

Key to MATLAB Exercise 8 – Graphics -Curve

1.

1)

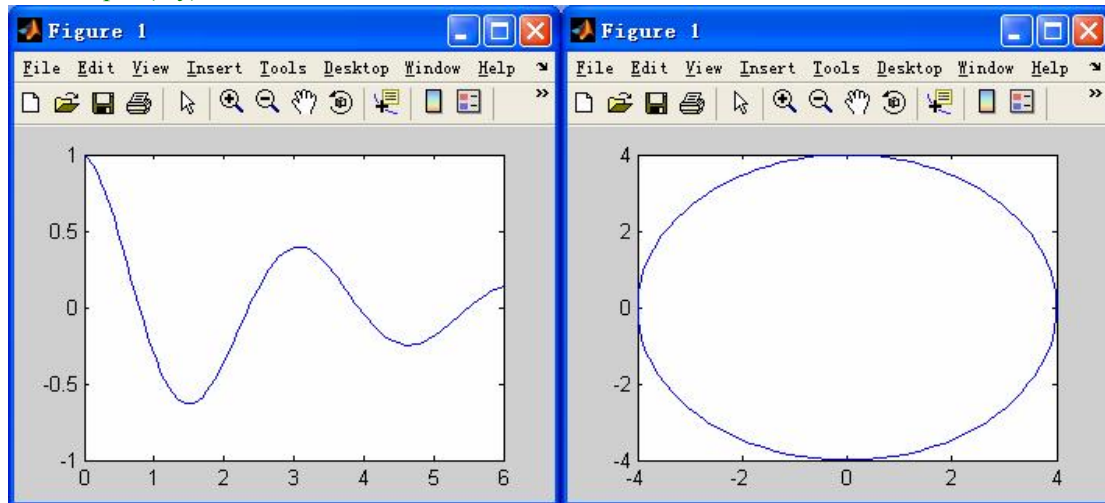
```
>> clear; x=linspace(0,6); y=exp(-0.3.*x).*cos(2.*x);
```

```
>> plot(x,y)
```

2)

```
>> clear; t=linspace(0,2*pi); x=4.*sin(t); y=4.*cos(t);
```

```
>> plot(x,y)
```



1. 1)

1. 2)

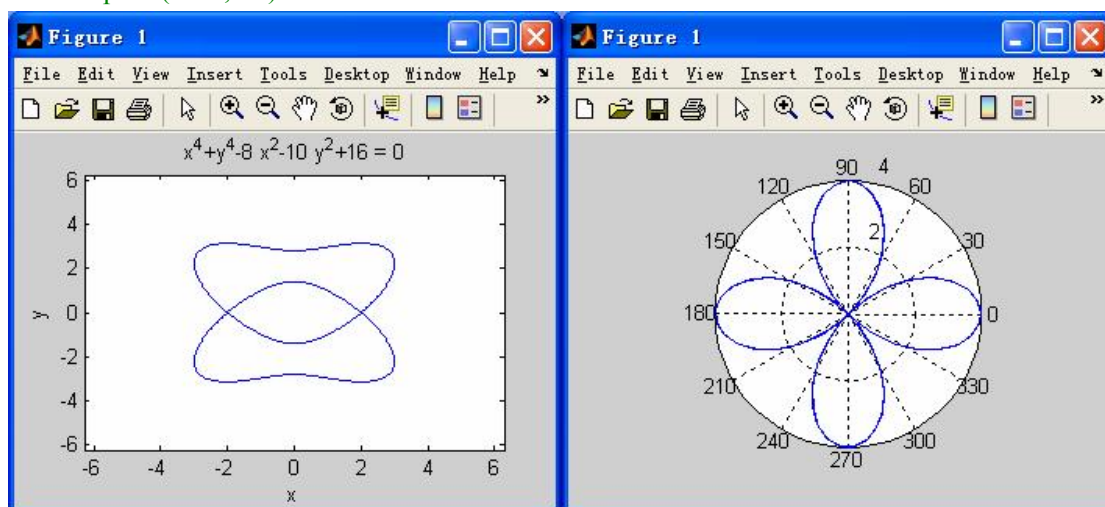
3)

```
>> clear; ezplot('x^4+y^4-8*x^2-10*y^2+16')
```

4)

```
>> clear; theta=-2*pi:0.1:2*pi; rho=4*cos(2*theta);
```

```
>> polar(theta,rho)
```



1. 3)

1. 4)

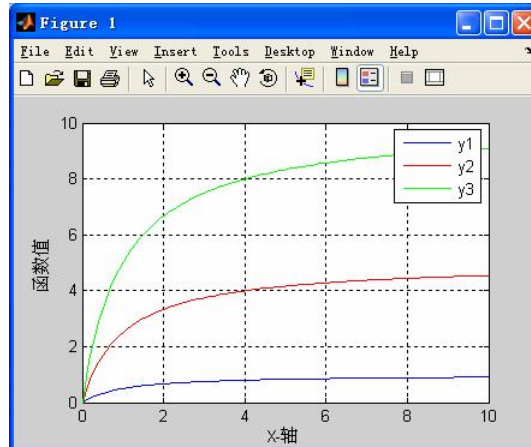
2.

```
>> clear; x=linspace(0,10);
```

```
>> y1=x./(1+x); y2=5*y1; y3=10*y1;
```

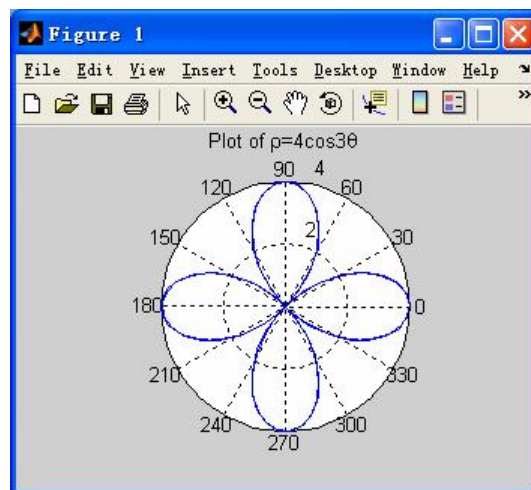
```
>> plot(x,y1,x,y2,'r',x,y3,'g')
```

```
>> legend('y1','y2','y3')
>> grid on
>> xlabel('X-轴'); ylabel('函数值')
```



3.

```
>> title('Plot of \rho=4cos3\theta')
```

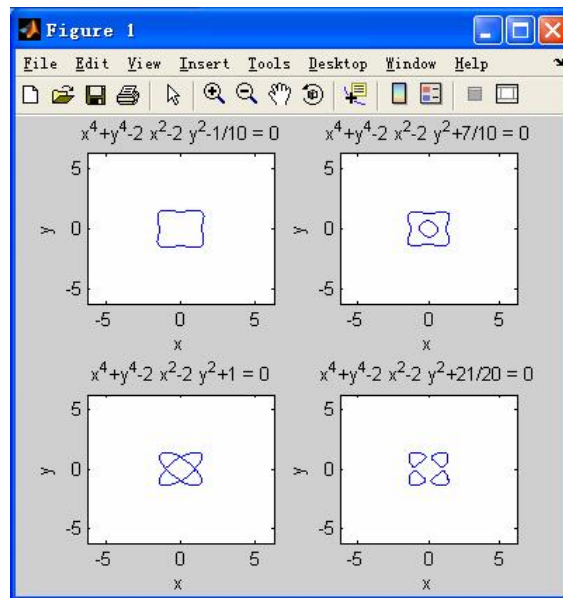


4.

```
1)
>> clear;
>> figure(1)
>> ezplot('x^4+y^4-2*(x^2+y^2)-1.0');
>> figure(2)
>> ezplot('x^4+y^4-2*(x^2+y^2)-(-0.7)');
>> figure(3)
>> ezplot('x^4+y^4-2*(x^2+y^2)-(-1.0)');
>> figure(4)
>> ezplot('x^4+y^4-2*(x^2+y^2)-(-1.05)');
```

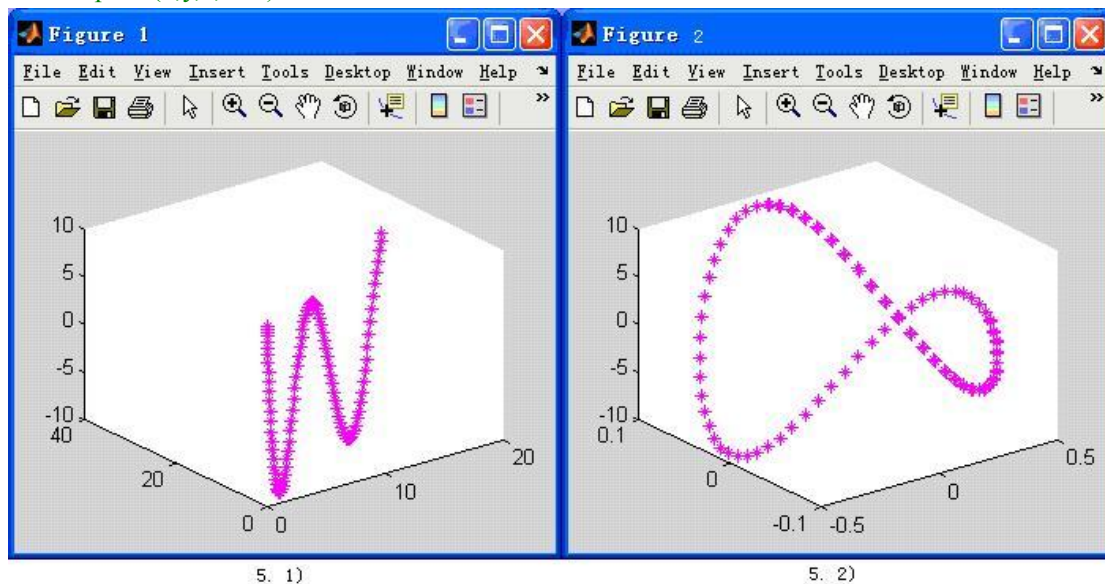
```
2)
>> subplot(2,2,1); ezplot('x^4+y^4-2*(x^2+y^2)-1.0')
>> subplot(2,2,2); ezplot('x^4+y^4-2*(x^2+y^2)-(-0.7)')
>> subplot(2,2,3); ezplot('x^4+y^4-2*(x^2+y^2)-(-1.0)')
```

```
>> subplot(2,2,4); ezplot('x^4+y^4-2*(x^2+y^2)-(-1.05)')
```



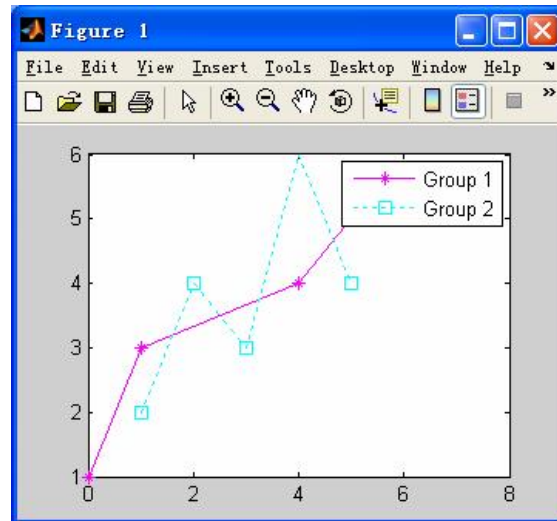
5.

```
>> figure(1); t=linspace(0,6); x=0.5*t.^2; y=0.1*t.^3; z=9*cos(2*t);
>> plot3(x,y,z,'m*')
>> figure(2); subplot; t=linspace(0,9); x=0.5*sin(t); y=0.1*cos(t); z=9*cos(2*t);
>> plot3(x,y,z,'m*')
```



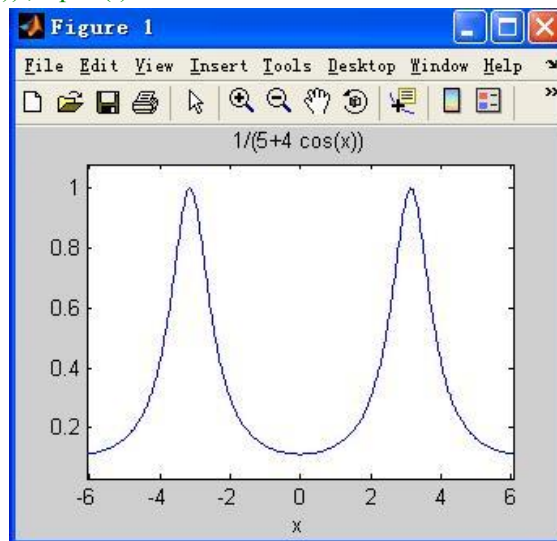
6.

```
>> figure; x=[0,1,4,5,7]; y=[1,3,4,5, 5.6]; plot(x,y,'-m*');
>> hold on; x1=[1,2,3,4,5]; y1=[2,4,3,6,4]; plot(x1,y1,'-cs'); legend('Group 1', 'Group 2');
```

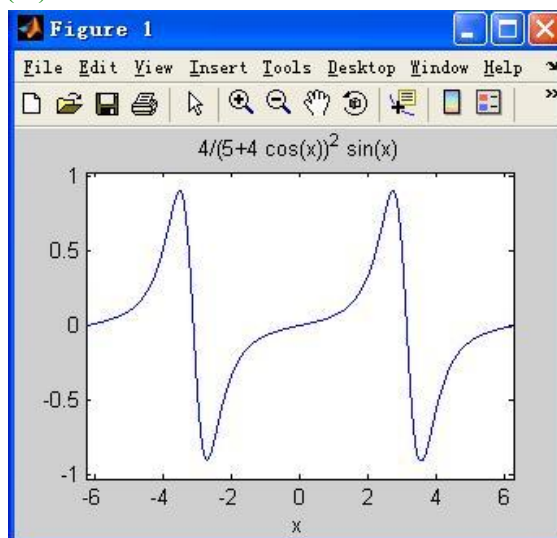


7.

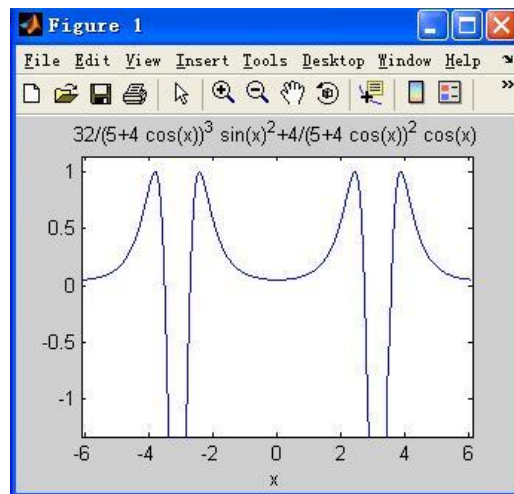
```
>> f='1/(5+4*cos(x))';ezplot(f)
```



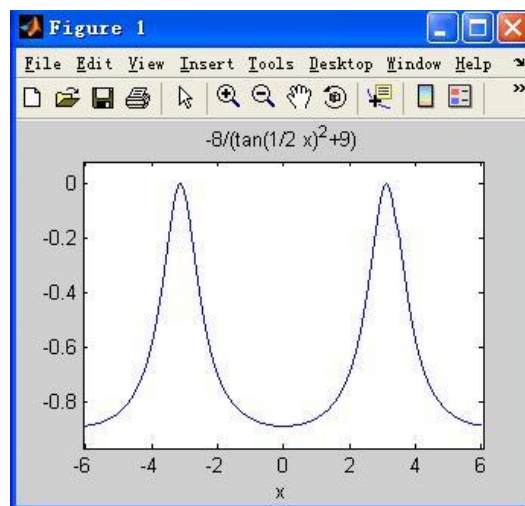
```
>> f1=diff(f);ezplot(f1)
```



```
>> f2=diff(f,2);ezplot(f2)
```



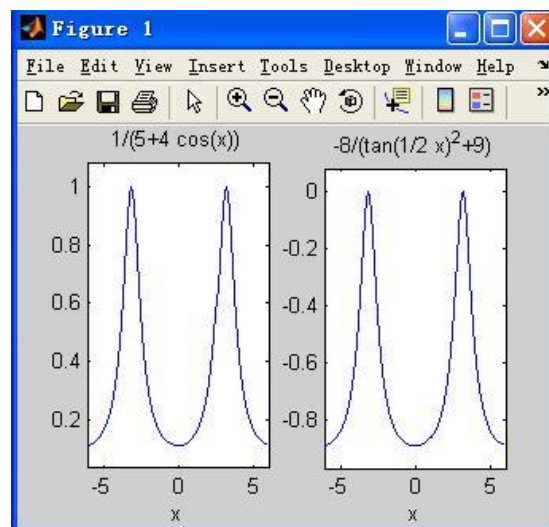
```
>> g= int(int(f2)); ezplot(g);
```



At first glance, the plots for f and g look the same. Look carefully, however, at their formulas and their ranges on the y-axis.

```
>> subplot(1,2,1); ezplot(f)
```

```
>> subplot(1,2,2); ezplot(g)
```



e is the difference between f and g. It has a complicated formula, but its graph looks like a

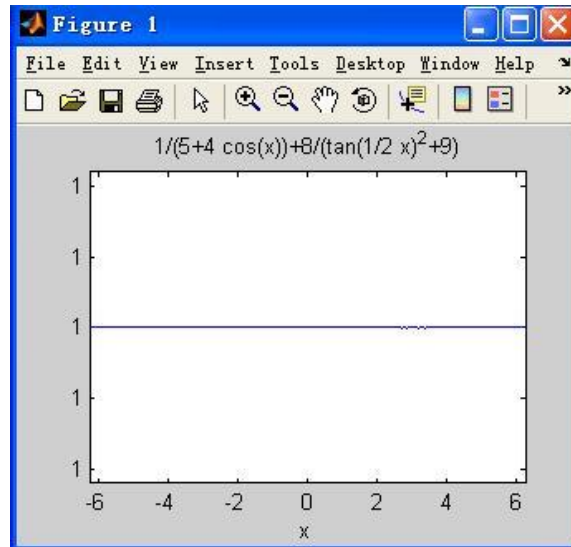
constant.

```
>> e=f-g
```

```
>> subplot(1,1,1); ezplot(e)
```

```
e =
```

```
1/(5+4*cos(x))+8/(tan(1/2*x)^2+9)
```



To show that the difference really is a constant, simplify the equation. This confirms that the difference between them really is a constant.

```
>> e=simple(e)
```

```
ezplot(e)
```

```
e =
```

```
1
```

8. We finish the exercise by following 4 different functions.

(1) ezplot function

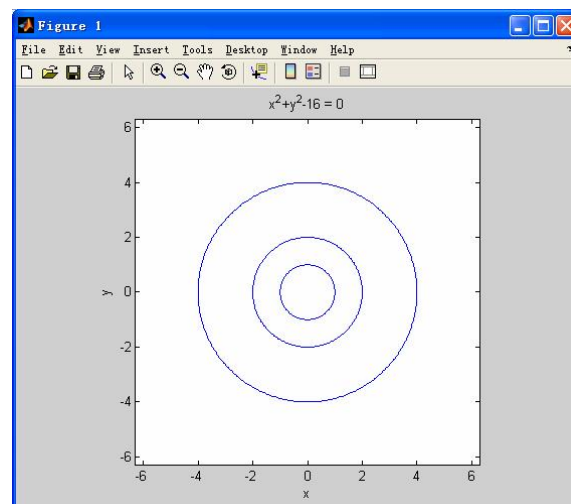
```
>> ezplot('x^2+y^2-1')
```

```
>> axis square
```

```
>> hold on
```

```
>> ezplot('x^2+y^2-4')
```

```
>> ezplot('x^2+y^2-16')
```



(2) plot function

```
>> t=linspace(0,2*pi); x1=sin(t); y1=cos(t); plot(x1,y1)
>> axis square
>> hold on
>> x2=2.*sin(t); y2=2.*cos(t); plot(x2,y2)
>> x3=4.*sin(t); y3=4.*cos(t); plot(x3,y3)
```

(3) polar function

```
>> theta=0:0.1:2*pi; r1=ones(1,numel(theta)); polar(theta,r1)
>> hold on
>> r2=2*ones(1,numel(theta)); polar(theta,r2)
>> r3=4*ones(1,numel(theta)); polar(theta,r3)
```

(4) line function

```
>> theta=0:0.1:2*pi+0.1;
>> line(cos(theta),sin(theta));
>> axis equal
>> hold on
>> line(2*cos(theta),2*sin(theta));
>> line(4*cos(theta),4*sin(theta));
```

9.

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

