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实验日期      指导教师 章军      实验成绩

课程目标 1 (权重 )	课程目标 2 (权重 )	课程目标 3 (权重 )	课程目标 4 (权重 )	课程目标 5 (权重 )	课程目标 6 (权重 )	综合成绩 (目标数可增删)

# 安徽大学电气工程及其自动化学院本科实验报告

【课程名称】 MATLAB程序设计

【课程目标】 (依据教学大纲)

【实验名称】

【实验目的】

- 练习掌握MATLAB使用教程（第二版）书中第六至第七章函数。

【实验原理及方法】

- 使用MATLAB或Octave完成书上习题。

【实验内容及过程】

- 内容

6.1, 6.2, 6.4, 6.5, 6.6, 6.7, 6.9, 6.10, 6.11, 6.13, 6.14, 6.15

7.1,7.2,7.3,.9,7.10,7.12,7.13.7.16
- 代码
  - 主程序

```
% 6.1
n = 10 : 100;
N = num_grains(n);
figure
plot(n, N)
title('ASTM Grain number')
```

```
xlabel('ASTM Grain Size')
ylabel('Number of grains')
grid
```

```
% 6.2
```

```
m = logspace(0, 6);
E = energy(m);
figure
subplot(2,2,1)
semilogy(m,E)
title('semilogy')
subplot(2,2,2)
semilogx(m,E)
title('semilogx')
subplot(2,2,3)
loglog(m,E)
title('loglog')
```

```
% 6.4
```

```
MV = [78.115 46.07 102.3];
m = 1:10;
[x,y] = meshgrid(m,MV);
n = nmoles(x',y');
disp(n)
```

```
% 6.5
```

```
MV = [78.115 46.07 102.3];
n = 1:10;
[x,y] = meshgrid(n,MV);
m = mass(x',y');
disp(m)
```

```
% 6.6
```

```
r = 1609.44.*[7926 4217];
h = 0.3048.*(0:1000:10000);
[x,y] = meshgrid(r,h);
d = distance(x',y');
disp(d)
```

```
% 6.7
```

```
t = 0:0.5:30;
h = height(t);
figure
plot(t,h)
title('The Path of Rocket')
xlabel('time')
ylabel('height')
[h_max,h_max_space] = max(h);
h_max_time = t(h_max_space);
disp(h_max_time)
```

```
% 6.9
```

```

figure
n = input('please input n: ')
polygon(n)

% 6.10
addpath('my_temp_conversion')
% (a)
t_F = 0:10:200;
t_K = F_to_K(t_F);
t1 = [t_F', t_K'];
disp('F_to_K')
disp(t1)
% (b)
t_C = linspace(0,100,25);
t_R = C_to_R(t_C);
t2 = [t_C', t_R'];
disp('C_to_R')
disp(t2)
% (c)
t_C = 0:5:100;
t_F = C_to_F(t_C);
t3 = [t_C', t_F'];
disp('C_to_F')
disp(t3)

% 6.11
midu = 13560;
g = 9.8;
% (a)
P = @(x) midu*g.*x;
% (b)
Pa_to_atm = @(x) 101325.*P(x);
% (c)
h = 0.5:0.1:1.0;
p = P(h);
patm = Pa_to_atm(h);
disp('Pa: ')
disp(p)
disp('atm: ')
disp(patm)

% (d)
save my_p_function1 P
save my_p_function2 Pa_to_atm

% 6.13
% (a)
my_function = @(x) -x^2-5*x-3+exp(x);
% (b)
figure
fplot(my_function, [-5, 5])
grid
% (c)

```

```
disp('函数最小值')
f_min = fminbnd(my_function, -5, 5);
disp(f_min)
```

```
% 6.14
% (a)
height_handle = @(x) height(x);
% (b)
figure
fplot(height_handle, [0, 60])
grid
% (c)
disp('火箭返回地面所用时间')
time_zero = fzero(height_handle, 30);
disp(time_zero)
```

```
% 6.15
temperature_conversions
```

```
% 7.1
x = input(' Enter a value : ');
y = sin(x);
disp('x = ')
disp(x)
disp('sin(x) = ')
disp(y)
```

```
% 7.2
x = input(' Enter a values for x in brackets = ');
y = max(x);
disp('x = ')
disp(x);
disp(' The maximum is :')
disp(y)
```

```
% 7.3
s = input('Enter the base area : ');
h = input('Enter the high : ');
V = (1/3)*s*h;
disp('s = ')
disp(s)
disp('h = ')
disp(h)
disp('The volume of cone is ')
disp(V)
```

```
% 7.9
x = 1:13;
y = x.*6;
table = [x; y];
fprintf('%d times 6 is %d\n', table)
```

```
% 7.10
angle = 0:pi/10:2*pi;
```

```

sines = sin(angle);
mathtable = [angle;sines];
disp('Table for sinusoidal mathematics')
disp(' angle   sines')
fprintf('%8.2f %8.2f\n',mathtable)

% 7.12
% (a)
yen = 5:5:125;
dollar = 0.008786.*yen;
money_table1 = [yen;dollar];
disp(' JRE To USD')
disp(' JPY  USD')
fprintf('%8.2f %8.2f\n',money_table1)
% (b)
EUR = 1:2:59;
USD = 1.1334.*EUR;
money_table2 = [EUR;USD];
disp(' EUR To USD')
disp(' EUR  USD')
fprintf('%8.2f %8.2f\n',money_table2)
% (c)
USD = 1:10;
EUR = 0.8823.*USD;
GBP = 0.7707.*USD;
JPY = 113.82.*USD;
money_table3 = [USD;EUR;GBP;JPY];
disp(' Exchange rate conversion table')
disp(' USD  EUR  GBP  JPY')
fprintf('%8.2f %8.2f %8.2f %8.2f\n',money_table3)

% 7.13
% (a)
incr = input('What temperature increments would you like calculated? ');
t_F = 0:incr:200;
t_K = (5/9).*(459.67 + t_F);
t1 = [t_F;t_K];
disp('温度转换表:华氏温度 to 开氏温度')
disp('华氏温度 开氏温度')
fprintf('%8.2f %8.2f\n', t1)
% (b)
temp_begin = input('Enter the Starting temperature: ');
incr = input('What temperature increments would you like calculated? ');
t_C = temp_begin:incr:24*incr+temp_begin;
t_R = (9/5)*t_C + 32 + 459.67;
t2 = [t_C;t_R];
disp('温度转换表:摄氏温度 to 兰金温度')
disp('摄氏温度 兰金温度')
fprintf('%8.2f %8.2f\n', t2)
% (c)
temp_begin = input('Enter the Starting temperature: ');
incr = input('What temperature increments would you like calculated? ');
line = input('Enter the Line number');

```

```

t_C = temp_begin:incr:(line-1)*incr+temp_begin;
t_F = (5/9).*t_C + 32;
t3 = [t_C;t_F];
disp('温度转换表:摄氏温度 to 华氏温度')
disp('摄氏温度 华氏温度')
fprintf('%8.2f %8.2f \n', t3)

```

```

% 7.16
m = 0:pi/100:2*pi;
x = sin(m);
y = cos(m);
plot(x,y)
hold on
axis([-1, 1, -1,1])
[a1, b1] = ginput(1);
[a2, b2] = ginput(1);
c = [a1 a2];
d = [b1 b2];
plot(c, d)
z = sqrt((a1 - a2)^2 + (b1 - b2)^2);
disp('z = ')
disp(z)

```

- 自定义函数

```

% 6.1
% num_grains
function output = num_grains(n)
output = 2.^(n-1);

```

```

% 6.2
%energy
function output = energy(m)
c = 2.9979*10^8;
output = m*c^2;

```

```

% 6.4
% nmoles
function output = nmoles(x,y)
output = x./y;

```

```

% 6.5
% mass
function output = mass(x,y)
output = x.*y;

```

```

% 6.6
% distance
function output = distance(x,y)
output = sqrt(2.*x.*y+y.^2);

```

```

% 6.7
%height

```

```
function output = height(x)
output = (-9.8/2).*x.^2 + 125.*x + 500;
```

```
% 6.9
```

```
% polygon
```

```
function polygon(n)
if n >= 3
    t = 2*pi/n;
    theta = 0:t:2*pi;
    r = 2*ones(size(theta));
    polar(theta,r);
else
    disp('error')
end
```

```
% 6.10
```

```
%F_to_K
```

```
function output = F_to_K(x)
output = (5/9).*(x+459.67);
```

```
% C_to_R
```

```
function output = C_to_R(x)
output = (9/5)*x + 32 + 459.67;
```

```
% C_to_F
```

```
function output = C_to_F(x)
output = (9/5)*x + 32;
```

```
% 6.15
```

```
% temperature_conversions
```

```
function [] = temperature_conversions
```

```
% Problem (a)
```

```
t_F = 0:10:200;
disp('F_to_K')
t_K = F_to_K(t_F);
t1 = [t_F',t_K'];
disp(t1)
```

```
% Problem (b)
```

```
t_C = linspace(0,100,25);
disp('C_to_R')
t_R = C_to_R(t_C);
t2 = [t_C', t_R'];
disp(t2)
```

```
% Problem (c)
```

```
t_C = 0:5:100;
disp('C_to_F')
t_F = C_to_F(t_C);
t3 = [t_C',t_F'];
disp(t3)
```

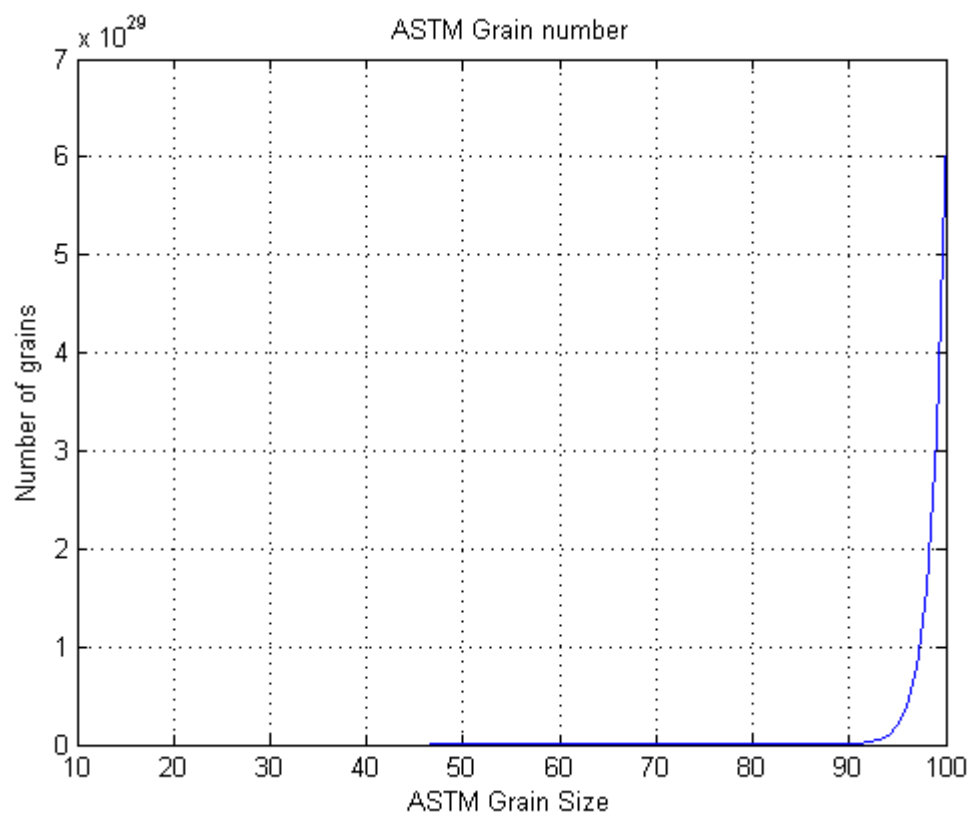
```
function result = F_to_K(x)
result = (5/9).*(x+459.67);
```

```
function result = C_to_R(x)
result = (9/5)*x + 32 + 459.67;
```

```
function result = C_to_F(x)
result = (9/5)*x + 32;
```

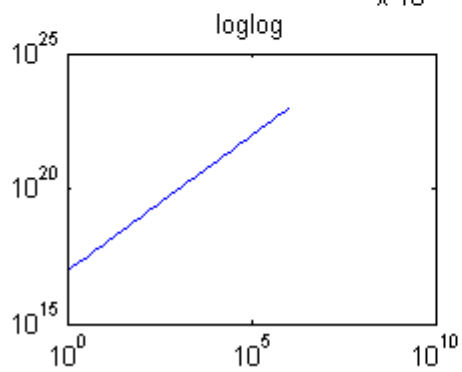
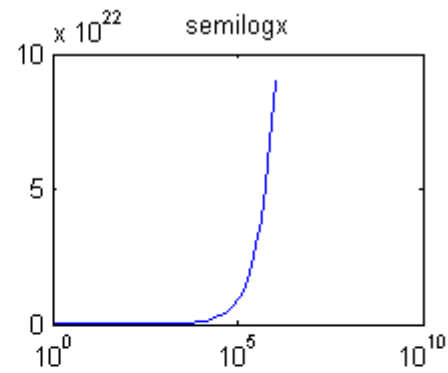
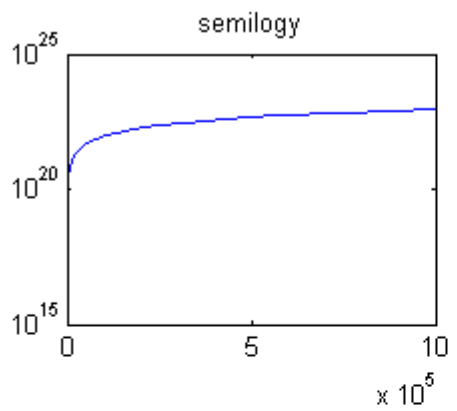
## 【实验结果】

% 6.1



%6.2





%6.4

```
0.0128 0.0217 0.0098
0.0256 0.0434 0.0196
0.0384 0.0651 0.0293
0.0512 0.0868 0.0391
0.0640 0.1085 0.0489
0.0768 0.1302 0.0587
0.0896 0.1519 0.0684
0.1024 0.1736 0.0782
0.1152 0.1954 0.0880
0.1280 0.2171 0.0978
```

% 6.5

```
1.0e+03 *
0.0781 0.0461 0.1023
0.1562 0.0921 0.2046
0.2343 0.1382 0.3069
0.3125 0.1843 0.4092
0.3906 0.2304 0.5115
0.4687 0.2764 0.6138
0.5468 0.3225 0.7161
0.6249 0.3686 0.8184
0.7030 0.4146 0.9207
0.7812 0.4607 1.0230
```

% 6.6

1.0e+05 \*

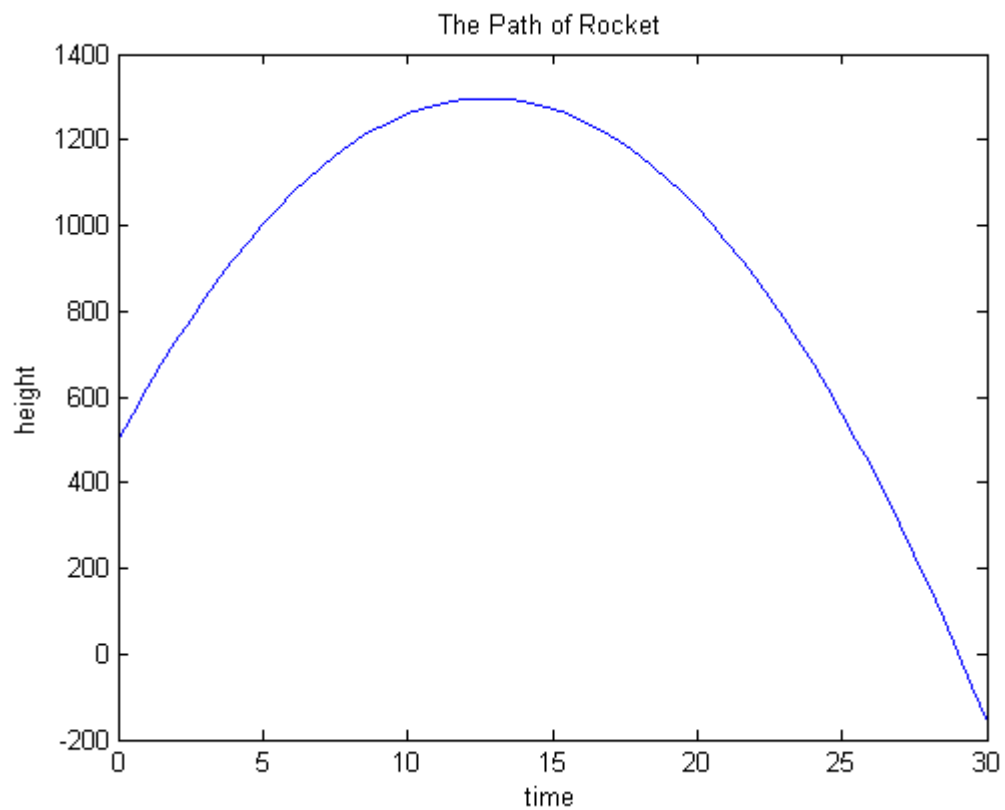
Columns 1 through 7

0	0.8818	1.2471	1.5274	1.7637	1.9719	2.1601
0	0.6432	0.9097	1.1141	1.2865	1.4384	1.5757

Columns 8 through 11

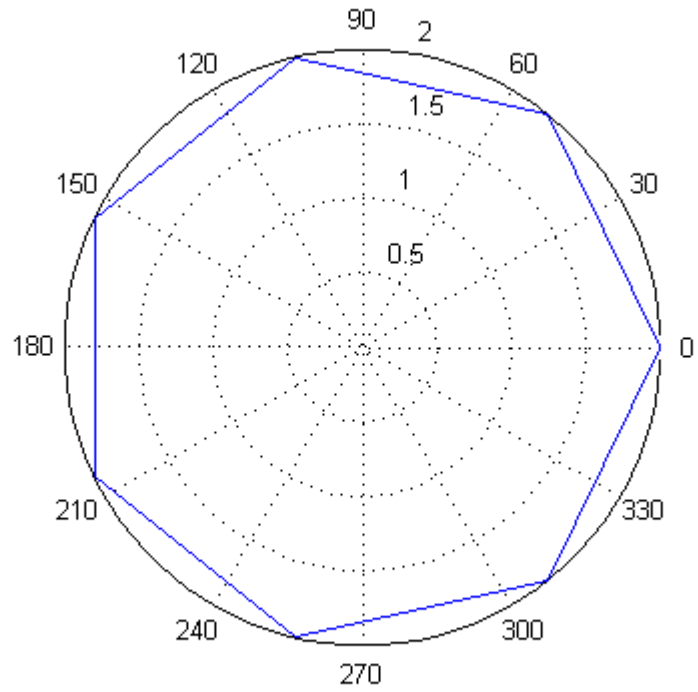
2.3332	2.4943	2.6456	2.7888
1.7019	1.8195	1.9299	2.0343

% 6.7



% 6.9

pleast input n: 7  
n = 7



% 6.10

F\_to\_K

```

0 255.3722
10.0000 260.9278
20.0000 266.4833
30.0000 272.0389
40.0000 277.5944
50.0000 283.1500
60.0000 288.7056
70.0000 294.2611
80.0000 299.8167
90.0000 305.3722
100.0000 310.9278
110.0000 316.4833
120.0000 322.0389
130.0000 327.5944
140.0000 333.1500
150.0000 338.7056
160.0000 344.2611
170.0000 349.8167
180.0000 355.3722
190.0000 360.9278
200.0000 366.4833

```

C\_to\_R

```

0 491.6700
4.1667 499.1700
8.3333 506.6700

```

```
12.5000 514.1700
16.6667 521.6700
20.8333 529.1700
25.0000 536.6700
29.1667 544.1700
33.3333 551.6700
37.5000 559.1700
41.6667 566.6700
45.8333 574.1700
50.0000 581.6700
54.1667 589.1700
58.3333 596.6700
62.5000 604.1700
66.6667 611.6700
70.8333 619.1700
75.0000 626.6700
79.1667 634.1700
83.3333 641.6700
87.5000 649.1700
91.6667 656.6700
95.8333 664.1700
100.0000 671.6700
```

C\_to\_F

```
0 32
5 41
10 50
15 59
20 68
25 77
30 86
35 95
40 104
45 113
50 122
55 131
60 140
65 149
70 158
75 167
80 176
85 185
90 194
95 203
100 212
```

% 6.11

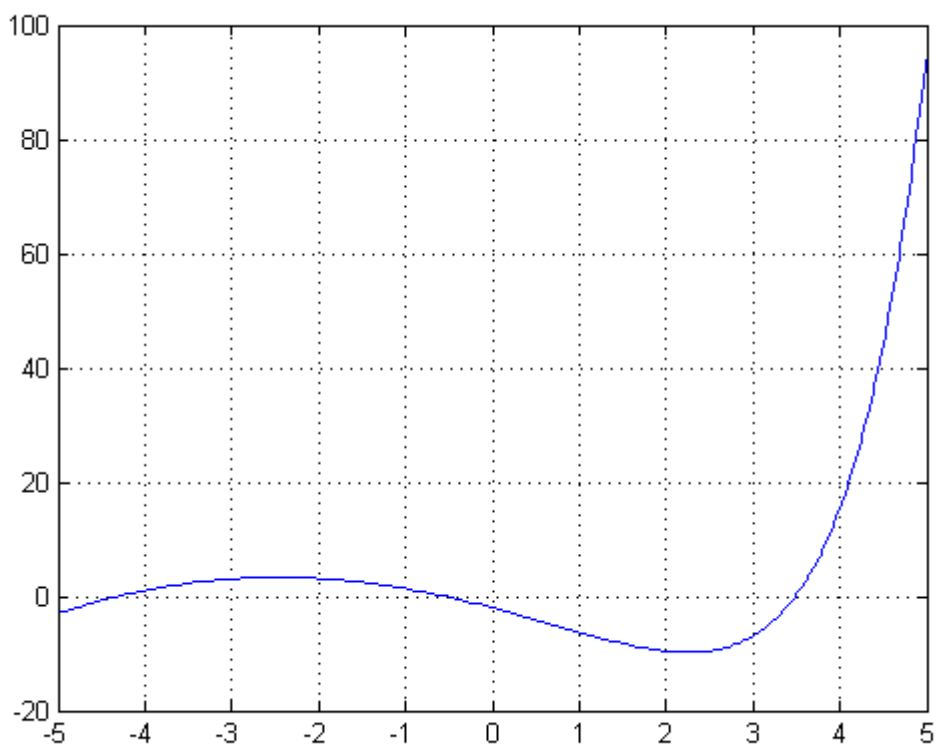
Pa:  
1.0e+05 \*

0.6644 0.7973 0.9302 1.0631 1.1960 1.3289

atm:  
1.0e+10 \*

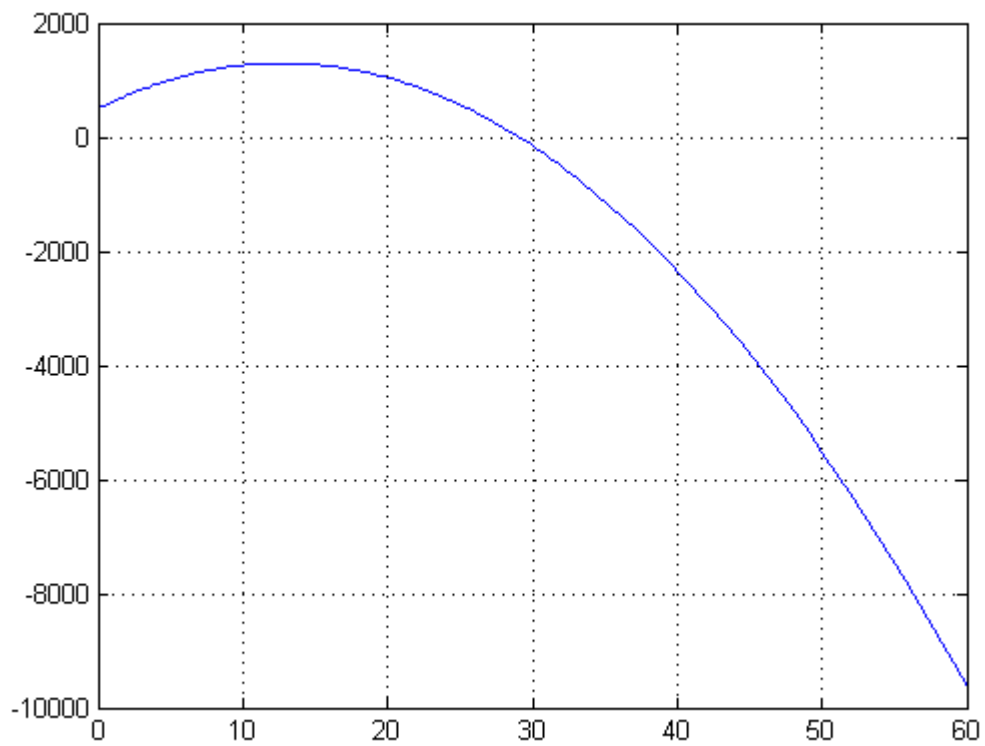
0.6732 0.8079 0.9425 1.0772 1.2118 1.3465

% 6.13



函数最小值  
2.2516

% 6.14



火箭返回地面所用时间  
29.0257

% 6.15  
结果同6.10

% 7.1

Enter a value :  $\pi/6$   
x =  
0.52360  
sin(x) =  
0.50000

% 7.2

Enter a values for x in brackets = [1 5 3 8 9 22]  
x =  
1 5 3 8 9 22  
The maximum is :  
22

% 7.3

Enter the base area : 2

Enter the high : 2

s =

2

h =

2

The volume of cone is

1.3333

% 7.9

1 times 6 is 6

2 times 6 is 12

3 times 6 is 18

4 times 6 is 24

5 times 6 is 30

6 times 6 is 36

7 times 6 is 42

8 times 6 is 48

9 times 6 is 54

10 times 6 is 60

11 times 6 is 66

12 times 6 is 72

13 times 6 is 78

% 7.10

Table for sinusoidal mathematics

angle	sines
-------	-------

0.00	0.00
------	------

0.31	0.31
------	------

0.63	0.59
------	------

0.94	0.81
------	------

1.26	0.95
------	------

1.57	1.00
------	------

1.88	0.95
------	------

2.20	0.81
------	------

2.51	0.59
------	------

2.83	0.31
------	------

3.14	0.00
------	------

3.46	-0.31
------	-------

3.77	-0.59
------	-------

4.08	-0.81
------	-------

4.40	-0.95
------	-------

4.71	-1.00
------	-------

5.03	-0.95
------	-------

5.34	-0.81
------	-------

5.65	-0.59
------	-------

5.97	-0.31
------	-------

6.28	-0.00
------	-------

% 7.12

#### JRE To USD

JPY	USD
5.00	0.04
10.00	0.09
15.00	0.13
20.00	0.18
25.00	0.22
30.00	0.26
35.00	0.31
40.00	0.35
45.00	0.40
50.00	0.44
55.00	0.48
60.00	0.53
65.00	0.57
70.00	0.62
75.00	0.66
80.00	0.70
85.00	0.75
90.00	0.79
95.00	0.83
100.00	0.88
105.00	0.92
110.00	0.97
115.00	1.01
120.00	1.05
125.00	1.10

#### EUR To USD

EUR	USD
1.00	1.13
3.00	3.40
5.00	5.67
7.00	7.93
9.00	10.20
11.00	12.47
13.00	14.73
15.00	17.00
17.00	19.27
19.00	21.53
21.00	23.80
23.00	26.07
25.00	28.34
27.00	30.60
29.00	32.87
31.00	35.14
33.00	37.40
35.00	39.67
37.00	41.94
39.00	44.20
41.00	46.47
43.00	48.74
45.00	51.00



47.00 53.27  
49.00 55.54  
51.00 57.80  
53.00 60.07  
55.00 62.34  
57.00 64.60  
59.00 66.87

#### Exchange rate conversion table

USD	EUR	GBP	JPY
1.00	0.88	0.77	113.82
2.00	1.76	1.54	227.64
3.00	2.65	2.31	341.46
4.00	3.53	3.08	455.28
5.00	4.41	3.85	569.10
6.00	5.29	4.62	682.92
7.00	6.18	5.39	796.74
8.00	7.06	6.17	910.56
9.00	7.94	6.94	1024.38
10.00	8.82	7.71	1138.20

% 7.13

What temperature increments would you like calculated? 20

温度转换表:华氏温度 to 开氏温度 ·

华氏温度 开氏温度 ·

0.00 255.37  
20.00 266.48  
40.00 277.59  
60.00 288.71  
80.00 299.82  
100.00 310.93  
120.00 322.04  
140.00 333.15  
160.00 344.26  
180.00 355.37  
200.00 366.48

Enter the Starting temperature: 0

What temperature increments would you like calculated? 100

温度转换表:摄氏温度 to 兰金温度 ·

摄氏温度 兰金温度 ·

0.00 491.67  
100.00 671.67  
200.00 851.67  
300.00 1031.67  
400.00 1211.67  
500.00 1391.67  
600.00 1571.67  
700.00 1751.67  
800.00 1931.67  
900.00 2111.67

```
1000.00 2291.67
1100.00 2471.67
1200.00 2651.67
1300.00 2831.67
1400.00 3011.67
1500.00 3191.67
1600.00 3371.67
1700.00 3551.67
1800.00 3731.67
1900.00 3911.67
2000.00 4091.67
2100.00 4271.67
2200.00 4451.67
2300.00 4631.67
2400.00 4811.67
```

Enter the Starting temperature: 0

What temperature increments would you like calculated? 10

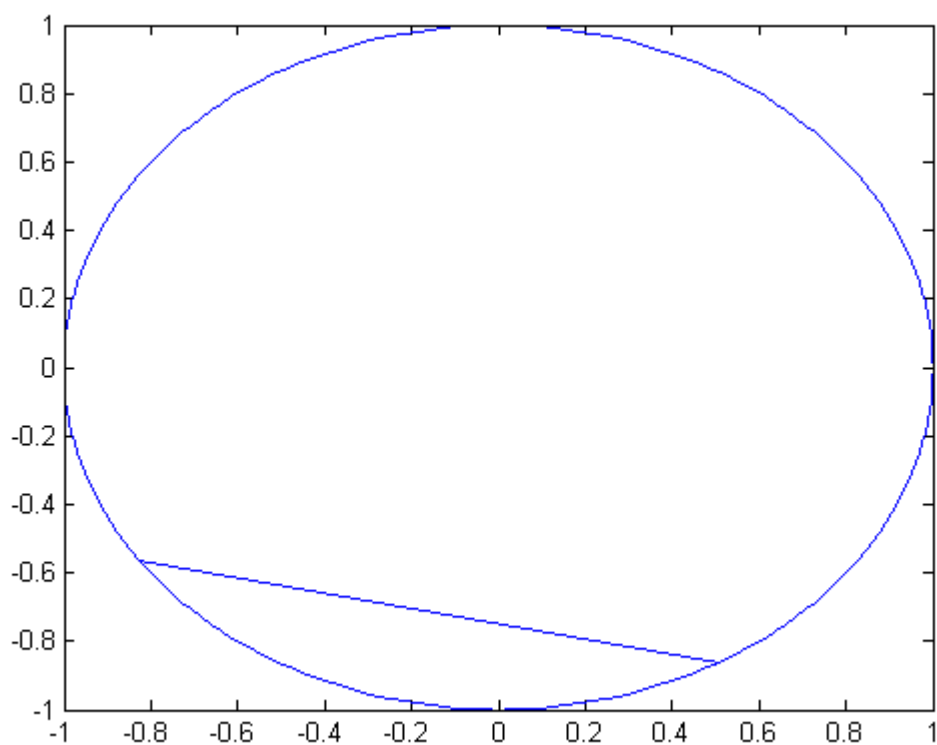
Enter the Line number10

温度转换表:摄氏温度 to 华氏温度

摄氏温度 华氏温度

```
0.00 32.00
10.00 37.56
20.00 43.11
30.00 48.67
40.00 54.22
50.00 59.78
60.00 65.33
70.00 70.89
80.00 76.44
90.00 82.00
```

% 7.16



$z =$   
1.3693

【数据分析及处理】

【总结或讨论】