aa(kk)=kk^3; end;

 aa=[1^3   2^3   3^3  4^3 ]

 aa=[  1   8  27  64]
------------------------
```

MATRIS KARESI VE USTEL ISLEMLER

>> a=[2 5 7 -8], b=a^2

??? Error using ==> mpower

Matrix must be square.

>> a=[2 5 7 -8], b=a**.**^2

b=[4 25 49 64]

$2^2 = 4$ $5^2 = 25$ $7^2 = 49$ $(-)8^2 = 64$

>> a=[2 5 7 -8], b=a**.**^3

b=[8 125 343 -512]

>>a=[1 2; 3 4]; d=a•^2;

$$d = \begin{bmatrix} 1^2 & 2^2 \\ 3^2 & 4^2 \end{bmatrix} = \begin{bmatrix} 1 & 4 \\ 9 & 16 \end{bmatrix},$$

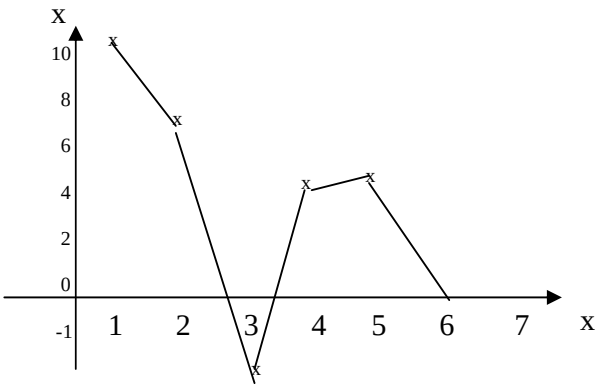
>> g=a^2

$$g = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 7 & 10 \\ 15 & 22 \end{bmatrix}$$

a•^2 ile a^2 arasindaki farki gozelemleyin.

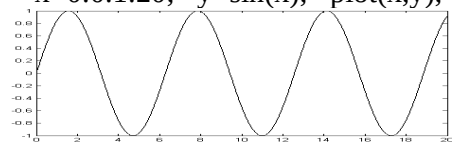
MATLAB'da grafik cizimi

x=[1 2 3 4 5 6]; y=[10 7 -1 5 6 0];
x-y duzleminde asagidaki grafigi elde ederiz.



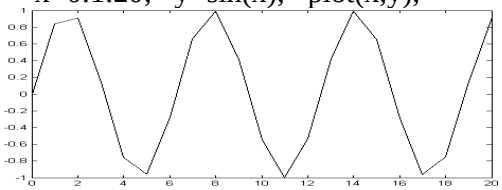
x e karsilik y yi cizmek icin MATLAB komutu plot(x,y)

>>x=0:0.1:20; y=sin(x); plot(x,y),

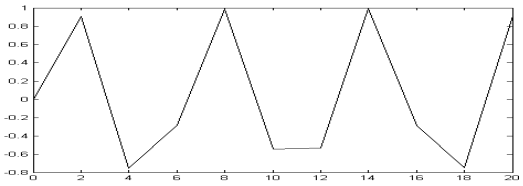


Graphic Resolution (cozunurluk)

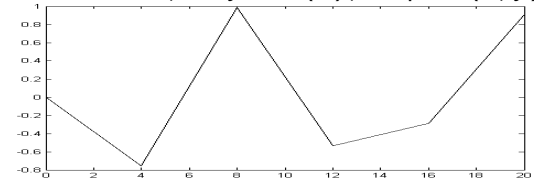
>>x=0:1:20; y=sin(x); plot(x,y),



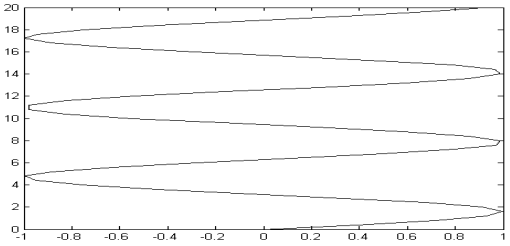
```
>>x=0:2:20;   y=sin(x);   plot(x,y),
```



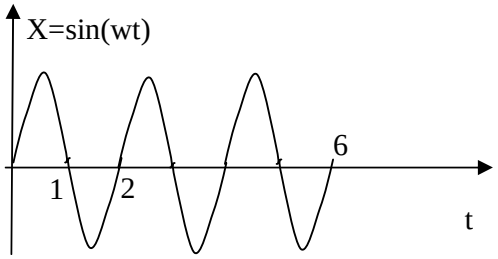
```
>> x=0:4:20;   y=sin(x);   plot(x,y),
```



```
>> x=0:0.1:20;   y=sin(x);   plot(y,x),
```



Problem 32: Asagidaki grafigi cizin.

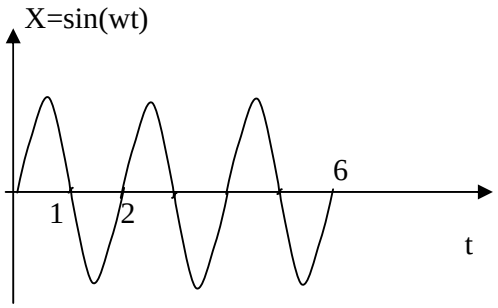


Cozum

t=0:0.1:6;
TT=2;
w=2*pi/TT;
x=sin(w*t);
plot(t,x);

t=0:0.1:6; TT=2; w=2*pi/TT; x=sin(w*t);plot(t,x);

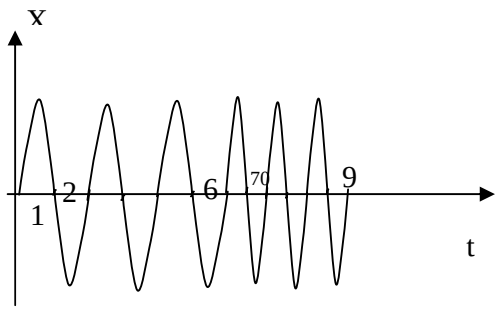
Problem 33: Asagidaki grafigi cizin.



Solution

t=0:0.1:60; TT=20; w=2*pi/TT; x=sin(w*t); plot(t,x);

Problem 34: Asagidaki grafigi cizin..
Note: frequency is doubled from t=60 to t=90



Solution

t1=0:0.1:60; TT1=20; w1=2*pi/TT1; x1=sin(w1*t1);

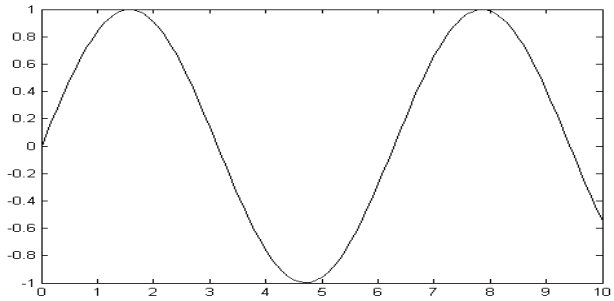
t2=60:0.1:90; TT2=10; w2=2*pi/TT2; x2=sin(w2*t2);

tTotal=[t1 t2]; xTotal=[x1 x2]; plot(tTotal,xTotal);

Problem 35: Draw x=sin(t) t=0 to 10

Solution:

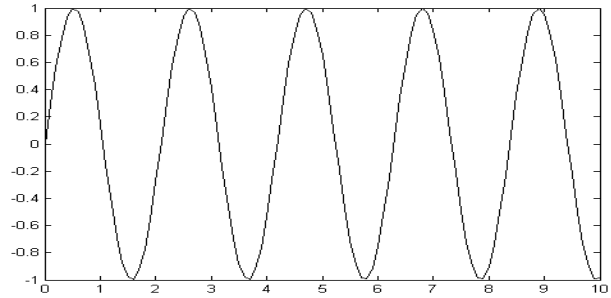
t=0:0.1:10; w1=1; x1=sin(w1*t); plot(t,x1);



Problem 36: Draw x=sin(3t) t=0 to 10

Solution:

t=0:0.1:10; w1=3; x1=sin(w1*t); plot(t,x1);

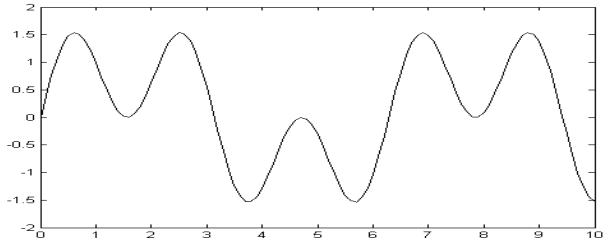


Problem 37: Draw x= sin(t) + sin(3t) t=0 to 10

Solution:

t=0:0.1:10; w1=1; w2=3;

x1=[sin(w1*t)+sin(w2*t)]; plot(t,x);



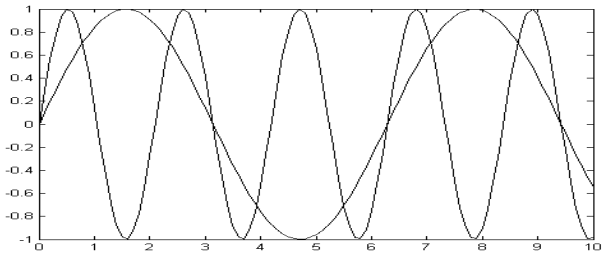
Problem 38: Draw x1= sin(t) and x2= sin(3t) t=0 to 10

Solution

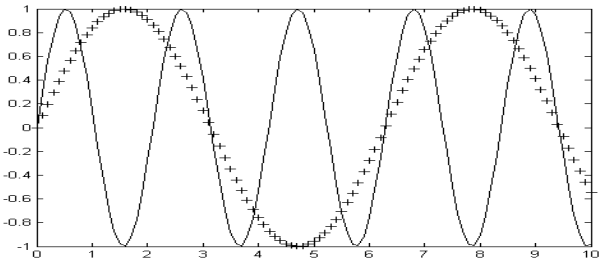
t=0:0.1:10; w1=1; w2=3;

x1=[sin(w1*t)]; x2=[sin(w2*t)];

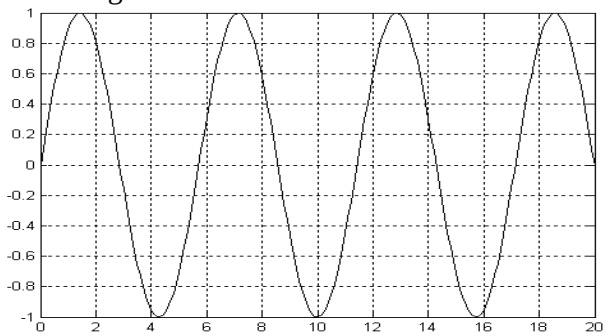
plot(t, x1 , t , x2);



plot(t, x1 ,'+', t , x2);



Exercise 57. Find the period and frequency of the following sinewave



T= f= w=

T=17/3=5.666 ???

261)Asagidaki dizileri olusturan komutlari yazin

a) 1 11 21 31 41 51
b) 1 11 21 31 41 51 .....251 261
c) 0.1 0.3 0.5 0.7 0.9
d) -0.1 -0.3 -0.5 -0.7 -0.9
e) -1 -2 -3 -4 ..... -99 -100
f) 1 4 9 16 25 256
g) -20 -19 -18 -17 0
h) 0 1 2 3 4 5 6 20
j) -20 -19 -18 ....0 100 101 102 120
k) 1 1 1 1 1 ..... 1 (yuz tane 1)
l) 2 2 2 2 2 ..... 2 (yuz tane 2)
m) 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 (10 defa 1 2 3 4 5 tekrar)

262)matrisleri yazin.

$$a=\begin{bmatrix}10 & 20 & 30\\ 40 & 50 & 60\end{bmatrix}, b=\begin{bmatrix}1 & 2 & 3\\ 4 & 5 & 6\end{bmatrix},$$

$$, ee=\begin{bmatrix}200\\ 440\\ 710\end{bmatrix}, \quad m=\begin{bmatrix}1 & 2 & 3\\ 4 & 5 & 6\end{bmatrix} \qquad d=\begin{bmatrix}1\\ 2\\ 5\end{bmatrix}$$

263)Once G matrisini elde edin sonra G matrisinden asagidakileri elde edin

$$G=\begin{bmatrix}10 & 20 & 30 & 40\\ 210 & 220 & 230 & 240\\ 310 & 320 & 330 & 340\\ 410 & 420 & 430 & 440\end{bmatrix}$$

$$n=\begin{bmatrix}410 & 420 & 430\end{bmatrix}$$

,

$$p=\begin{bmatrix}230\\ 330\end{bmatrix}$$

264)Matrisleri **eye, ones** ve **zeros** kullanarak elde edin

$$ww=\begin{bmatrix}1 & 1 & 1\\ 0 & 0 & 0\end{bmatrix}, \quad ff=\begin{bmatrix}0 & 0 & 1 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 1 & 0\end{bmatrix},$$

$$gg=\begin{bmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{bmatrix}$$

265) ones ve zeros kullanarak elde edin.

aa=[0 0 0 0 1 1 1 0 0 0 0]

$$\text{bb}=\begin{bmatrix}0 & 0 & 1 & 1 & 0 & 0\\ 0 & 0 & 1 & 1 & 0 & 0\end{bmatrix}$$

cc=[0 0 0 0 1 1 1 10 10 10 10]

266)ones, zerso, **:** kullanarak elde edin.

a) 1 1 1 1 10 12 14 16 18 ... 20
b) 1 1 1 1 -10 -12 -14 -16 -18 ... -20
c) 10 12 14 16 18 ... 20 0 0 0 0 1 1 1 1

267) aa=[1 2 3]; bb= sum(aa)
ekrana bb nin degeri ne olarak yazilir. .

268) aa=[1 2 3]' ; bb= sum(aa)
ekrana bb nin degeri ne olarak yazilir. .

269) aa=[1 2 3; 4 5 6; 7 8 9]; bb= sum(aa)
ekrana bb nin degeri ne olarak yazilir. .

270)q=[1 2; 3 4], p=[10 20; 30 40];

aa=q.*p, bb=p.*q, cc=q*p, dd=p*q,
aa,bb,cc,dd nin degerleri nedir.

271) aa=[2 3 4], bb=[10 20 30]',
p=aa*bb, q=bb*aa, r=bb*aa',carpimlari neledir.

281)Asagidaki matrisleri MATLAB komutlariyla elde edin.

$$A=\begin{bmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{bmatrix},$$

$$B=\begin{bmatrix}0 & 0 & 0 & 0\\ 0 & 0 & 0 & 0\\ 0 & 0 & 0 & 0\\ 0 & 0 & 0 & 0\end{bmatrix}, \text{C}=\begin{bmatrix}1 & 1\\ 1 & 1\end{bmatrix}, \quad D=\begin{bmatrix}100 & 100\\ 100 & 100\end{bmatrix},$$

282)

>>A=[1 2 3; 10 20 30; 40 50 60],

$$A=\begin{bmatrix}1 & 2 & 3\\ 10 & 20 & 30\\ 40 & 50 & 60\end{bmatrix}$$

B matrisini A matrisinin satir ve sutunlarini degistirerek elde edin.
C matrisini A matrisinin satir ve sutunlarini degistirerek elde edin.

$$B=\begin{bmatrix}1 & 2 & 3\\ 40 & 50 & 60\\ 10 & 20 & 30\end{bmatrix}, \quad C=\begin{bmatrix}1 & 3 & 2\\ 40 & 60 & 50\\ 10 & 30 & 20\end{bmatrix}$$

283) Asagidaki matrisi zeros ve ones komutlari ile elde edin. ornek olarak n=3, m=4, k=5, p=6, q=2,r=3 alin

$$q\begin{bmatrix} \overbrace{1\ 1\ ..\ 1\ 1}^{n}\ \overbrace{0\ 0\ ..\ 0}^{m} \\ 1\ 1\ ..\ 1\ 1\ 0\ 0\ ..\ 0 \\ ..\ \ ..\ ..\ \ ..\ \ ..\ \ .. \\ 1\ 1\ ..\ 1\ 1\ 0\ 0\ ..\ \ 0 \end{bmatrix}$$

a)

$$q\begin{bmatrix} \overbrace{1\ 1\ ..\ 1\ 1}^{n}\ \overbrace{0\ 0\ ..0}^{m}\ \overbrace{2\ \ 2\ \ ...\ 2}^{k} \\ 1\ 1\ ..\ 1\ 1\ 0\ 0\ ..\ 0\ 2\ \ 2\ \ ...2 \\ ..\ \ ..\ ..\ \ ..\ \ ..\ \ .. \\ 1\ 1\ ..\ 1\ 1\ 0\ 0\ ..\ 0\ 2\ \ 2\ \ ...2 \end{bmatrix}$$

b)

$$\begin{bmatrix} q\begin{Bmatrix} \overbrace{1\ \ 1\ \ ..\ \ 1\ \ 1}^{n} \\ 1\ \ 1\ \ ..\ \ 1\ \ 1 \\ ..\ \ \ ..\ \ ..\ \ \ ..\ \ .. \\ 1\ \ 1\ \ ..\ \ 1\ \ 1 \end{Bmatrix} \\ m\begin{Bmatrix} 0\ \ 0\ ..\ \ \ 0\ \ \ 0 \\ 0\ \ 0\ ..\ \ \ 0\ \ \ 0 \\ ..\ \ \ ..\ \ ..\ \ \ ..\ \ .. \\ 0\ \ 0\ ..\ \ \ 0\ ..\ \ 0 \end{Bmatrix} \\ k\begin{Bmatrix} 1\ \ 0\ ..\ \ \ 0\ \ \ ..\ 0 \\ 0\ \ 1\ ..\ \ \ 0\ \ ..\ \ 0 \\ ..\ \ \ ..\ \ ..\ 0\ ..\ \ 0 \\ 0\ \ \ \ 0\ \ ..0\ \ 1\ ..\ \ 0 \end{Bmatrix} \\ p\ \{0\ \ \ \ 0\ \ ..\ 0\ \ 0\ \ ..\ 0 \end{bmatrix}$$

C)

$$\begin{bmatrix} \overbrace{1\ \ 1\ \ ..\ \ 1\ \ 1}^{n}\ \ \overbrace{0\ \ 0\ ..0}^{m}\ \ \overbrace{0..\ 0}^{k} \\ p\begin{Bmatrix} 1\ \ 1\ \ ..\ \ 1\ \ 1\ \ 0\ \ 0\ ..\ 0\ \ \ \ 0..\ 0 \\ ..\ \ \ ..\ \ ..\ \ ..\ \ \ ..\ \ ..\ \ ..\ \ ..\ \ \ . \\ 1\ \ 1\ \ ..\ \ 1\ \ 1\ \ 0\ \ 0\ \ ..0\ \ \ \ 0\ ..0 \end{Bmatrix} \\ q\begin{Bmatrix} 4\ \ 4\ \ ..\ 4\ \ \ 4\ 1\ \ 0\ \ ..0\ \ \ \ 0..\ 0 \\ 4\ \ 4\ \ ..\ 4\ \ \ 4\ 0\ \ 1\ \ ..0\ \ \ \ 0..\ 0 \\ ..\ \ \ ..\ \ ..\ \ ..\ \ \ ..\ \ ..\ \ ..\ \ ..\ \ \ . \\ 4\ \ 4\ \ ..\ 4\ \ \ 4\ 0\ \ 0\ \ ..1\ \ \ \ 0..\ 0 \end{Bmatrix} \\ r\begin{Bmatrix} 0\ \ 0\ \ ..\ 0\ \ 0\ 0\ \ 0..\ \ 0\ \ \ \ 0..\ 0 \\ ..\ \ ..\ \ ..\ \ ..\ \ ..\ \ ..\ \ ..\ \ ... \\ 0\ \ \ 0\ ..\ \ 0\ \ 0\ \ ..\ \ 0\ \ \ 0\ \ \ 0\ ..\ 0 \end{Bmatrix} \end{bmatrix}$$

Indexleme islemi

P41)
x(1)=2; x(2)=5; x(3)=34;
sonuc
x=[2 5 34]

P42)
x=[15 32 56 71]; x(2)=111
sonuc
x=[15 111 56 71]

P43)
x=[1 2; 3 4; 5 6];
sonuc

$$x = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$$

P45)
x=[1 2; 3 4; 5 6];   x(2 , :)=[66 46]
sonuc

$$x = \begin{bmatrix} 1 & 2 \\ 66 & 46 \\ 5 & 6 \end{bmatrix}$$

for loop kullanimi
P46) >> for k=1:5, x(k)=k; end;
sonuc
x=[1 2 3 4 5]

P47) >> for k=1:5, x(k)=k^2; end;
sonuc
x=[1 4 9 16 25]

Fonksiyon Yazilimi
---
21) iki sayiyi toplayan function
---------- dosya basi---------
function [cc]=islem1(a1,a2)
cc=a1+a2;
---------- dosya sonu -----

-----MATLABdan kosturma sekli---
>>q=islem1(3,6)

22) iki sayidan buyugunu bul
function [cc]=buyukbul(a1,a2)
c1=a1
if a2>a1, cc=a2; end;

23) iki sayidan kucugunu bul
function [cc]=kucukbul(a1,a2)
c1=a1
if a2<a1, cc=a2; end;

24)verilen sayiya kadar tamsayilari topla
function [toplam]=coktopla(NN)
toplam=0;
for kk=1:NN
 toplam= toplam +kk;
end;

25)Tabloyu dolduran program. Not: istenen sey toplam isleminini programlamakdir.

$\sum_{k=1}^{N} k = 1+2+3+....+N = \frac{N(N+1)}{2}$ bagintisi **istenmiyor**.

n	$\sum_{k=1}^{N} k = 1+2+3+....+N$
1	1
2	3
3	6
..	..
10	..

------- dosya basi -------
for k=1:10,
 qq(k , :) =[k coktopla(k)]
end;
------ dosya sonu-------

26)verilen sayiya kadar tamsayilari carp

```
%faktoriyel programi
function  [carpim]=cokcarp(N)
carpim =1;
for k=1:N
  carpim = carpim *k;
end;
```

Onemli not: Kullanilan degisken isimlerinin bir onemi yoktur, Yukaridaki program asagidaki gibi yazilsa ayni sonucu verir. Sadece giris ve cikislardaki isimler onemlidir.

27)verilen sayiya kadar tamsayilari carp. (faktoriyel programi)

```
function  [wwq]=cokcarp(ppp)
wwq =1;
for  kk=1:ppp
  wwq = wwq *kk;
end;
```

28)Tabloyu dolduran program.

N	$\prod_{k=1}^{N} = 1\ 2\ 3\ 4 \ldots N$
1	1
2	2
3	6
..	..
10	..

```
------- dosya basi -------
for k=1:10,
  qq(k , : ) =[ k  cokcarp(k)  ]
end;
------ dosya sonu-------
```

41) $f = \frac{x^2-1}{x^2+1}e^{0.1x}$ f'yi hesaplayan function yazin.

```
function  [cc]=islem21(x)
cc= ( x^2 – 1 )/ ( x^2 +1 )
cc=cc*exp(0.1*x)
```

42) $f = \frac{x^2-1}{x^2+1}e^{0.1x}$ f'yi tablolayan program

x	$f = \frac{x^2-1}{x^2+1}e^{0.1x}$
1	
2	
3	
4	
5	

```
------- dosya basi -------
for k=1:5,
  qq(k , : ) =[ k  islem21(k)  ]
end;
------- dosya sonu -------
```

43) $f = \frac{x^2-1}{x^2+1}e^{0.1x}$ f'yi tablolayan program

x	$f = \frac{x^2-1}{x^2+1}e^{0.1x}$
0	
0.1	
0.2	
0.3	
0.4	
5	

```
inx=0;
 for x=0:0.1:5,
  inx=inx+1;
  qq(inx , : ) =[ x  islem21(x)  ]
end;
```

44) $\left(1+\frac{1}{n}\right)^n$ islemini yapan function

```
function  [cc]=islem56(n)
cc= (1+1/x)^n
```

45)Asagidaki tabloyu doldurun.

n	$\left(1+\frac{1}{n}\right)^n$
1	
2	
3	
..	
50	

```
for n=1:50,
  qq(n , : ) =[ n  islem56(n)  ]
end
```

51)Asagidaki islemi yapan MATLAB programi yazin.

$$f(x) = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!}$$

```
fx=1 + x + x^2/(1*2) +  x^3/(1*2*3)
```

52) 51 deki islemin degisik sekilde programlamasi

```
  fx=1 + x + x^2/ cokcarp(2)   +  x^3/ cokcarp(3)
```

53)Asagidaki islemi yapan function.

$$f(x) = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \ldots\ldots\ldots + \frac{x^N}{N!}$$

```
function  ff=seri21(x,N)
 ff=1;
 for k=1:N
  ff = ff  +  x^k/ cokcarp(k);
end;
```

61)sayi tek ise cikis -1, sayi cift ise cikis 1 olsun

```
function  ff=tekcift1(N)
ff=(-1)^N
```

62)sayi tek ise cikis 1, sayi cift ise cikis -1 olsun

```
function  ff=tekcift2(N)
ff=- (-1)^N
```

63)sayi tek ise cikis 1, sayi cift ise cikis -1 olsun

```
function  ff=tekcift2(N)
ff=(-1)^(N+1)
```

Bazi hazir MATLAB komutlari:

round(x): yuvarlatma

```
round(2.3)=2
round(2.49)=2
round(2.51)=3
round(2.99)=3
round(2)=2
round(78.25)=78
```

floor (x): alttaki tamsayi

```
floor (2.3)=2
floor (2.999)=2
floor (2)=2
```

ceil (x):ustteki tamsayi

```
ceil (2.001)=3
ceil (2.999)=3
```

64)sayi 3 e tam bolumde kalan sifir ise cikis 0, 3 e bolumde kalan sifir degilse cikis 1 olsun.

```
function  ff=ucebol1(sayi)
kalan=round(sayi/3) - sayi/3
if kalan==0, ff=0;
else ff=;
end;
```

65)sayi N ye tam bolumde kalan sifir ise cikis 0, N ye bolumde kalan sifir degilse cikis 1 olsun.

```
function  ff=nkalan1 (sayi,N)
kalan= sayi/N  - round(sayi/N)
if kalan==0, ff=0;
else ff=1;
end;
```

66)sayi N ye tam bolumde kalan sifir ise cikis 1, N ye bolumde kalan sifir degilse cikis -1 olsun.

```
function  ff=nkalan2 (sayi,N)
kalan= sayi/N  - round(sayi/N)
if kalan==0, ff=1;
else ff=-1;
end;
```

67)sayi N ye tam bolumde kalani hesapla.

```
function   kalan=ndenkalan(sayi,N)
kalan=sayi-N*floor(sayi/N)
```

101)Verilen bir x ve N icin asagidaki seriyi hesapla.

$$f(x)=1-x+\frac{x^2}{2!}-\frac{x^3}{3!}+\frac{x^4}{4!}-\frac{x^5}{5!}.....\frac{x^N}{N!}$$

```
function   ff=seri101(x,N)
 ff=1;
 for k=1:N
isaret=(-1)^k;
   ff = ff  +  isaret*x^k/ cokcarp(k);
end;
```

111)Verilen bir x ve N icin asagidaki seriyi hesapla.

$$f(x)=x-\frac{x^3}{3!}+\frac{x^5}{5!}-\frac{x^7}{7!}.....\frac{x^N}{N!}$$

Not: terimin kuvveti (ve faktoriyeli) ve isareti arasindaki iliski asagidaki gibidir.

n	1	3	5	7	.	k
isaret	+	-	+	-	.	.

$$\text{isaret}=\begin{cases}0 \text{ eger n cift ise}\\ +1 \text{ eger 4 e bolundugunde kalan 1 ise}\\ -1 \text{ eger 4 e bolundugunde kalan 3 ise}\end{cases}$$

```
function   ff=seri111(x,N)
 ff=0;
 for k=1:2:N
  kalan=ndenkalan(k,4);
  if kalan==1, isaret=1;
    elseif kalan==3, isaret=-1;
    else isaret=0;
  end;
   ff = ff  +  isaret*x^k/ cokcarp(k);
end;
```

113)Verilen bir x ve N icin asagidaki seriyi hesapla.

$$f(x)=1-\frac{x^2}{2!}+\frac{x^4}{4!}-\frac{x^6}{6!}.....\frac{x^N}{N!}$$

Not: terimin kuvveti (ve faktoriyeli) ve isareti arasindaki iliski asagidaki gibidir.

n	2	4	6	8	.	k
isaret	-	+	-	+	.	.

$$\text{isaret}=\begin{cases}0 \text{ eger n tek ise}\\ +1 \text{ eger 4 e bolundugunde kalan 0 ise}\\ -1 \text{ eger 4 e bolundugunde kalan 2 ise}\end{cases}$$

```
function   ff=seri113(x,N)
 ff=1;
 for k=2:2:N
  kalan=ndenkalan(k,4);
  if kalan==0, isaret=1;
    elseif kalan==2, isaret=-1;
    else isaret=0;
  end;
   ff = ff  +  isaret*x^k/ cokcarp(k);
end;
```

KOMPLEKS SAYILAR

MATLABda i ve j $\sqrt{-1}$, demektir.

201)asagidaki matrisi MATLAB da elde edin.

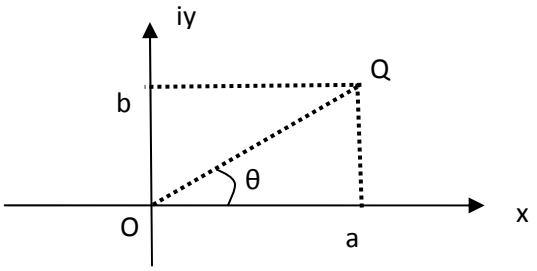
$$a=\begin{bmatrix}1+2i & 3+4\text{i}\\ -5+2\text{i} & -5\text{i}\end{bmatrix}$$

cevap:

```
a=[1+2*i   3+4*i ;  -5+2*i   -5*i ]
```

Mutlak deger ve aci.

Komplex Duzlem



z=a+ib, $|z|=r=\overline{OQ}=\sqrt{a^2+b^2}$, a=r cos θ, b=r sin θ

$\sin\theta=\frac{b}{r}$, $\cos\theta=\frac{a}{r}$, $\tan\theta=\frac{b}{a}$,

r: genlik, mutlak deger, modulus, magnitude, amplitude, absolute value,

θ: aci, faz, angle, argument, phase

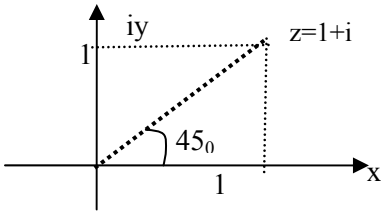
$z = a+bi=r\,e^{j\theta} = |z| \angle \theta$

$|z| = r = \sqrt{a^2 + b^2}$ $\theta = \tan^{-1}\frac{b}{a}$

202) z=1+i sayisini komplex duzlemde gosterin mutlak degerini ve acisini bulun.

Cozum: $r = \sqrt{1^2 + 1^2} = \sqrt{2} = 1.41$

$\theta = \tan^{-1}\frac{1}{1} = \tan^{-1} 1 = 45^0$



polar form is $z = 1.41\, e^{j45(\text{degree})}$

$z = 1.41 < 45^0$

202) z=1+i MATLAB da
abs(z) mutlak degeri
angle(z) aciyi (radyan olarak) verir
203) a = [3+4*j -6 +9j 2+5j -7j 30]
>> w = abs(a)
5 10.81 5.38 7 30

$\sqrt{3^2 + 4^2} = 5$, $\sqrt{6^2 + 9^2} = 10.81$ …

>> p=angle(a)
0.92 2.15 1.19 -1.57 0

>> s=angle(a)*180/pi
53.13 123.69 68.19 -90 0

$\tan^{-1}(\frac{4}{3}) = 0.92^{\text{radian}} = 53.13^0$

$\tan^{-1}(\frac{9}{-6}) = 2.15^{\text{radian}} = 123.69^0$

211) $H(z) = z^2 + 1$ ise asagidaki tabloyu doldurun

z	z^2+1
0i	
0.1i	
0.2i	
0.3i	
0.4i	
0.5i	

>> z=i*[0:0.1:0.5]', qq=[z z.^2+1]
MATLAB da gorunen
hz=
0 1.
0 + 0.1i 0.99
0 + 0.2i 0.96
0 + 0.3i 0.91
0 + 0.4i 0.84
0 + 0.5i 0.75
seklinde olur.

213) $H(z) = z + 1$ ise asagidaki tabloyu doldurun

z	z+1	| z+1|	< (z+1)
0i			
0.1i			
0.2i			
0.3i			
0.4i			
0.5i			

>> z=i*[0:0.1:0.5]';
>>hz=z.^2+1 ;
>> qq=[z hz abs(hz) angle(hz) angle(hz)*180/pi]

0	1.	1.	0	0
0+0.1i	1+0.1i	1.50	0.09	5.71
0+0.2i	1+0.2i	1.01	0.19	11.3
0+0.3i	1+0.3i	1.04	0.29	16.6
0+0.4i	1+0.4i	1.07	0.38	21.8
0+0.5i	1+0.5i	1.11	0.46	26.5