```matlab
%%%二题
x=-10+40*rand(1,2000)
%或者x=unifrnd(-10,30,1,2000)


%%%三题
N=10000;                % 投点个数
x=10*rand(1,N);      % 投点x坐标
y=-5+7*rand(1,N); %  投点y坐标[-5,2]
plot(x,y,'.')           % 描点



%%%四题
N = 10000;
x=2*rand(1,N);
d=sqrt(2)*exp(4);
y= d*rand(1,N);
freq=sum(y<=sqrt(x).*exp(x.^2))/N;
S2 = 2*d;
S1 = freq *S2 %蒙特卡罗法求解结果
syms x
S1acc=vpa(int(sqrt(x)*exp(x*x),x,0,2))%调用符号工具箱函数求精确解



%%%五题
%下面代码绘制两条曲线.
x=linspace(-2,3,50);
y1=x.^2;
y2=x+6;
plot(x,y1,x,y2)
figure
%1. 随机投点
N = 10000;
x= 5*rand(1,N); % x= unifrnd(0,5,1,N);
y= 3*rand(1,N); % y= unifrnd(0,3,1,N);
%2. 绘图
plot(x,y,'.')
%3. 统计
num=sum(y>=x)


%%%六题
N=10000;
x=5*rand(1,N);
y=3*rand(1,N);
plot(x,y,'.')
idx=find(y>=x);
num=length(idx)
%前2行可以用下列代码完成
num = sum(y>=x)


%%%七题
function V= simfun(N)
if nargin == 0 %  设置投点个数N默认值
     N = 10000;
end
if N < 10000, %  如果投点太少，函数给出警告信息
     warning('输入参数投点个数N<10000')
end
```

```matlab
draw %  绘制曲面

r = rand(N,3);
x = 2*r(:,1)-1;%随机投点
y = 2*r(:,2)-1;
z = 2*r(:,3);
t1 = x.^2+y.^2;%临时变量
t2 = sqrt(t1); %临时变量
index = find(z>=t2 & z<=1+sqrt(1-t1));
m = length(index);%计算落在圆锥面和半球面区域内的点个数
%或者用：m = sum(z>=t1 & z<=1+sqrt(1-t2));%代替前2行
V = 8*m/N;

function draw
%
%  绘制两个曲面---这里圆锥面为下底面
r     = linspace(0,1,100);
theta = linspace(0,2*pi,100);
[rr,tt]=meshgrid(r,theta)
xx = rr.*cos(tt);
yy = rr.*sin(tt);
zz = sqrt(xx.^2+yy.^2);
zz2 = 1+sqrt(abs(1-xx.^2-yy.^2));
mesh(xx,yy,zz)
hold on
mesh(xx,yy,zz2)
```