# HW_5　F74067036 常定 利

Matlab Code...

```
prompt_a = 'What is the value of probability ? ';
prompt_b = 'What is the value of outcome ? ';
prompt_c = 'What is the value of successes ? ';
a = input(prompt_a);
b = input(prompt_b);
c = input(prompt_c);

k = a;
n = factorial(b);
p = factorial(b-c);
p2 = factorial(c);
isfloat(x);
x = n./(p*p2)*a^c*(1-a)^(b-c);
disp(x);
```

OutPut...

```
What is the value of probability ? 0.3
What is the value of outcome ? 6
What is the value of successes ? 1
   0.3025
```

1.b

Matlab Code...

```
prompt_a = 'What is the value of mean number ? ';
prompt_b = 'What is the value of outcomes ? ';
a = input(prompt_a);
b = input(prompt_b);
kp = factorial(b);
x = (a^b*exp(-a))./kp;

disp(x);
```

Output...

```
What is the value of mean number ? 4
What is the value of outcomes ? 6
   0.1042
```

1.c

Matlab Code...

```
P = [0.1 0.2 0.25 0.3 0.4  0.5 0.6 0.7 0.8 0.9];
for m = 1.0:+1.0:7.0
D = zeros(m+1,9);
c=0;
for i = 1.0:+1.0:m+1
        j=0;
       for k = 1.0:+1.0:10
          j = j+1;
          C = nchoosek(m,c);
          if(i>1)
          D(i,k) = C*P(j)^c*(1-P(j))^(m-c)+D(i-1,k);
          end
          if(i==1)
          D(i,k) = C*P(j)^c*(1-P(j))^(m-c);
          end
       end
       c = c+1;
end
disp(m);
disp(D);
end
```

Output...

```
     1

    0.9000    0.8000    0.7500    0.7000    0.6000    0.5000    0.4000    0.3000    0.2000    0.1000
    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000

     2

    0.8100    0.6400    0.5625    0.4900    0.3600    0.2500    0.1600    0.0900    0.0400    0.0100
    0.9900    0.9600    0.9375    0.9100    0.8400    0.7500    0.6400    0.5100    0.3600    0.1900
    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000

     3

    0.7290    0.5120    0.4219    0.3430    0.2160    0.1250    0.0640    0.0270    0.0080    0.0010
    0.9720    0.8960    0.8438    0.7840    0.6480    0.5000    0.3520    0.2160    0.1040    0.0280
    0.9990    0.9920    0.9844    0.9730    0.9360    0.8750    0.7840    0.6570    0.4880    0.2710
    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000

     4
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.6561 | 0.4096 | 0.3164 | 0.2401 | 0.1296 | 0.0625 | 0.0256 | 0.0081 | 0.0016 | 0.0001 |
| 0.9477 | 0.8192 | 0.7383 | 0.6517 | 0.4752 | 0.3125 | 0.1792 | 0.0837 | 0.0272 | 0.0037 |
| 0.9963 | 0.9728 | 0.9492 | 0.9163 | 0.8208 | 0.6875 | 0.5248 | 0.3483 | 0.1808 | 0.0523 |
| 0.9999 | 0.9984 | 0.9961 | 0.9919 | 0.9744 | 0.9375 | 0.8704 | 0.7599 | 0.5904 | 0.3439 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

5

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.5905 | 0.3277 | 0.2373 | 0.1681 | 0.0778 | 0.0312 | 0.0102 | 0.0024 | 0.0003 | 0.0000 |
| 0.9185 | 0.7373 | 0.6328 | 0.5282 | 0.3370 | 0.1875 | 0.0870 | 0.0308 | 0.0067 | 0.0005 |
| 0.9914 | 0.9421 | 0.8965 | 0.8369 | 0.6826 | 0.5000 | 0.3174 | 0.1631 | 0.0579 | 0.0086 |
| 0.9995 | 0.9933 | 0.9844 | 0.9692 | 0.9130 | 0.8125 | 0.6630 | 0.4718 | 0.2627 | 0.0815 |
| 1.0000 | 0.9997 | 0.9990 | 0.9976 | 0.9898 | 0.9688 | 0.9222 | 0.8319 | 0.6723 | 0.4095 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

6

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.5314 | 0.2621 | 0.1780 | 0.1176 | 0.0467 | 0.0156 | 0.0041 | 0.0007 | 0.0001 | 0.0000 |
| 0.8857 | 0.6554 | 0.5339 | 0.4202 | 0.2333 | 0.1094 | 0.0410 | 0.0109 | 0.0016 | 0.0001 |
| 0.9842 | 0.9011 | 0.8306 | 0.7443 | 0.5443 | 0.3438 | 0.1792 | 0.0705 | 0.0170 | 0.0013 |
| 0.9987 | 0.9830 | 0.9624 | 0.9295 | 0.8208 | 0.6562 | 0.4557 | 0.2557 | 0.0989 | 0.0158 |
| 0.9999 | 0.9984 | 0.9954 | 0.9891 | 0.9590 | 0.8906 | 0.7667 | 0.5798 | 0.3446 | 0.1143 |
| 1.0000 | 0.9999 | 0.9998 | 0.9993 | 0.9959 | 0.9844 | 0.9533 | 0.8824 | 0.7379 | 0.4686 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

7

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.4783 | 0.2097 | 0.1335 | 0.0824 | 0.0280 | 0.0078 | 0.0016 | 0.0002 | 0.0000 | 0.0000 |
| 0.8503 | 0.5767 | 0.4449 | 0.3294 | 0.1586 | 0.0625 | 0.0188 | 0.0038 | 0.0004 | 0.0000 |
| 0.9743 | 0.8520 | 0.7564 | 0.6471 | 0.4199 | 0.2266 | 0.0963 | 0.0288 | 0.0047 | 0.0002 |
| 0.9973 | 0.9667 | 0.9294 | 0.8740 | 0.7102 | 0.5000 | 0.2898 | 0.1260 | 0.0333 | 0.0027 |
| 0.9998 | 0.9953 | 0.9871 | 0.9712 | 0.9037 | 0.7734 | 0.5801 | 0.3529 | 0.1480 | 0.0257 |
| 1.0000 | 0.9996 | 0.9987 | 0.9962 | 0.9812 | 0.9375 | 0.8414 | 0.6706 | 0.4233 | 0.1497 |
| 1.0000 | 1.0000 | 0.9999 | 0.9998 | 0.9984 | 0.9922 | 0.9720 | 0.9176 | 0.7903 | 0.5217 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

1.d

Matlab Code...

```
u = [5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5];
D = zeros(24,9);
for m = 1:+1:25
c=0;
for k = 1:+1:9
   a = u(k);
   b = m-1;
   kp = factorial(b);
   if(m>1)
   D(m,k) = (a^b*exp(-a))./kp+D(m-1,k);
   end
```

```
    if(m==1)
    D(m,k) = (a^b*exp(-a))./kp;
    end
end
end
disp(D);
```

Output...

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0.0041 | 0.0025 | 0.0015 | 0.0009 | 0.0006 | 0.0003 | 0.0002 | 0.0001 | 0.0001 |
| 0.0266 | 0.0174 | 0.0113 | 0.0073 | 0.0047 | 0.0030 | 0.0019 | 0.0012 | 0.0008 |
| 0.0884 | 0.0620 | 0.0430 | 0.0296 | 0.0203 | 0.0138 | 0.0093 | 0.0062 | 0.0042 |
| 0.2017 | 0.1512 | 0.1118 | 0.0818 | 0.0591 | 0.0424 | 0.0301 | 0.0212 | 0.0149 |
| 0.3575 | 0.2851 | 0.2237 | 0.1730 | 0.1321 | 0.0996 | 0.0744 | 0.0550 | 0.0403 |
| 0.5289 | 0.4457 | 0.3690 | 0.3007 | 0.2414 | 0.1912 | 0.1496 | 0.1157 | 0.0885 |
| 0.6860 | 0.6063 | 0.5265 | 0.4497 | 0.3782 | 0.3134 | 0.2562 | 0.2068 | 0.1649 |
| 0.8095 | 0.7440 | 0.6728 | 0.5987 | 0.5246 | 0.4530 | 0.3856 | 0.3239 | 0.2687 |
| 0.8944 | 0.8472 | 0.7916 | 0.7291 | 0.6620 | 0.5925 | 0.5231 | 0.4557 | 0.3918 |
| 0.9462 | 0.9161 | 0.8774 | 0.8305 | 0.7764 | 0.7166 | 0.6530 | 0.5874 | 0.5218 |
| 0.9747 | 0.9574 | 0.9332 | 0.9015 | 0.8622 | 0.8159 | 0.7634 | 0.7060 | 0.6453 |
| 0.9890 | 0.9799 | 0.9661 | 0.9467 | 0.9208 | 0.8881 | 0.8487 | 0.8030 | 0.7520 |
| 0.9955 | 0.9912 | 0.9840 | 0.9730 | 0.9573 | 0.9362 | 0.9091 | 0.8758 | 0.8364 |
| 0.9983 | 0.9964 | 0.9929 | 0.9872 | 0.9784 | 0.9658 | 0.9486 | 0.9261 | 0.8981 |
| 0.9994 | 0.9986 | 0.9970 | 0.9943 | 0.9897 | 0.9827 | 0.9726 | 0.9585 | 0.9400 |
| 0.9998 | 0.9995 | 0.9988 | 0.9976 | 0.9954 | 0.9918 | 0.9862 | 0.9780 | 0.9665 |
| 0.9999 | 0.9998 | 0.9996 | 0.9990 | 0.9980 | 0.9963 | 0.9934 | 0.9889 | 0.9823 |
| 1.0000 | 0.9999 | 0.9998 | 0.9996 | 0.9992 | 0.9984 | 0.9970 | 0.9947 | 0.9911 |
| 1.0000 | 1.0000 | 0.9999 | 0.9999 | 0.9997 | 0.9993 | 0.9987 | 0.9976 | 0.9957 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9999 | 0.9997 | 0.9995 | 0.9989 | 0.9980 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9999 | 0.9998 | 0.9996 | 0.9991 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9999 | 0.9998 | 0.9996 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9999 | 0.9999 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.9999 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

1.e

Matlab Code...

```
subplot(4,2,1);
x = 0:10^4;

a1 = binopdf(x,10^4,0.01);
b1 = poisspdf(x,100);
plot(x,a1);
hold on
plot(x,b1);
hold off
```

```
subplot(4,2,2);
a2 = binopdf(x,10^4,0.1);
b2 = poisspdf(x,1000);
plot(x,a2);
hold on
plot(x,b2);
hold off

subplot(4,2,3);
a3 = binopdf(x,10^4,0.2);
b3 = poisspdf(x,2000);
plot(x,a3);
hold on
plot(x,b3);
hold off

subplot(4,2,4);
a4 = binopdf(x,10^4,0.5);
b4 = poisspdf(x,5000);
plot(x,a4);
hold on
plot(x,b4);
hold off



c1 = zeros(10^4,1);
c2 = zeros(10^4,1);
c3 = zeros(10^4,1);
c4 = zeros(10^4,1);
for i = 1.0:+1:10^4
    c1(i) =  a1(i) - b1(i);
end
subplot(4,2,5)
 plot(c1);

 for i = 1.0:+1:10^4
    c2(i) =  a2(i) - b2(i);
 end

 subplot(4,2,6)
 plot(c2);
```

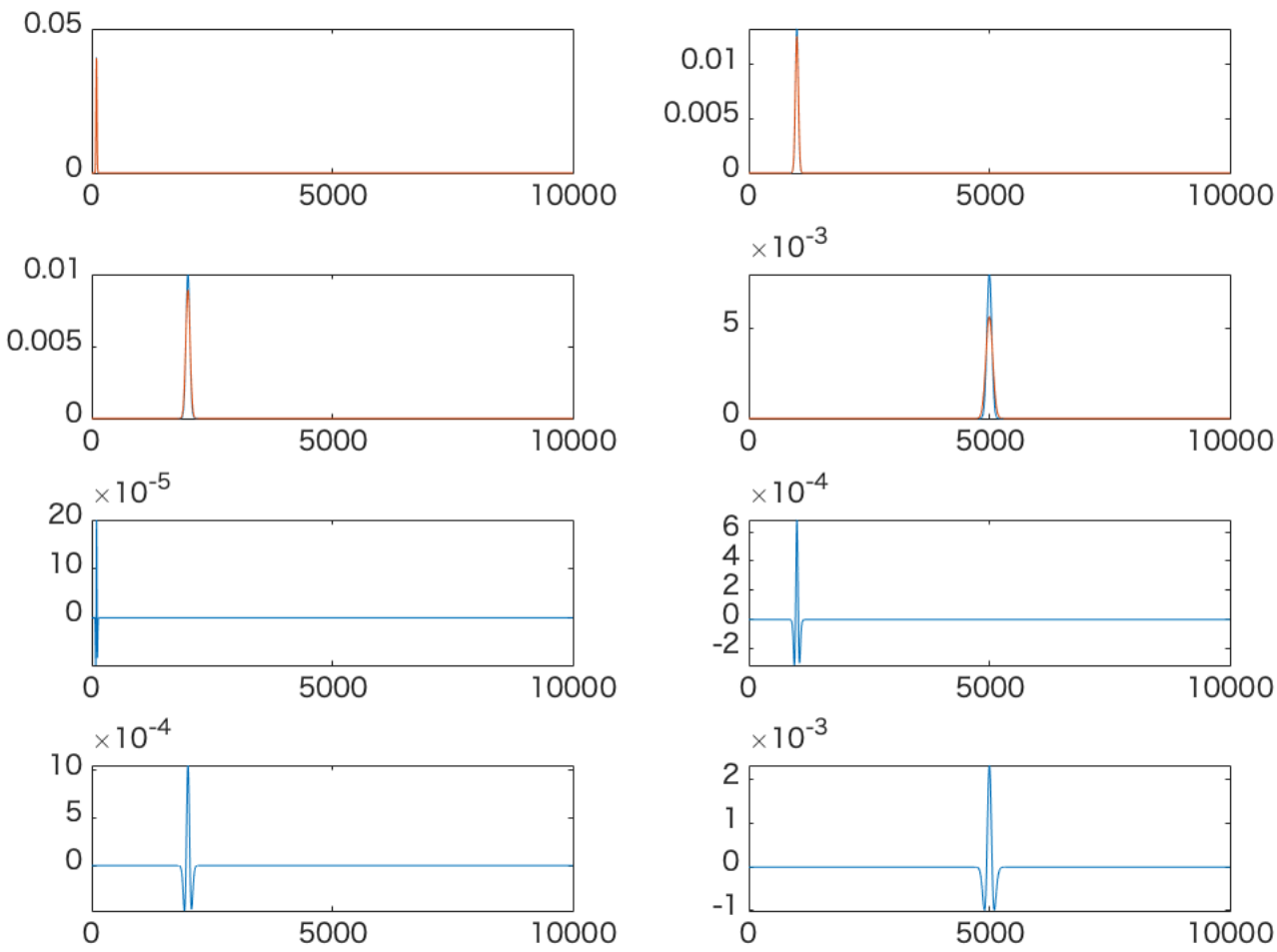
```
for i = 1.0:+1:10^4
   c3(i) =  a3(i) - b3(i);
end

subplot(4,2,7)
plot(c3);

for i = 1.0:+1:10^4
   c4(i) =  a4(i) - b4(i);
end

subplot(4,2,8)
plot(c4);

m1 = mean(c1)
m2 = mean(c2)
m3 = mean(c3)
m4 = mean(c4)
```

Output...

```
m1 =

  -5.4886e-21


m2 =

  -2.4899e-21


m3 =

  -9.0189e-21


m4 =

   5.2118e-21
```

**Opinion…**

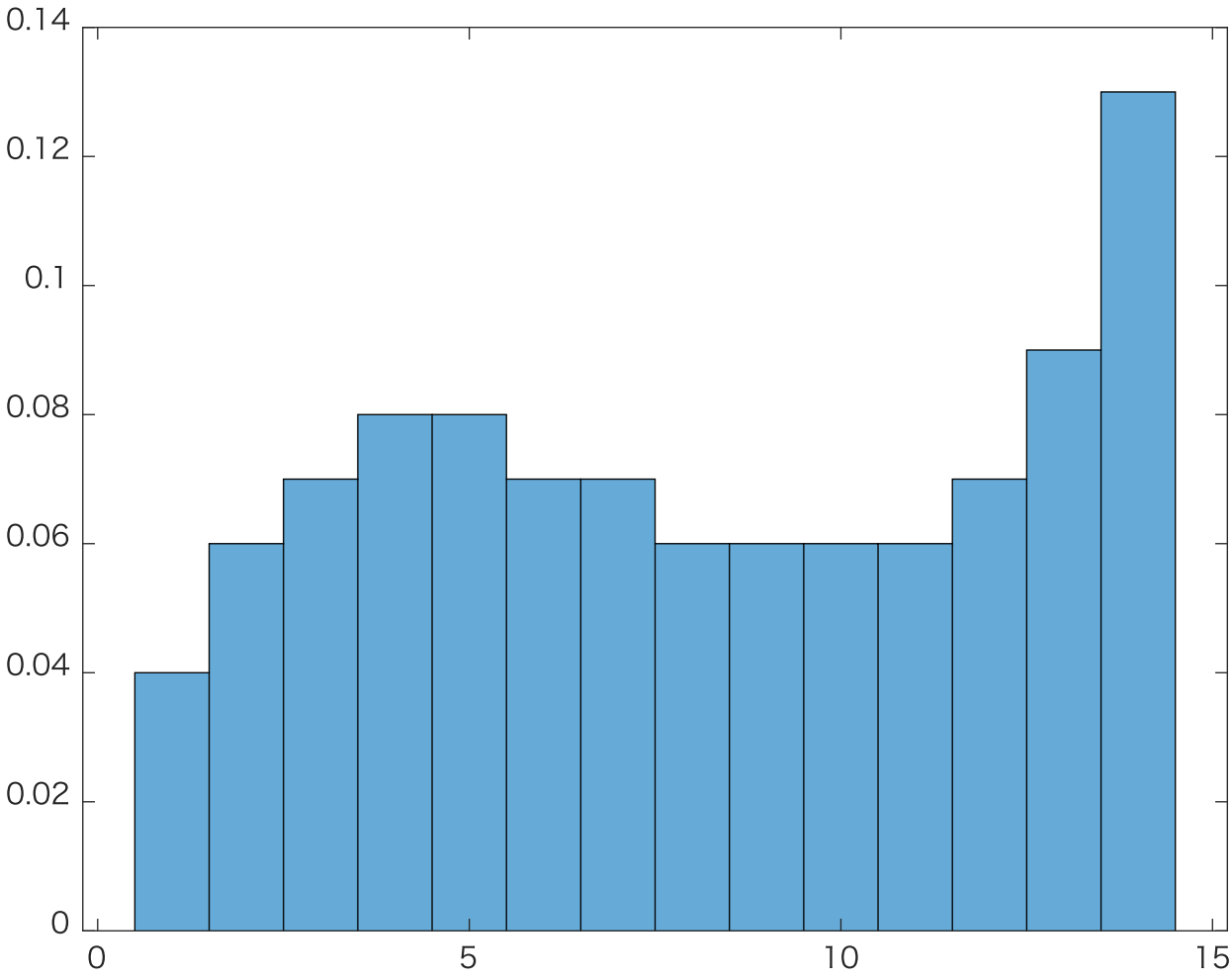
**As number gets closer to 0 or 1,**
**gap will be smaller**


0.05
0
0
5000
10000
0.01
0.005
0
0
5000
10000
0.01
0.005
0
0
5000
10000
×10-3
5
0
0
5000
10000
×10-5
20
10
0
0
5000
10000
×10-4
6
4
2
0
-2
0
5000
10000
×10-4
10
5
0
0
5000
10000
×10-3
2
1
0
-1
0
5000
10000

2.a

Matlab Code...

```
d1 = [1 1 1 1];
d2 = [2 2 2 2 2 2];
d3 = [3 3 3 3 3 3 3];
d4 = [4 4 4 4 4 4 4 4];
d5 = [5 5 5 5 5 5 5 5];
d6 = [6 6 6 6 6 6 6];
d7 = [7 7 7 7 7 7 7];
d8 = [8 8 8 8 8 8];
d9 = [9 9 9 9 9 9];
d10 = [10 10 10 10 10 10];
d11 = [11 11 11 11 11 11];
d12 = [12 12 12 12 12 12 12];
d13 = [13 13 13 13 13 13 13 13 13];
d14 = [14 14 14 14 14 14 14 14 14 14 14 14 14 14];
d = [d1 d2 d3 d4 d5 d6 d7 d8 d9 d10  d11 d12 d13 d14];
histogram(d,'Normalization','probability');
```


0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
5
10
15

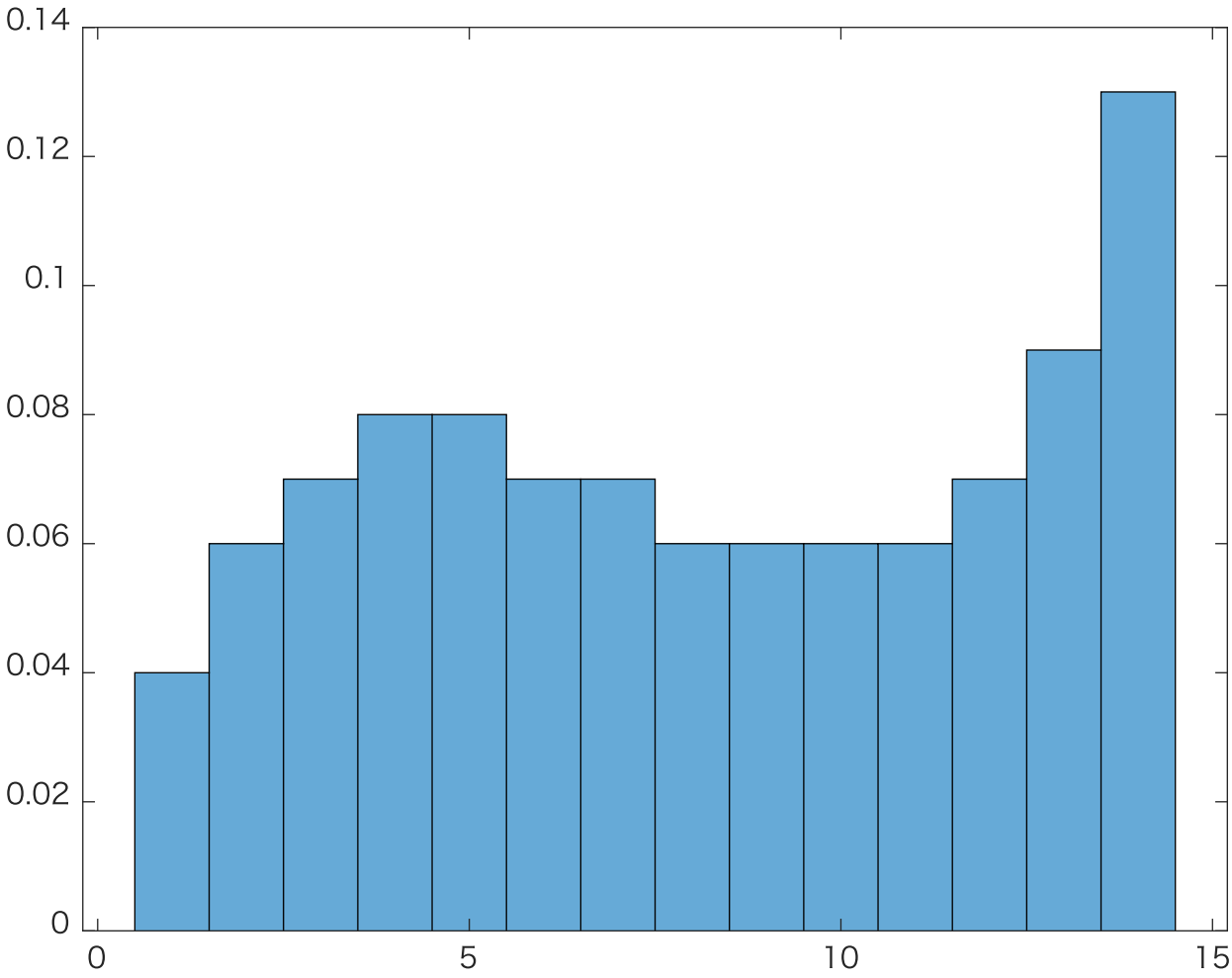
2.b

Matlab Code...

```
d1 = 0.04;
d2 = 0.06;
d3 = 0.07;
d4 = 0.08;
d5 = 0.08;
d6 = 0.07;
d7 = 0.07;
d8 = 0.06;
d9 = 0.06;
d10 = 0.06;
d11 = 0.06;
d12 = 0.07;
d13 = 0.09;
d14 = 0.13;

prompt_a = 'How Many Samples ?';
x = input(prompt_a);
x_arr = zeros(x,1);

for a1 = 1:+1:d1*x
x_arr(a1)=1;
end

for a2 = a1+1:+1:a1+d2*x
x_arr(a2)=2;
end
for a3 = a2+1:+1:a2+d3*x
x_arr(a3)=3;
end
for a4 = a3+1:+1:a3+d4*x
x_arr(a4)=4;
end
for a5 = a4+1:+1:a4+d5*x
x_arr(a5)=5;
end
for a6 = a5+1:+1:a5+d6*x
x_arr(a6)=6;
end
for a7 = a6+1:+1:a6+d7*x
x_arr(a7)=7;
end
```

```
for a8 = a7+1:+1:a7+d8*x
x_arr(a8)=8;
end
for a9 = a8+1:+1:a8+d9*x
x_arr(a9)=9;
end
for a10 = a9+1:+1:a9+d10*x
x_arr(a10)=10;
end
for a11 = a10+1:+1:a10+d11*x
x_arr(a11)=11;
end
for a12 = a11+1:+1:a11+d12*x
x_arr(a12)=12;
end
for a13 = a12+1:+1:a12+d13*x
x_arr(a13)=13;
end
for a14 = a13+1:+1:a13+d14*x
x_arr(a14)=14;
end

histogram(x_arr,'Normalization','probability');
```

Opinion...
They look a like because I've applied same possibility to each element


0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
5
10
15