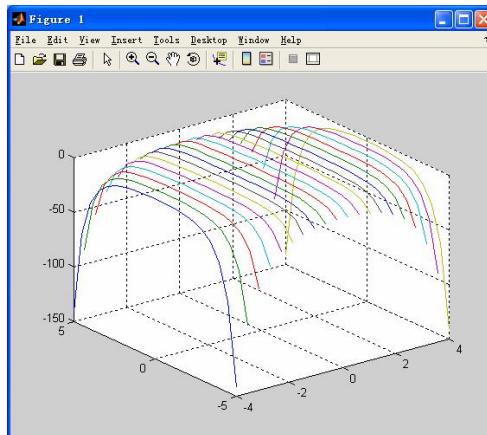


Key to MATLAB Exercise 9 – Graphics -Surface

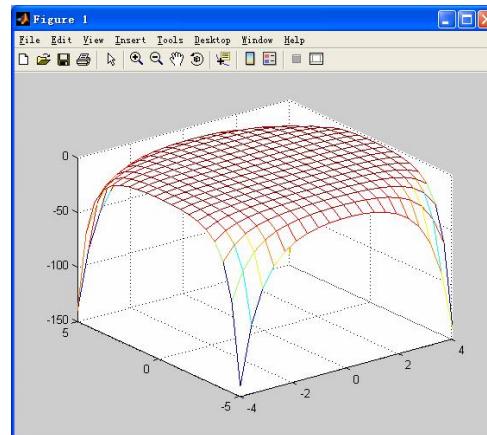
1.

```
>> clear; clf; x=linspace(-4,4,20); y=linspace(-5,5,20);
>> [X, Y]=meshgrid(x,y); Z=[0.3*exp(-0.15*(X.^2+Y.^2))- 0.3*exp(0.15*(X.^2+Y.^2))];
1)
>> plot3(X,Y,Z); grid on;
```



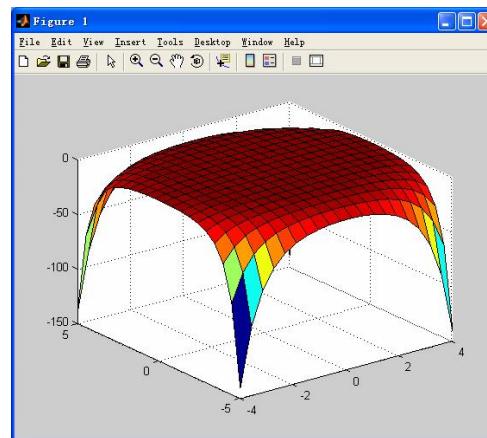
2)

```
>> mesh(X,Y,Z)
```



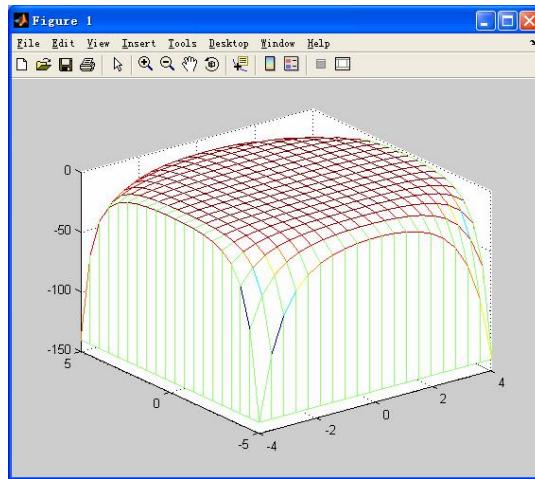
3)

```
>> surf(X,Y,Z)
```



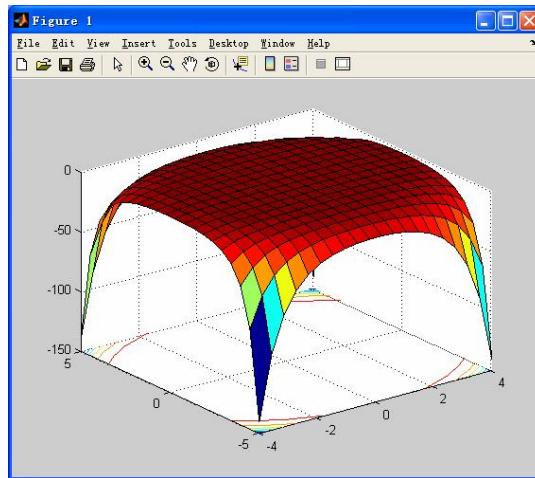
4)

>> meshz(X,Y,Z)



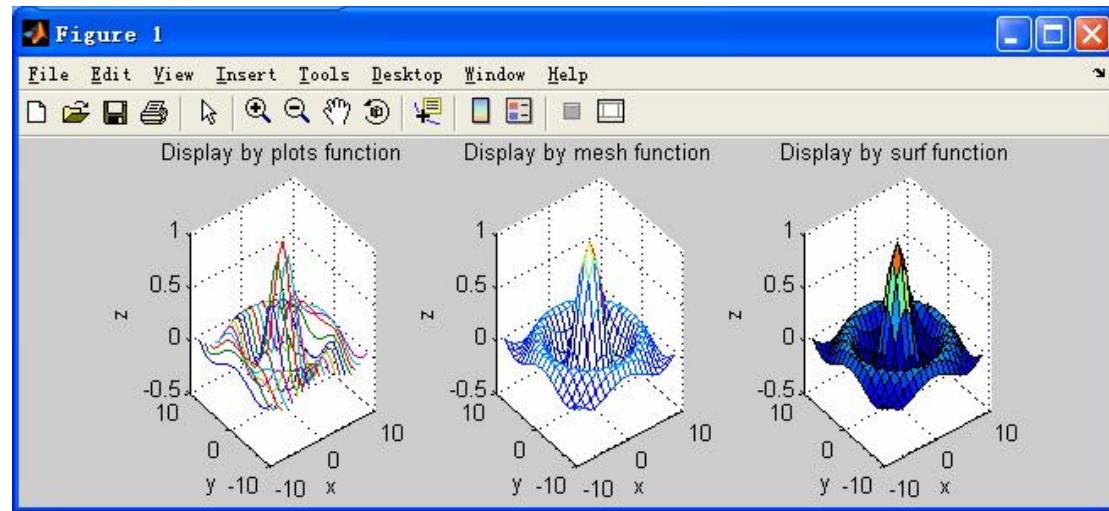
5)

>> surfc(X,Y,Z)



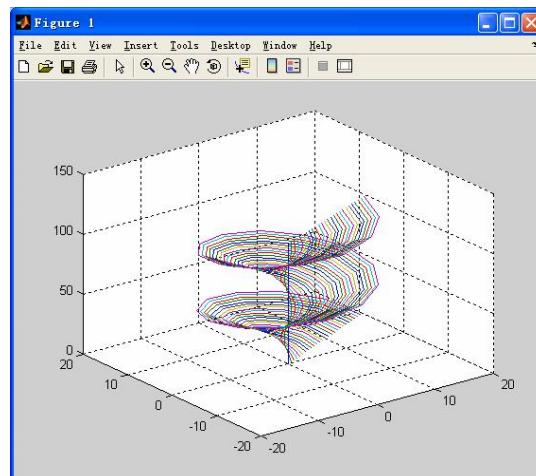
2.

```
>> clear; clf;
>> x=[-9:9];y=[-9:9]; [X,Y]=meshgrid(x,y);
>> XY= (X.^2+Y.^2).^(1/2)+eps; Z=sin(XY)./XY;
1)
>> subplot(1,3,1); plot3(X, Y, Z);
>> title('Display by plots function'); xlabel('x'); ylabel('y'); zlabel('z'); grid on
2)
>> subplot(1,3,2); mesh(X,Y,Z);
>> title('Display by mesh function'); xlabel('x'); ylabel('y'); zlabel('z'); grid on
3)
>> subplot(1,3,3); surf(X, Y, Z);
>> title('Display by surf function'); xlabel('x'); ylabel('y'); zlabel('z'); grid on
```



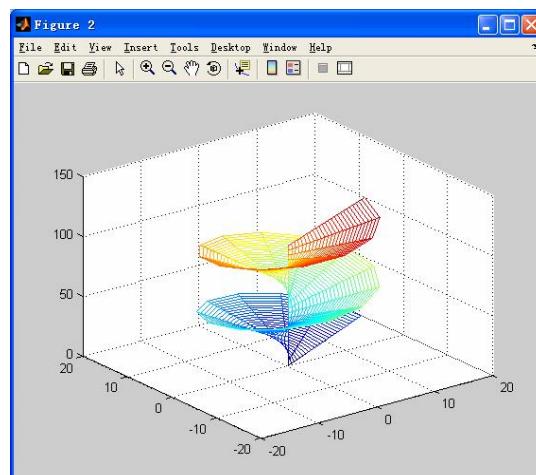
3.

```
>> clear; clf;
>> u=[0:0.5:4*pi]; v=[0:0.5:4*pi]; [U,V]=meshgrid(u,v);
>> X=U.*cos(V); Y=U.*sin(V); Z=2*U+8*V;
1)
>> figure(1); plot3(X,Y,Z); grid on
```



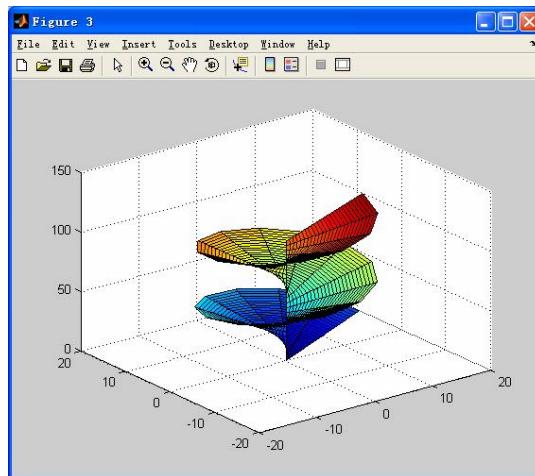
2)

```
>> figure(2); mesh(X,Y,Z); grid on
```



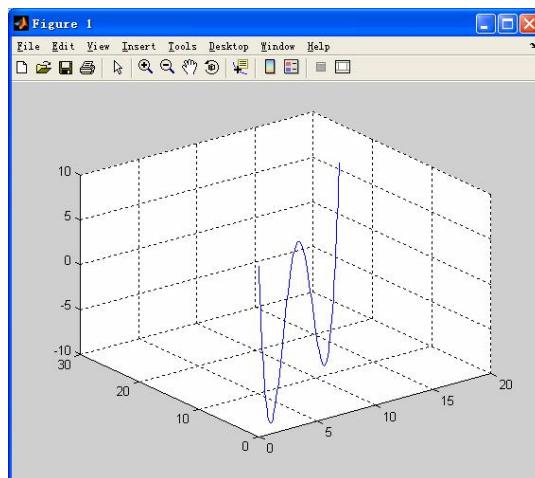
3)

```
>> figure(3); surf(X,Y,Z); grid on
```



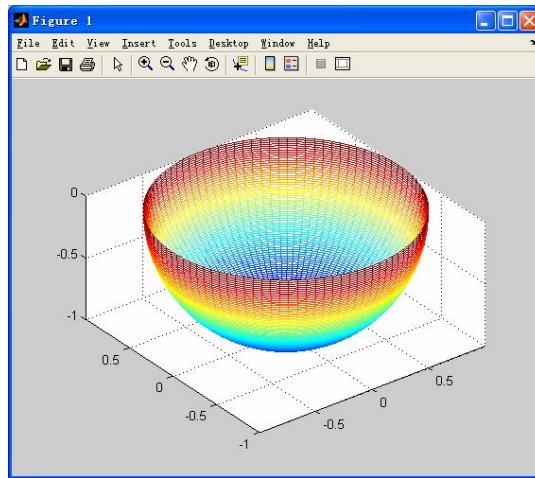
4.

```
>> clear; close all;  
>> t=linspace(0,6); x=0.5*t.^2; y=0.1*t.^3; z=9*( cos(2*t));  
>> plot3(x,y,z); grid on
```



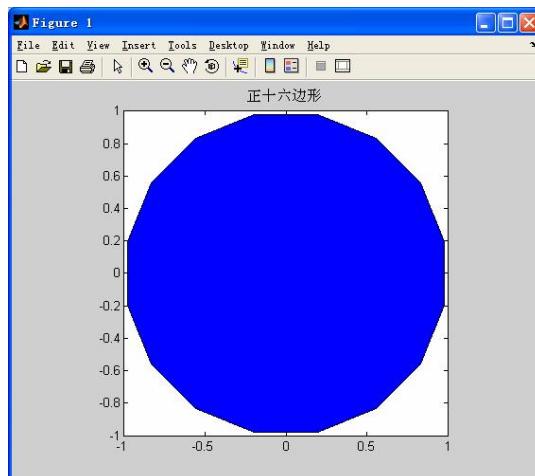
5.

```
>> theta=linspace(-pi/2,0); leq=linspace(-pi,pi);  
>> [THETA,LEQ]=meshgrid(theta,leq);  
>> X=cos(THETA).*sin(LEQ);Y=cos(THETA).*cos(LEQ); Z=sin(THETA);  
>> mesh(X,Y,Z); axis equal;
```



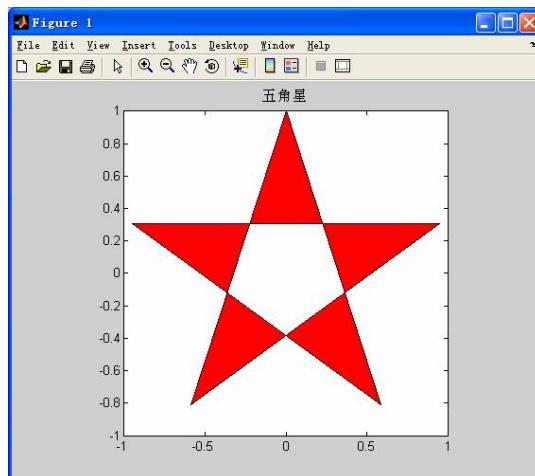
6.

```
>> t=pi/16: pi/8:2*pi; x=cos(t);y=sin(t);
>> fill(x,y,'b'); axis square; title('正十六边形')
```



7.

```
>> phi=pi/2:4*pi/5:4*pi; B=exp(i*phi); x1=real(B); y1=imag(B);
>> fill(x1,y1,'r'),axis square; title('五角星')
```



8.

```
>> u=rand(10,1)*10; v=rand(10,1)*10;
```

```
>> x=u.*cos(v); y=u.*sin(v); z=2*u+2*v;  
>> xlin = linspace(min(x),max(x),33);  
>> ylin = linspace(min(y),max(y),33);  
>> [X,Y] = meshgrid(xlin,ylin);  
>> Z = griddata(x,y,z,X,Y,'cubic');  
>> mesh(X,Y,Z)  
>> axis tight; hold on  
>> plot3(x,y,z,'.','MarkerSize',15)
```

