Physics 341 - Lecture 11

- Share screen ✓
- Assignment 2
- β - probability

Question 8

$$N = 200$$

$$p = 0.10$$

"approximate"

Poisson   Normal

$p <$ "small ish" $p \sim 0.5$
         ? $N \rightarrow$ large

$$\lambda = N \cdot p$$

a)   " X is at most 30 "

              $0 \ldots \ldots 30$

Binomial $\rightarrow$ Discrete

         $0, 1, 2, \ldots \ldots$

         $cdf(30)$
         $[0, \ldots \ldots , 30]$

Poisson / Normal → continuous.
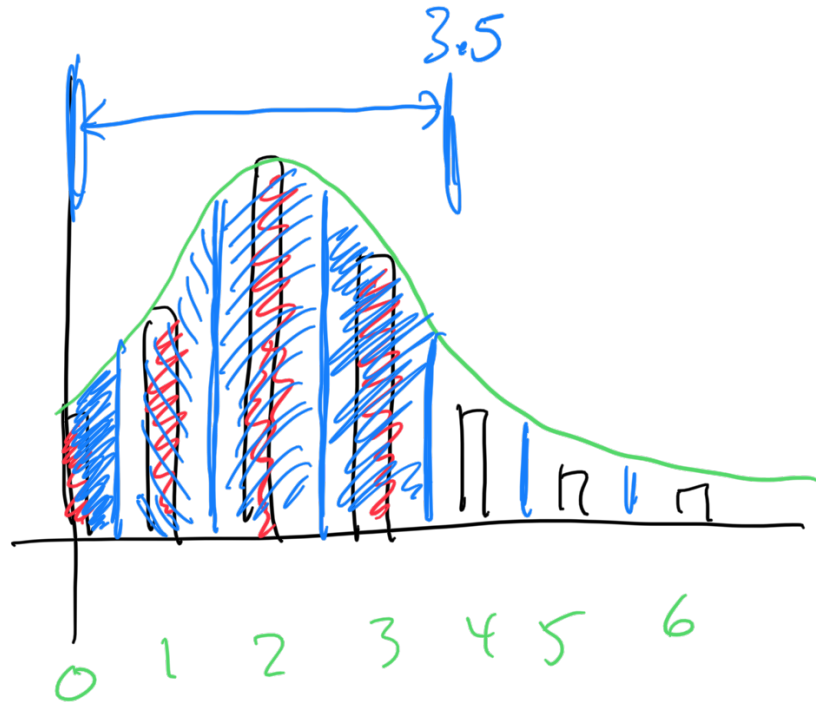
cdf (3)

Binomial
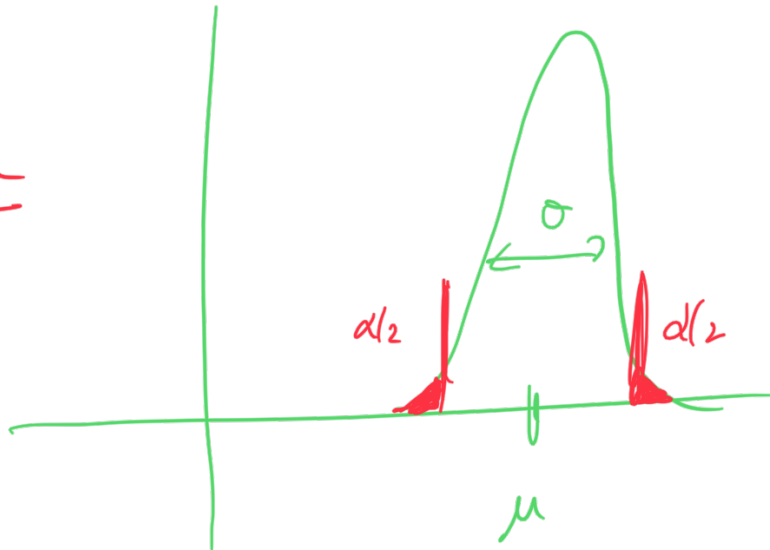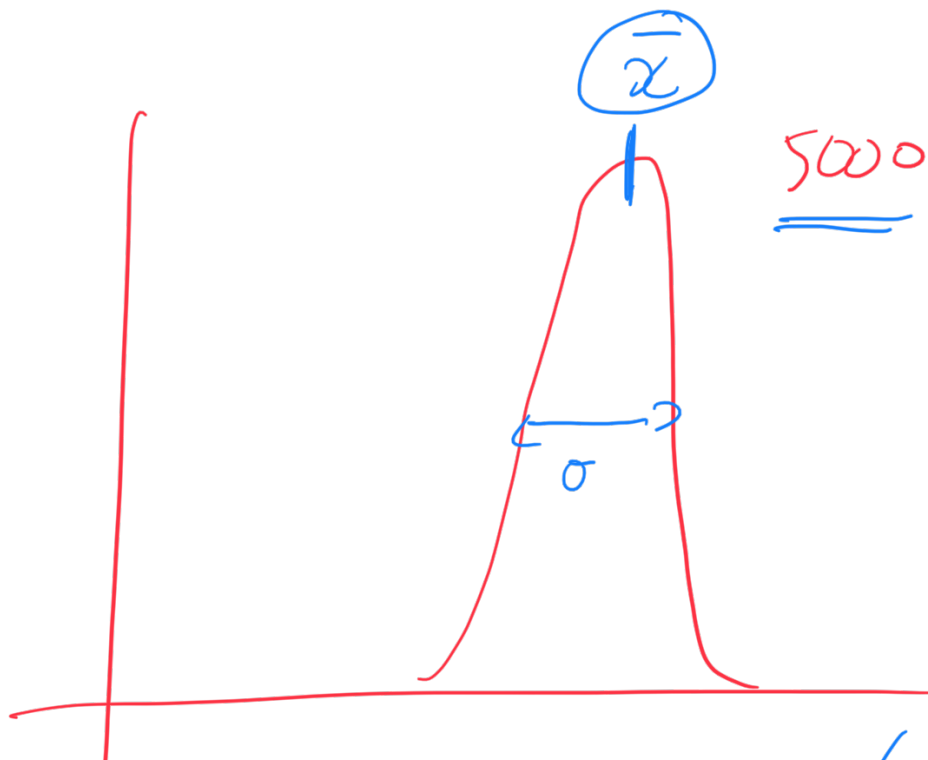cdf (30)

Poisson
cdf (30.5)

B - probability
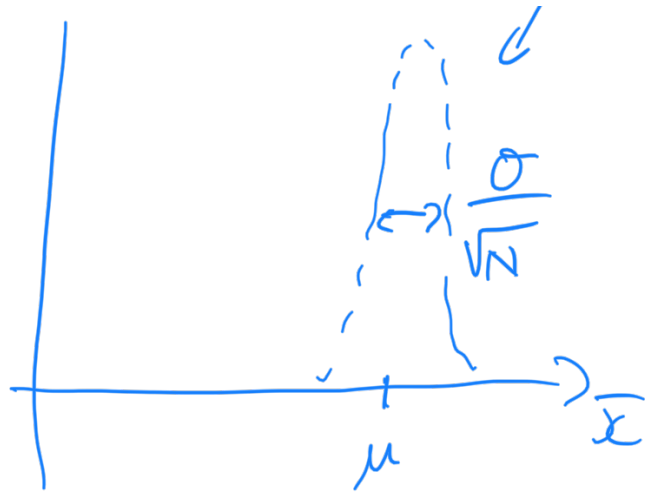
mean uncertainty $(z_{1-\alpha...})$

No problem

Unlucky

$\alpha = 0.05 \rightarrow 95\% \ CL$

$\bar{x}$

5000

$\frac{\sigma}{\sqrt{N}}$

μ

x

LIFE σ/σ_N

theory

$\frac{\sigma}{\sqrt{N}}$

$\mu - 10$ μ

$\bar{x}$
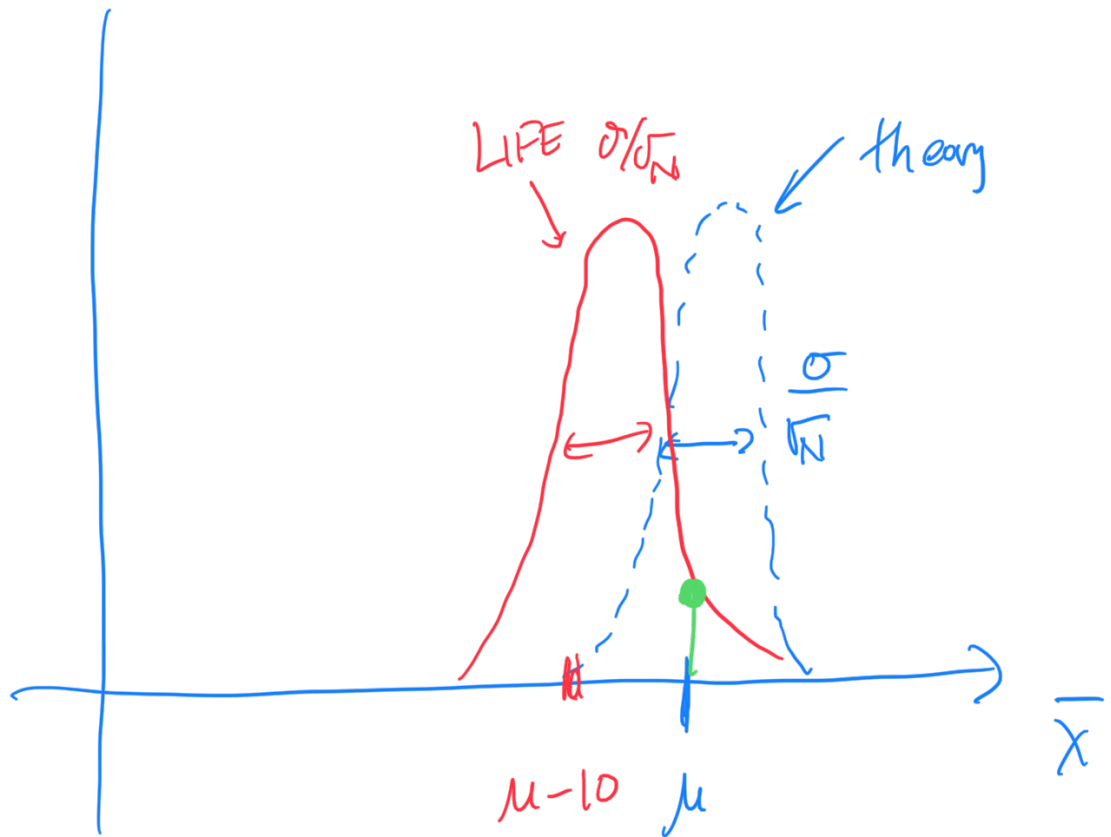
truth → $\mu = 90$

possible → $\bar{x} = 100$

$$\frac{\sigma}{\sqrt{N}} \rightarrow SEM$$

$= .05$
α

$Z_{critical}$
$= -1.64$

?

Z

α

β

not a problem

100

$\bar{x}_{lower}$

$$Z \equiv \frac{x - \mu}{\sigma/\sqrt{N}} = \frac{x - \mu}{SEM}$$

$$\overline{x} = \mu + Z \cdot SEM$$

$$\beta \left(\mu_{true\,n} \right)$$

$Z_{critical}$

β

α

O

P_{va} ... nothing not on

exam → ... HW

β

Nature is kind

BAD

we: no problem
$n = 100$

GOOD

X   ✓   ✓

99.7   99.8   99.9 μ

truth

lower
β →

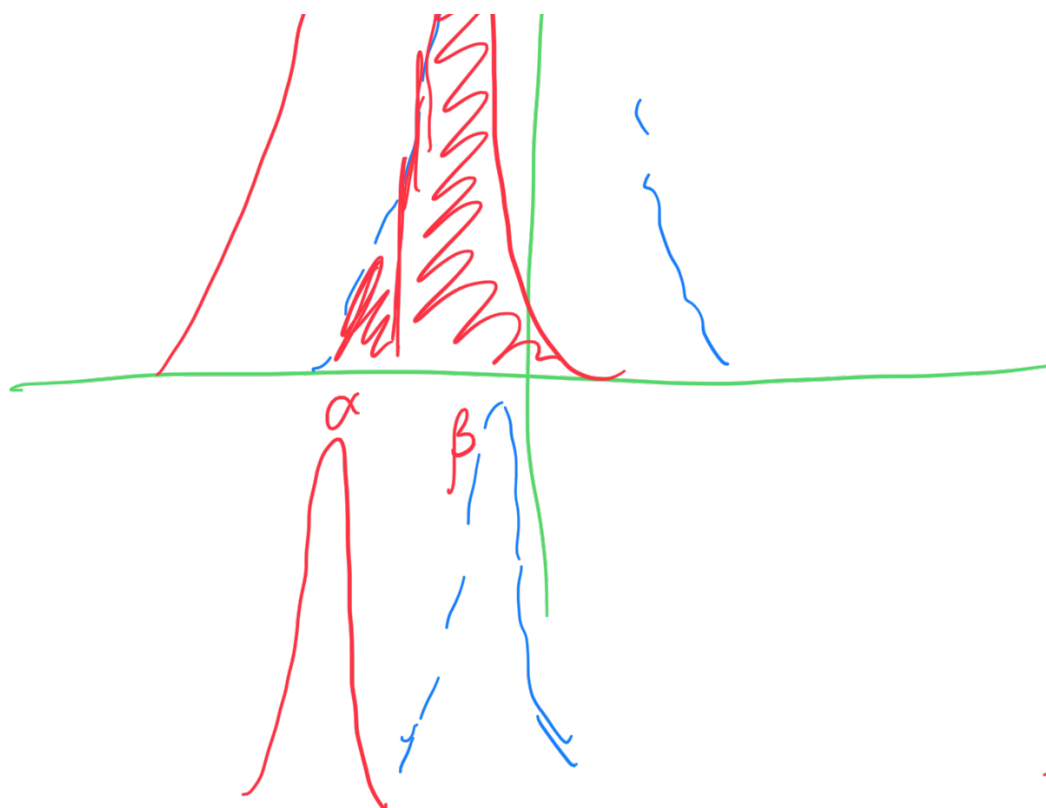increasing N

$\dfrac{\sigma}{\sqrt{N}}$

α β
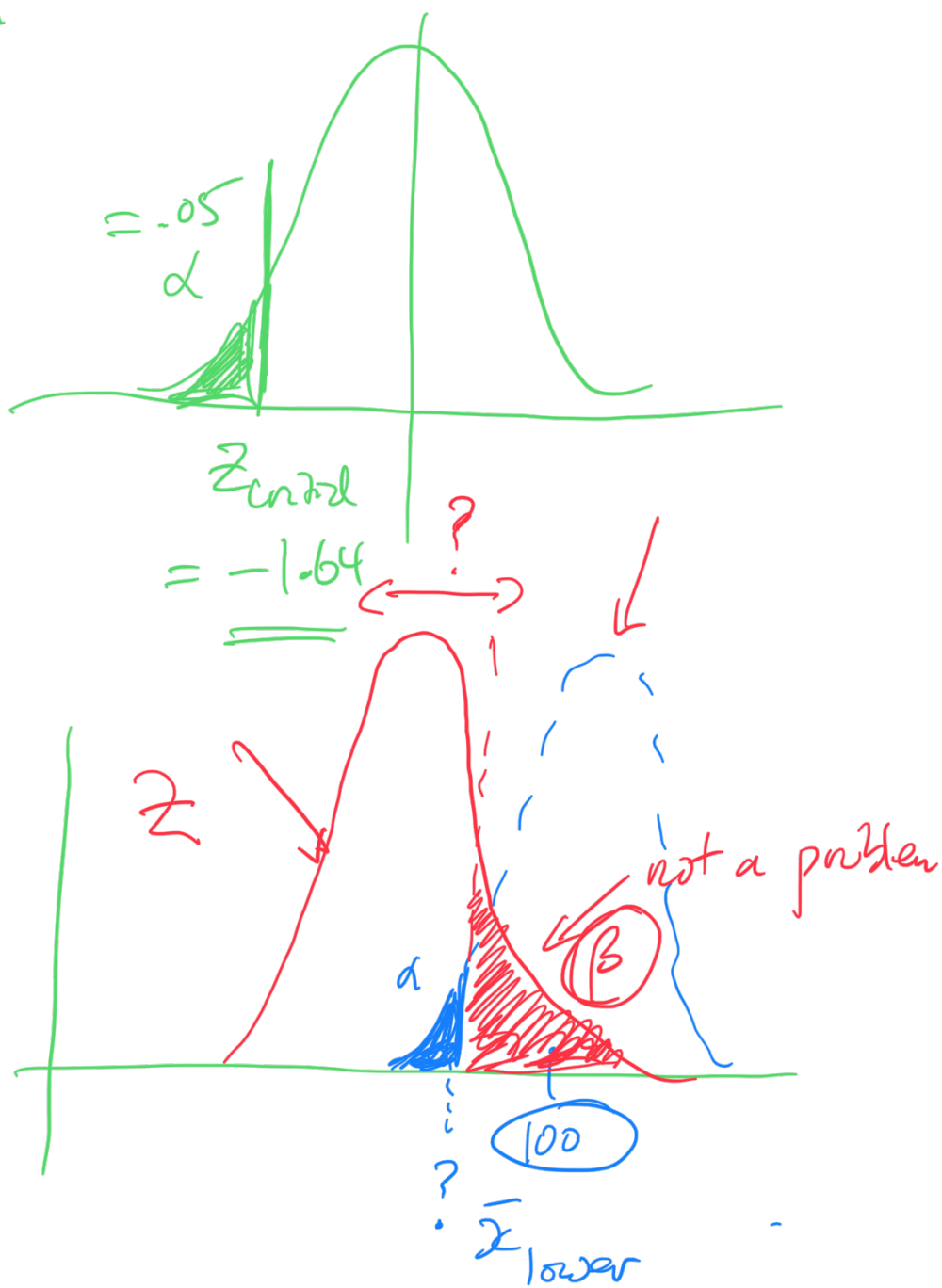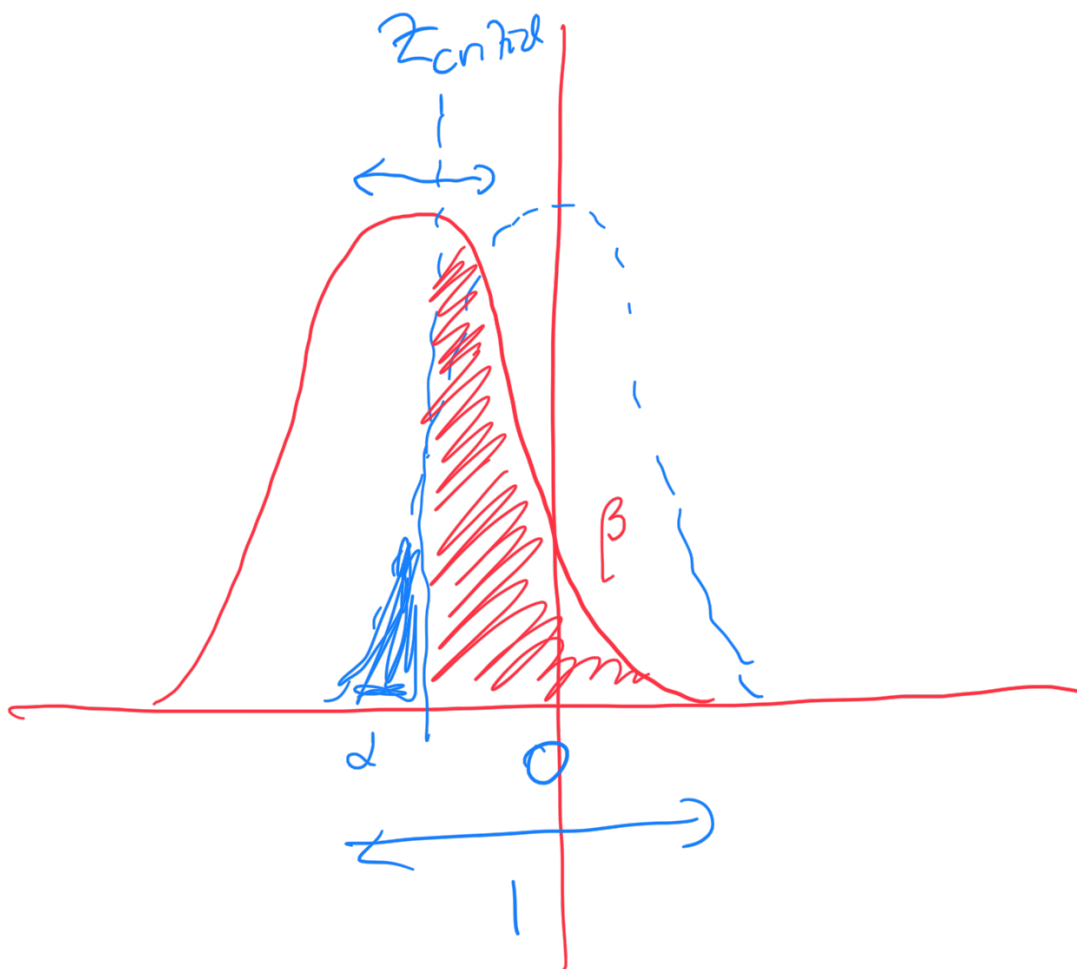
Today.

F

① WebAssign

② Just like HW

③ 9:00 am → midnight