F14076083 魏湧致

5.14

(a) b(4;4,0.9) = $\binom{4}{4}0.9^4 0.1^0$ = 0.6561

(b) P(X≥4) = $\sum_{x=4}^{x=7} b(x;7,0.9)$ = $\sum_{x=0}^{x=7} b(x;7,0.9)$ - $\sum_{x=0}^{x=3} b(x;7,0.9)$

= 1-0.0027 = 0.9973

(c) Chicago Bulls 每一場贏的機率是 0.9

5.26

(a) b(6;8,0.6) = $\binom{8}{6}0.6^6 0.4^2$ = $28\times0.046656\times0.16 = 0.20901888$

(b) b(6;8,0.6) =$\sum_{x=0}^{x=6} b(x;8,0.6)$ - $\sum_{x=0}^{x=5} b(x;8,0.6)$ = 0.8936 -0.6846 = 0.209

5.50

(a) b*(7;3,0.5) = $\binom{6}{2}0.5^3 0.5^4$ = $15\times0.0078125 = 0.1171875$

(b) b*(4;1,0.5) = $0.5^1 0.5^3$ = 0.0625

5.80

(a) P(X≤4) = $\sum_{x=0}^{x=4} p(x;2.7)$ = $\sum_{x=0}^{x=4} \frac{e^{-2.7}2.7^x}{x!}$ = 0.8629

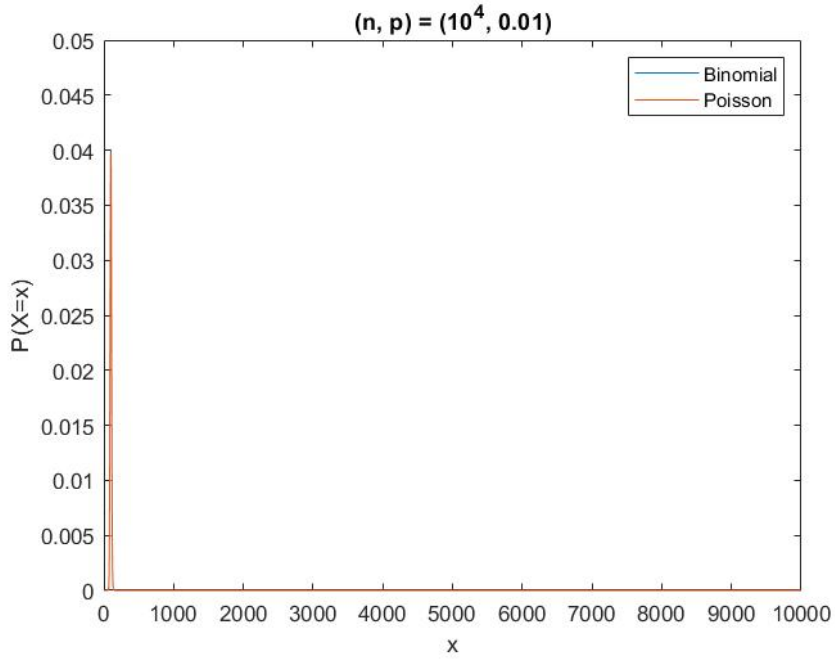
(b) P(X≤1) = $\sum_{x=0}^{x=1} p(x;2.7)$ = $\sum_{x=0}^{x=1} \frac{e^{-2.7}2.7^x}{x!}$ = 0.2487

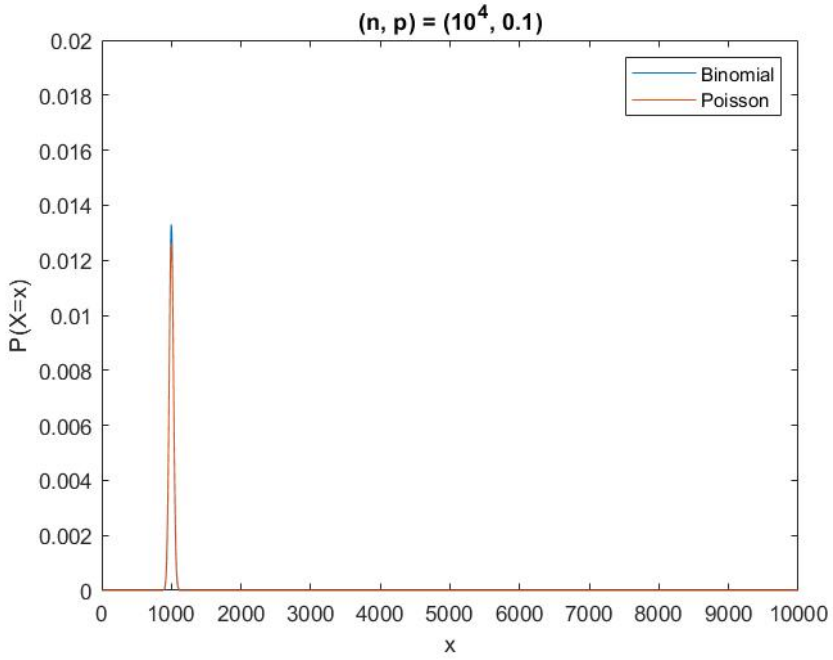
(c) 2.7×5 = 13.5 P(X>10) = 1 - P(X≤10) = 1 - $\sum_{x=0}^{x=10} \frac{e^{-13.5}13.5^x}{x!}$

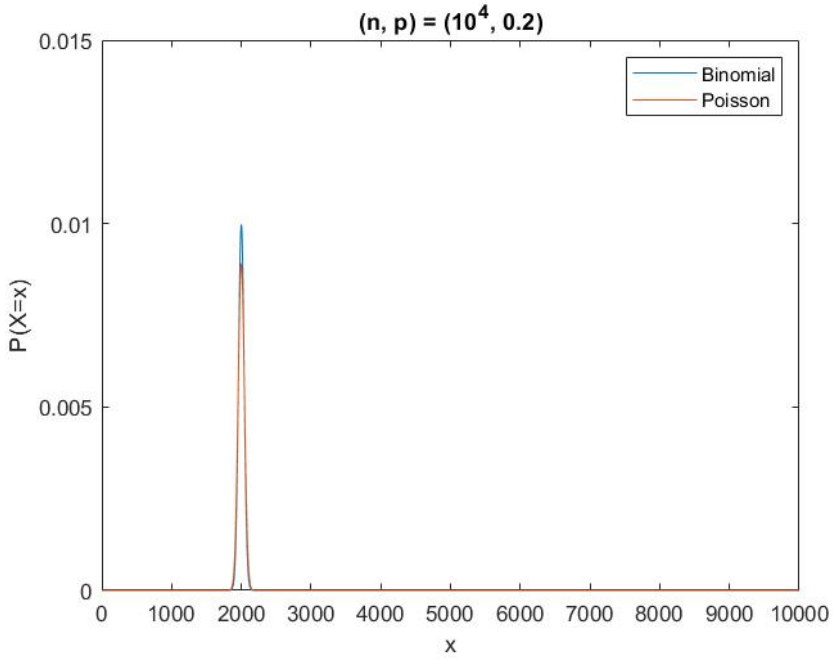
= 1- 0.2112 = 0.7888

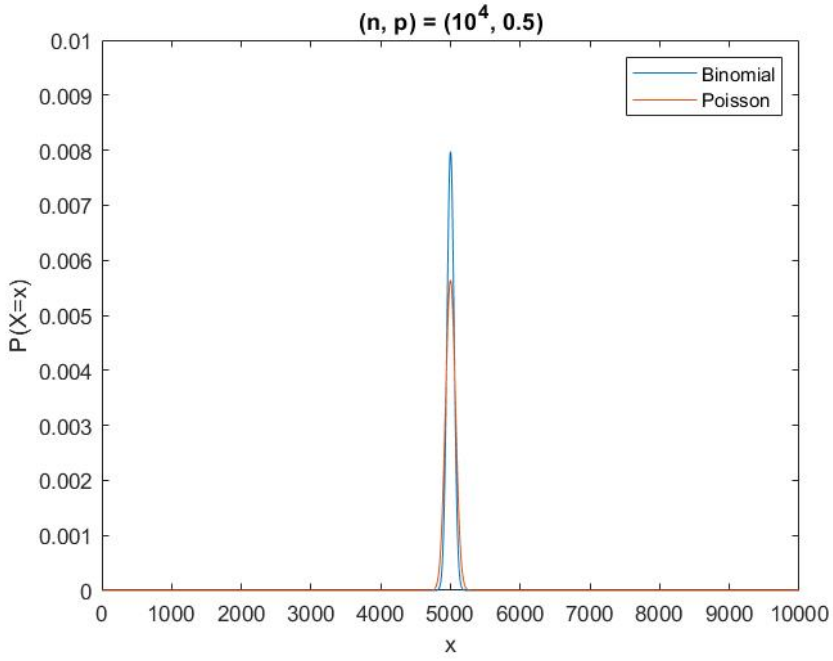
Matlab

1.(e)下面四張圖分別為題目的四種情況，n 都是 10 的 4 次方，p 分別為 0.01, 0.1, 0.2, 0.5，可以看出 p 越小 Binomial 和 Poisson 的曲線就越接近，與課本定理的結論相同。

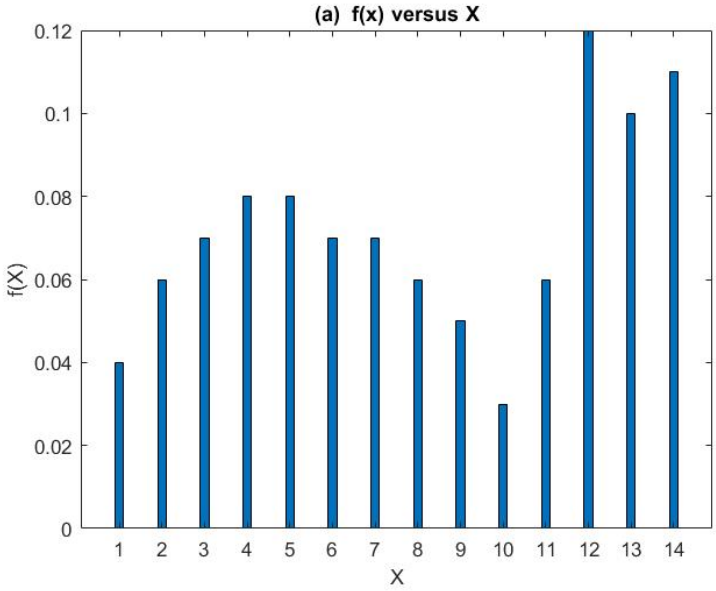





(n, p) = (10^4, 0.2)
Binomial
Poisson
P(X=x)
x
0.015
0.01
0.005
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000


(n, p) = (10^4, 0.5)
Binomial
Poisson
P(X=x)
x
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000

2.(a)



2.(b)因為是透過 X 的機率分布來生成 10^4 個 sample，數量很大所以比較偏差比較看不出來，所以與(a)的圖非常相似，