Statistic Coursework 1

BY 19B4009, LI WEE ANN

Step 1

Date	Number of Covid patients per day	Number of Test conducted per day
01-Sep-21	146	3059
02-Sep-21	102	3857
03-Sep-21	133	4603
04-Sep-21	126	2140
05-Sep-21	110	3803
06-Sep-21	135	2472
07-Sep-21	103	3876
08-Sep-21	116	4052
09-Sep-21	148	4491
10-Sep-21	63	4461
11-Sep-21	141	2597
12-Sep-21	128	3606
13-Sep-21	160	3019
14-Sep-21	108	4083
15-Sep-21	135	4525
16-Sep-21	109	4566
17-Sep-21	139	4925
18-Sep-21	143	4991
19-Sep-21	90	3938
20-Sep-21	214	3724
21-Sep-21	124	5031
22-Sep-21	201	5195
23-Sep-21	111	4141
24-Sep-21	263	4609
25-Sep-21	326	4487
26-Sep-21	254	5508
27-Sep-21	160	4322
28-Sep-21	113	4137
29-Sep-21	137	5791
30-Sep-21	166	5575
01-Oct-21	210	5271
02-Oct-21	242	3857
03-Oct-21	148	4433
04-Oct-21	188	4687
05-Oct-21	140	5062

Step 2

Number of days = 35

Average number of COVID-19 patients per day = 152.342857

Average number of test conducted per day = 4254.114429

Probability of success = 0.03581071

Let X be the number of positive COVID-19 case

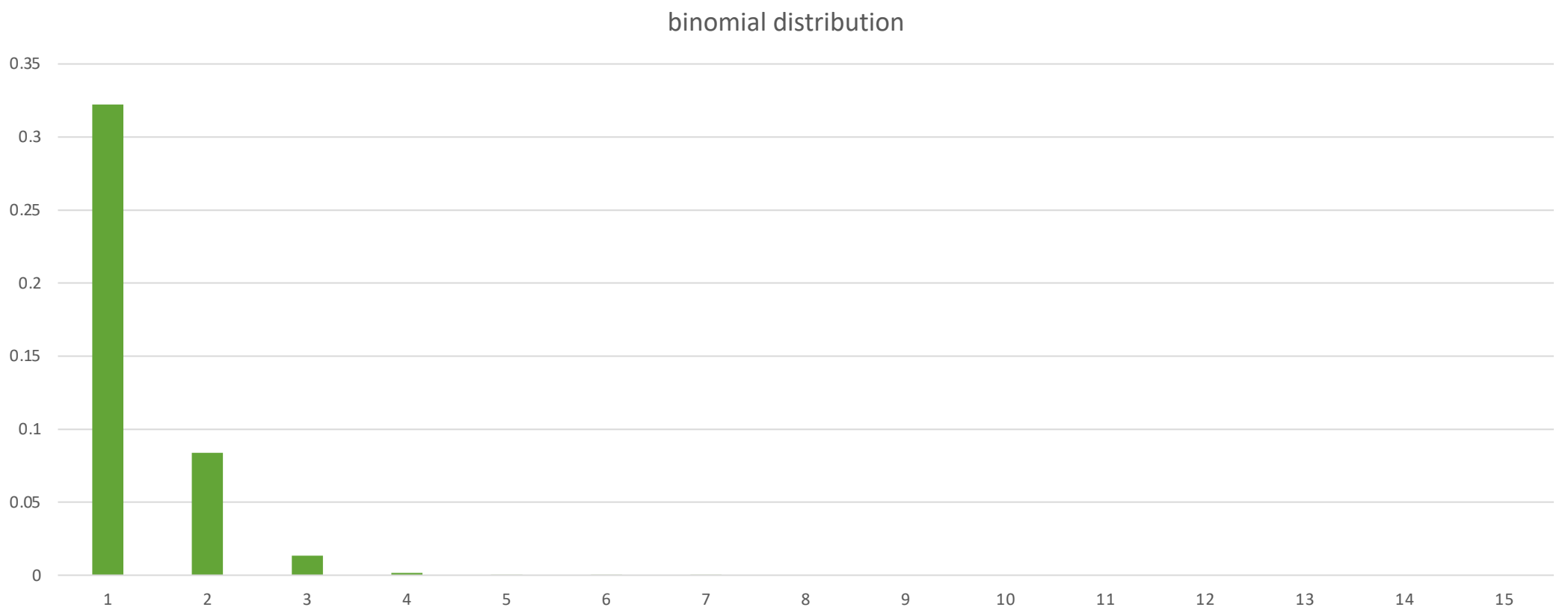
n1 = 15, n2 = 300;

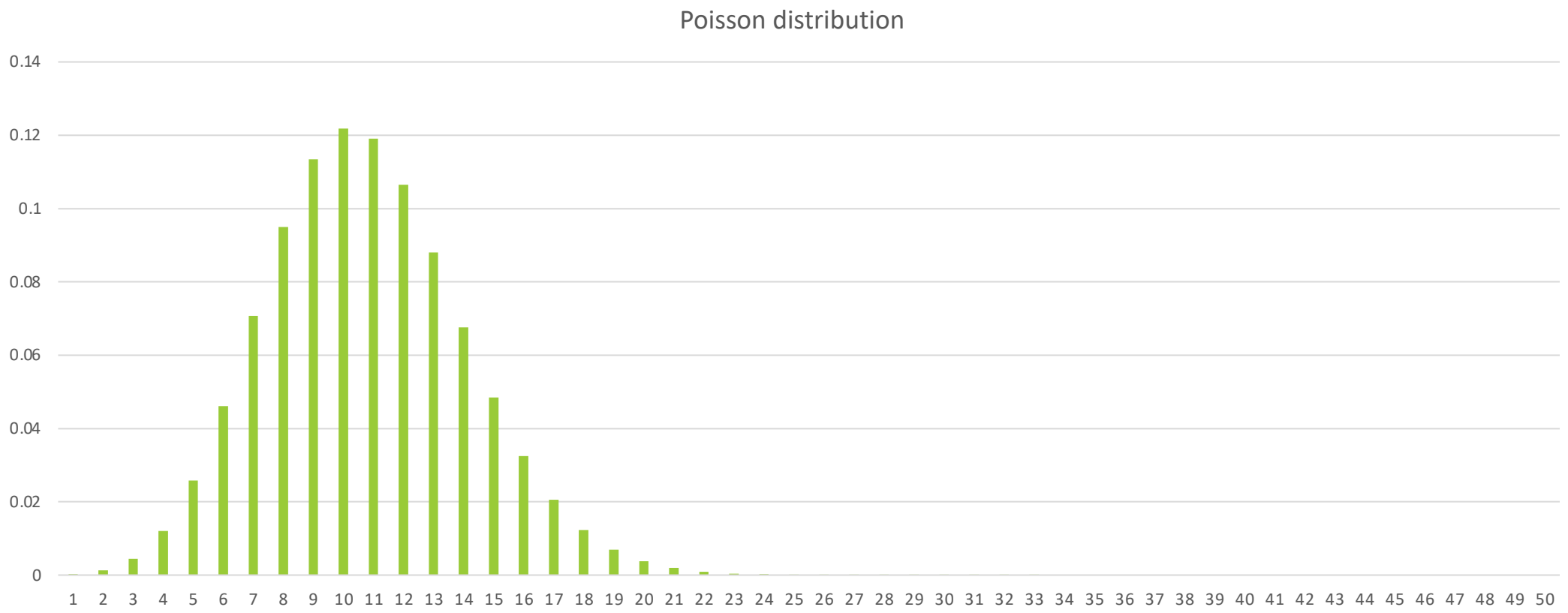
Using Binomial Distribution for n1

X ~ Bin(15, 0.03581071)

Using Poisson Distribution for n2

X ~Poisson(10.743)


binomial distribution
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15


Poisson distribution
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

Step 3

When n = 15:

$np = (15) \times (0.03581071) = 0.537$

$n(1-p) = (15) \times (1- 0.03581071) = 14.462$

$np < 10$ hence normal approximation is not possible

Step 3 continue

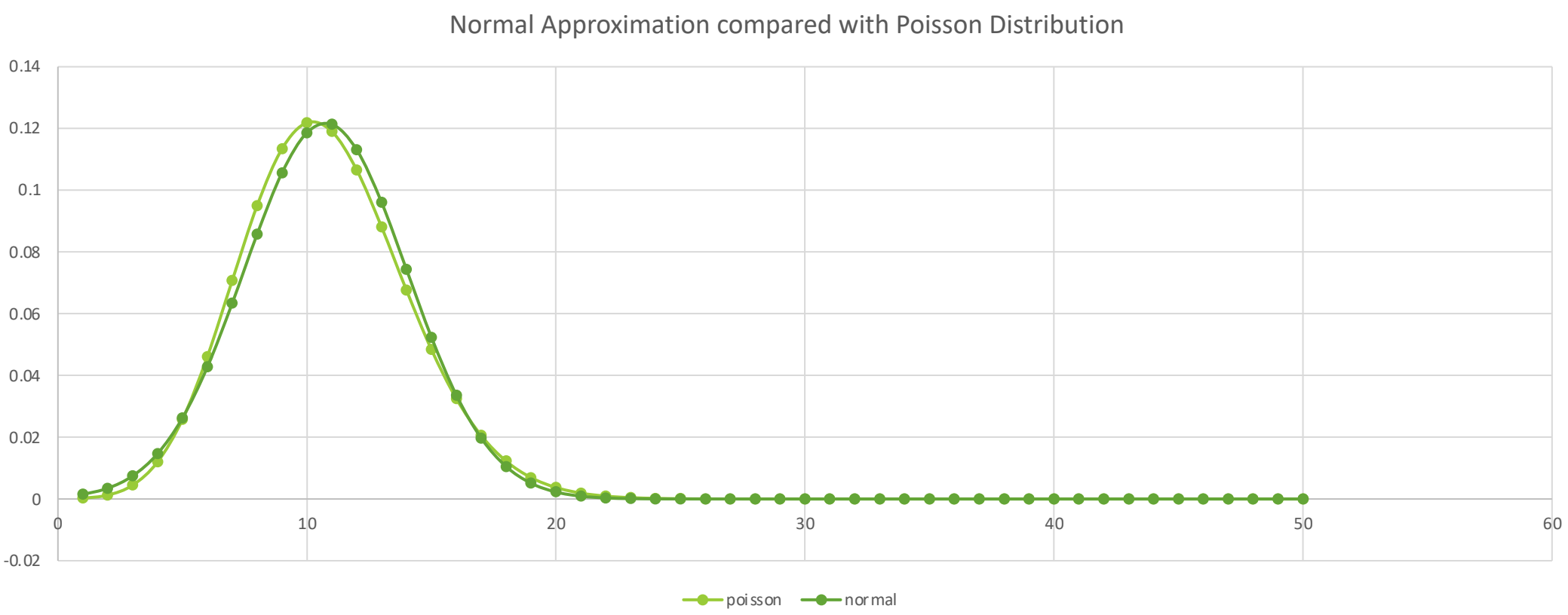
When n = 300

np = (300) x (0.03581071) = 10.74

np > 10 hence normal approximation is possible

Thus

X ~ N(10.74, 1074)


Normal Approximation compared with Poisson Distribution
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
-0.02
0
10
20
30
40
50
60
poisson
normal

Step 4

Standard deviation = 3.278

Square root of n = 17.32

Z95% = 1.96

Confidence interval = (1.96) * (3.278/17.32) = 0.371

Lower interval = 10.372

Upper interval = 11.114