1.

```
close all; clear;

x = [2 1+2j;
     -0.45 5];
I = [1 0;
     0 1];
z1 = 0.5*log(x+sqrt(1+x.^2)) + I;
z1
```

```
z1 = 2×2 complex
   1.7218 + 0.0000i   0.7347 + 0.5317i
  -0.2180 + 0.0000i   2.1562 + 0.0000i
```

2.

```
A = [12 34 -4; 34 7 87; 3 65 7];
B = [1 4 7; 2 5 8; 3 6 9];

z2 = A*B;
z3 = A.*B;
z4 = A^3;
z5 = A.^3;
z6 = [A([1:3],:);B^2];
[T, E] = eig(B); z7 = E;
z8 = det(A);
z2
```

```
z2 = 3×3
         68         194         320
        309         693        1077
        154         379         604
```

```
z3
```

```
z3 = 3×3
    12   136   -28
    68    35   696
     9   390    63
```

```
z4
```

```
z4 = 3×3
       37226      233824       48604
      247370      149188      600766
       78688      454142      118820
```

```
z5
```

```
z5 = 3×3
```

```
               1728         39304          -64
             39304           343       658503
                27        274625          343
```

z6

```
z6 = 6×3
     12     34     -4
     34      7     87
      3     65      7
     30     66    102
     36     81    126
     42     96    150
```

z7

```
z7 = 3×3
   16.1168          0          0
         0    -1.1168          0
         0          0    -0.0000
```

z8

```
z8 = -75246
```

3.

```
H3 = [1/2 1/3 1/4; 1/3 1/4 1/5; 1/4 1/5 1/6];
Y = [0.95; 0.67; 0.52];
x = (H3^-1)*Y;
x1 = x(1,1); x2 = x(2, 1); x3 = x(3, 1);
fprintf('x1 = %2.2f, x2 = %2.2f, x3 = %2.2f\n', x1, x2, x3);
```

```
 x1 = 1.20, x2 = 0.60, x3 = 0.60
```

```
Y = [0.95; 0.67; 0.53];
x = (H3^-1)*Y;
x1 = x(1,1); x2 = x(2, 1); x3 = x(3, 1);
fprintf('After changing 0.52 to 0.53:\n');
```

```
 After changing 0.52 to 0.53:
```

```
fprintf('x1 = %2.2f, x2 = %2.2f, x3 = %2.2f\n', x1, x2, x3);
```

```
 x1 = 3.00, x2 = -6.60, x3 = 6.60
```

4.

$$H_{ij} = \frac{1}{i + j - 1}, H_{ij} = \int_0^1 x^{i+j-2}dx$$

```
H4 = zeros(9,9);

for i = 1:1:9
    for j = 1:1:9
        f4 = @(x) x.^(i+j-2);
        H4(i, j) = integral(f4, 0, 1);
    end
end
H4
```

```
H4 = 9×9
    1.0000    0.5000    0.3333    0.2500    0.2000    0.1667    0.1429    0.1250 ···
    0.5000    0.3333    0.2500    0.2000    0.1667    0.1429    0.1250    0.1111
    0.3333    0.2500    0.2000    0.1667    0.1429    0.1250    0.1111    0.1000
    0.2500    0.2000    0.1667    0.1429    0.1250    0.1111    0.1000    0.0909
    0.2000    0.1667    0.1429    0.1250    0.1111    0.1000    0.0909    0.0833
    0.1667    0.1429    0.1250    0.1111    0.1000    0.0909    0.0833    0.0769
    0.1429    0.1250    0.1111    0.1000    0.0909    0.0833    0.0769    0.0714
    0.1250    0.1111    0.1000    0.0909    0.0833    0.0769    0.0714    0.0667
    0.1111    0.1000    0.0909    0.0833    0.0769    0.0714    0.0667    0.0625
```
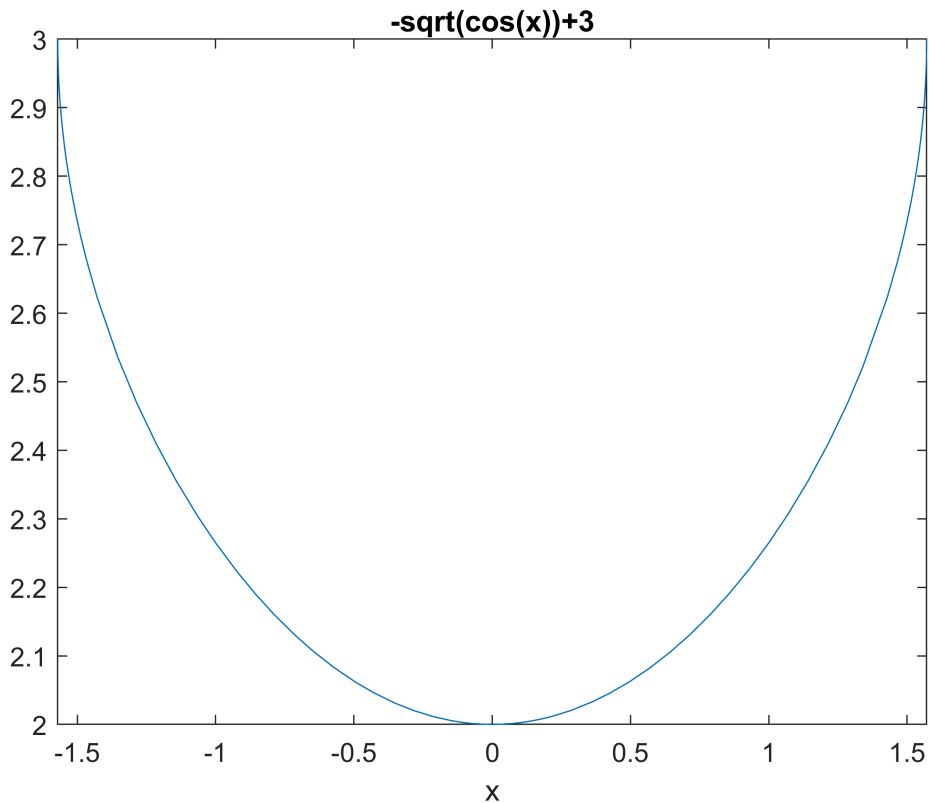
5.

```
figure;
fplot(@(x) -sqrt(cos(x))+3, [-pi/2, pi/2]);
title('-sqrt(cos(x))+3');
xlabel('x');
```

```matlab
figure;
x =[-2:0.2:2];  % value x range
y =[-4:0.2:4];  % value y range
[xm, ym] = meshgrid(x,y);  % meshgrid: 2-D and 3-D grids
fxy =  (xm.^2/(2^2)) - (ym.^2/(4^2)); % Your Function  fxy=f(x,y)
surf(fxy);   % surf : Surface plot
title('(x^2/(2^2)) - (y^2/(4^2))');
```

$(x^2/(2^2)) - (y^2/(4^2))$