学号 Z11714047　　专业 自动化　　姓名 耿严

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('pleast 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 maxinum 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

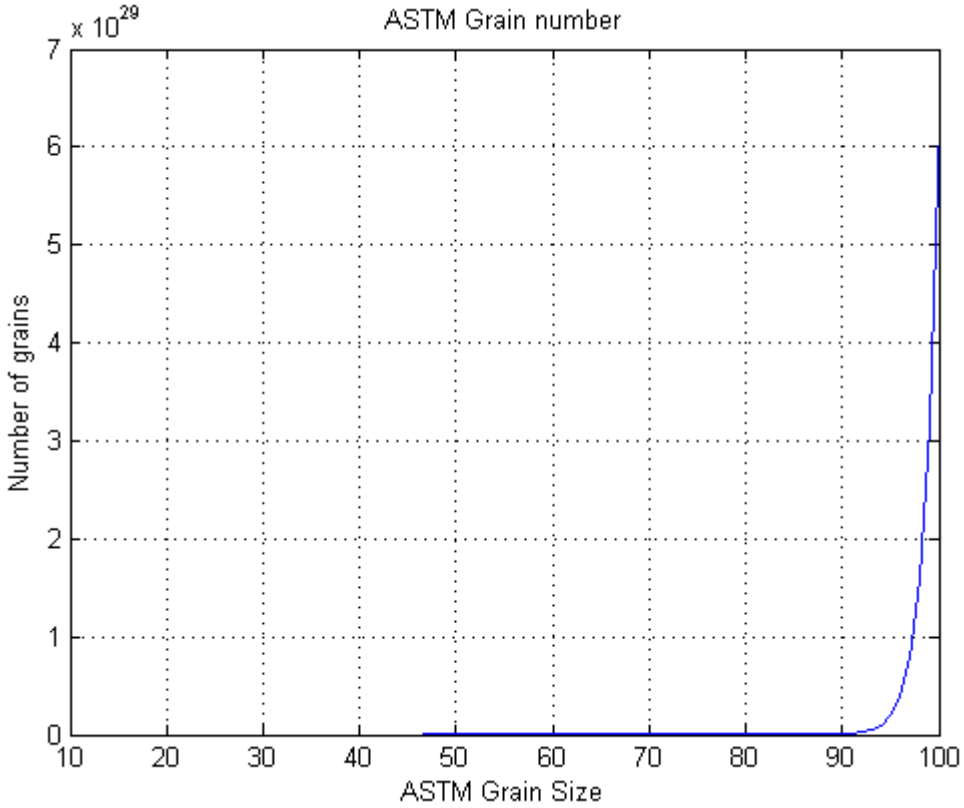
```
% 6.1
% num_grains
function output = num_grains(n)
output = 2.^(n-1);

% 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;
```

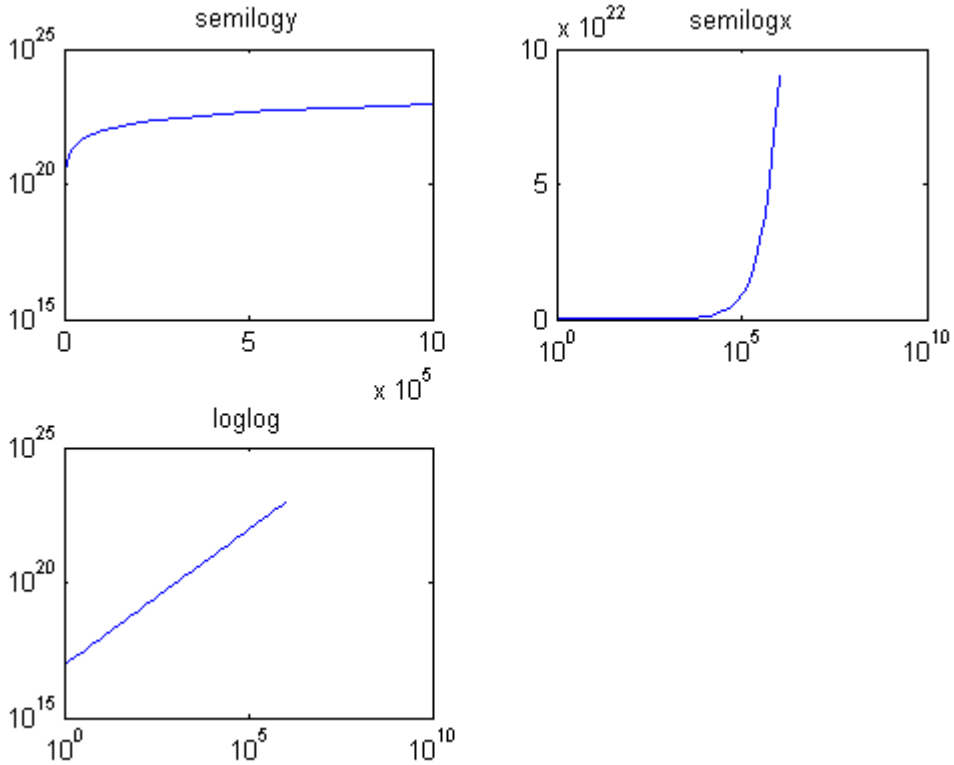
```
function result = C_to_F(x)
result = (9/5)*x + 32;
```

【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
```

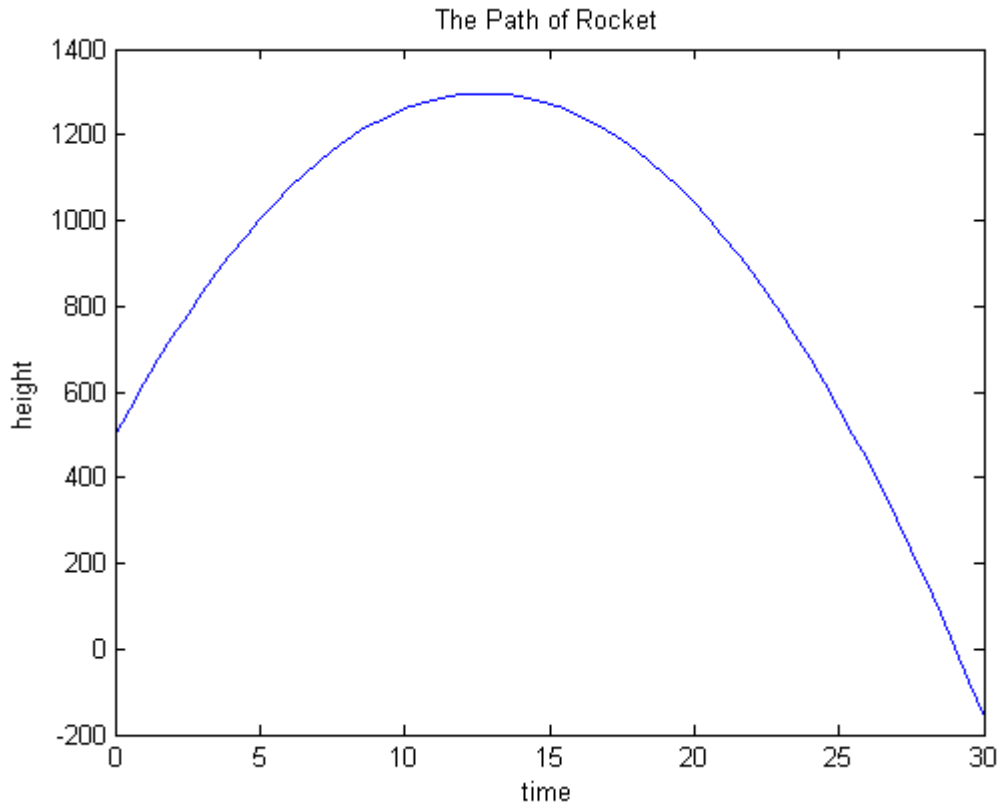
% 6.5

```
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

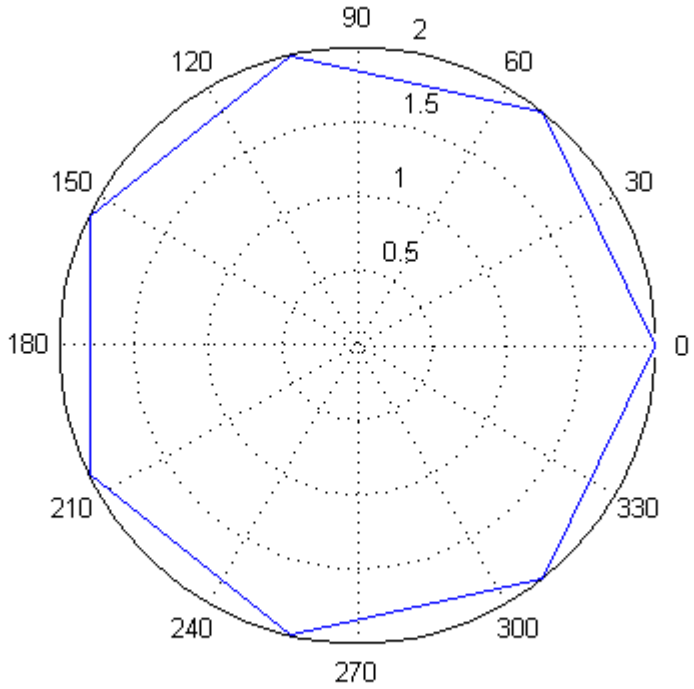
```
1.0e+05 *

 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

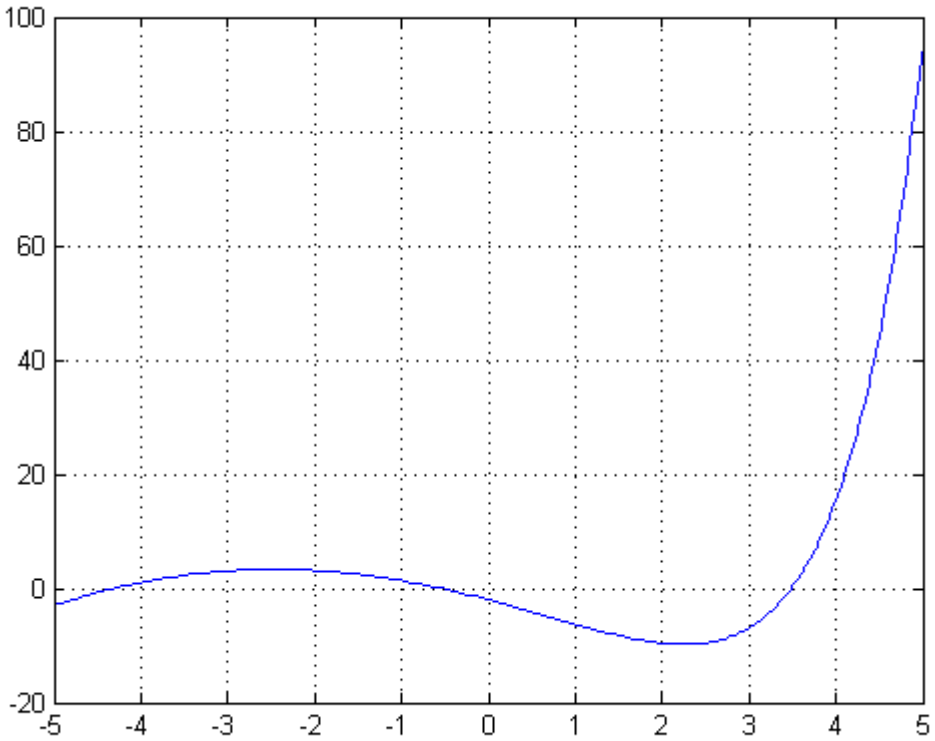
```
F_to_K
       0  255.3722
 10.0000  260.9278
 20.0000  266.4833
 30.0000  272.0389
 40.0000  277.5944
 50.0000  283.1500
 60.0000  288.7056
 70.0000  294.2611
 80.0000  299.8167
 90.0000  305.3722
100.0000  310.9278
110.0000  316.4833
120.0000  322.0389
130.0000  327.5944
140.0000  333.1500
150.0000  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
```

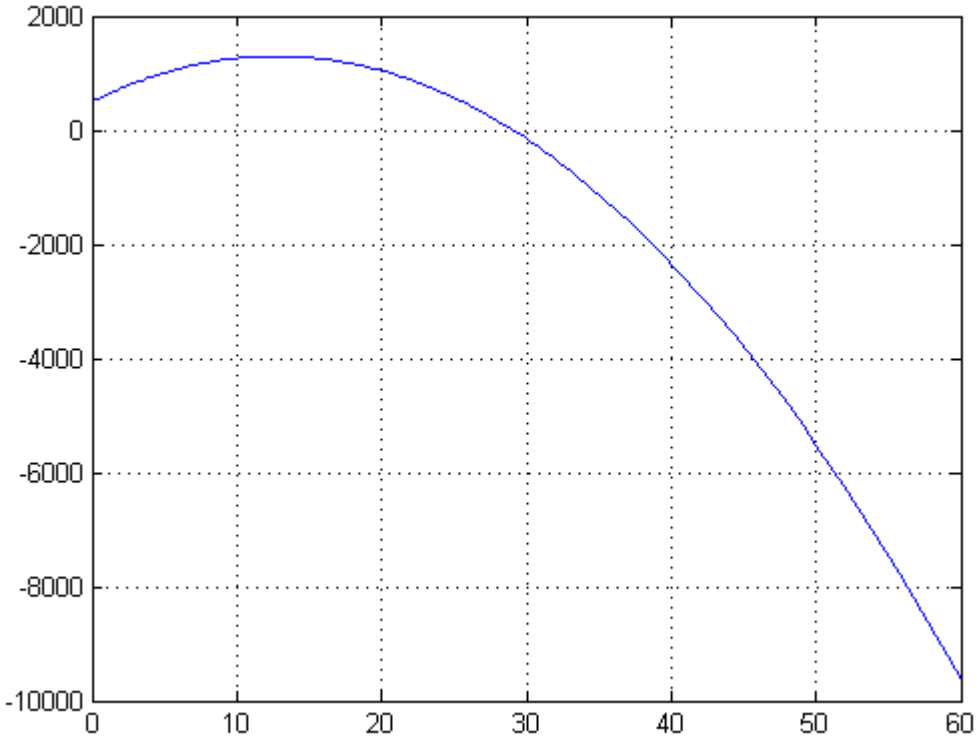
```
Pa:
 1.0e+05 *

  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 maxinum 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
```

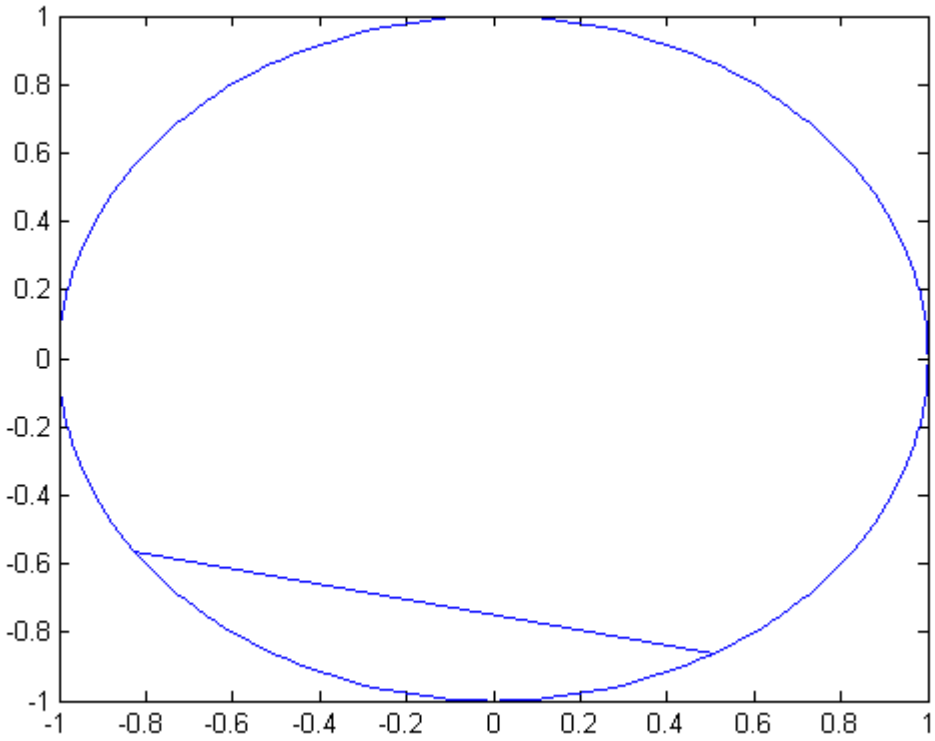
```
 47.00    53.27
 49.00    55.54
 51.00    57.80
 53.00    60.07
 55.00    62.34
 57.00    64.60
 59.00    66.87

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】