

## Examples from probability

```
//Example 23 -----  
//a) What is the probability, that after a roll of two dice the sum  
// will be odd number?  
//b) What is the above probability if we know, that the number on  
// the first dice was not six.  
//c) What is the probability according to a) if we know, that neither  
// on the first nor on the second dice the result was six.
```

```
clc, clear, close, mode(2)  
n=1000;  
c=0;  
x=grand(n,2,'uin',1,6);  
s=sum(x,2);  
for i=1:n  
    if fix(s(i)/2)~=s(i)/2  
        c=c+1;  
    end  
end  
end
```

```
p=c/n
```

```
//Result  
//True probabilities  
//Pa=1/2  
//Pb=1/2  
//Pc=12/25=0.48
```

```
//Example 24 -----  
//A cowboy shoots three times at the target. The probability of  
//hitting is 0.7 and the shoots are independent. What is the  
//probability, that he hits twice?
```

```
clc, clear, close, mode(2)  
n=1000;  
p=.7;  
C=0;  
for i=1:n  
    c=0;  
    for j=1:3  
        r=rand(1,1,'u');  
        if r<p, c=c+1; end  
    end  
    if c==2  
        C=C+1;  
    end  
end  
end
```

```

P=C/n

//Result
//True probability is
//P=3*.7^2*.3=0.441

//Example 32 -----
//In the store, there are 100 bulbs. Three of them are bad.
//Five bulbs are randomly chosen. What is the probability, that at
//least one of the chosen bulbs will be bad?

clc, clear, close, mode(2)
n=100;
m=3;
k=5;

C=0;
N=1000;
for i=1:N
    s=sum(rand(1,5)<m/n);
    if s>0,
        C=C+1;
    end
end

P=C/N

//Result
//exp(combLn(95,3)-combLn(100,3)) = 0.8559988

//Example 33 -----
//A watch, whose battery was weak, randomly stopped. What is
//the probability, that the big hand was stopped between
//9 and 12 o'clock? What is the probability for the small hand?

clc, clear, close, mode(2)
N=1000;
C=0;
for i=1:N
    x=grand(1,1,'uin',1,720);
    if (x>540)
        C=C+1;
    end
end

P=C/N

//Result
//True probability is
//P = 1/4

```

```

//Example 41 -----
//Verify limit theorem (sufficiently large sample gives
//sum-characteristics with normal disteibution

clc, clear, close, mode(2)
nd=10000;      // number of experiments
nc=500;        // length of samples
a=2;           // 6 - dice, 2 - coin
x=fix(a*rand(nc,nd,'u')+1); // samples in columns
s=sum(x,1)/nc; // sample average

histplot(20,s);

//nd=10000;
//nc=50;
//a=6;           // 6 - dice, 2 - coin
//x=fix(a*rand(nc,nd,'u')+1);
//s=sum(x,1);
//
//histplot(20,s);

//Example 42 -----
//Verify law of large numbers - for large samples
//the sample characteristics approach the population ones

clc, clear, close, mode(2)
n=1000;        // numb. of visible steps
m=50;          // number of steps within
a=6;           // 6 - dice, 2 - coin
x=fix(a*rand(m,n,'u')+1);
s=mean(x,1);

mx=mean(x(1:$))
vx=variance(x(1:$))
ms=mean(s)
vs=variance(s)

Vs=vx/m

```