HW Q's

#1) find sample distribution

(35, 35) ~ $\bar{x} = 35$

(35, 40) ~ 37.5

(40, 40) $\bar{x} = 40$

(40, 65) = 52.5

(65, 40)

(65, 65) = 65

(65, 35) = 50

(35, 65)

35	37.5	40	50	52.5	65

↑

2 P(35) · P(40)

2(.2)(.5)

= .20

b) s^2 add $\frac{\text{dev's}^2}{n-1}$

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3) sample size = ?

$X \sim$ > $= \mu_X = 5$

$\sigma_X = 4$

T = ?

~~total time?~~

~~sum~~ all x_i's

$\mu_{\bar{x}} = \mu$

$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$

as long as sampling

Sample is normal if pop is normal or if big enough.

dist. is ... equal to population mean + variation

$\bar{x} \sim N\left(\mu, \frac{\sigma^2}{n}\right)$

$\mu_{Total} = n \cdot \mu_x$ ↳ mean of population

n = sample size

$\sigma_T = \sigma\sqrt{n}$

If n = large, then $\bar{x}$ + T have normal distributions

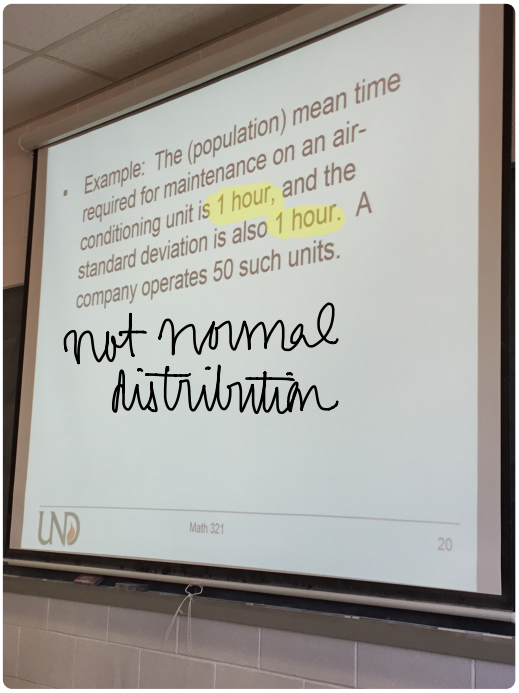
EXAMPLE

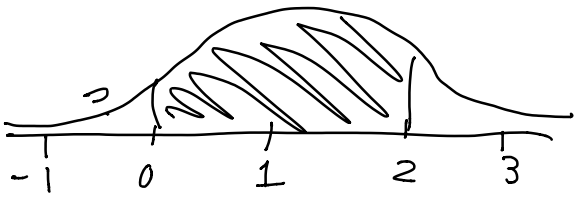
find prob. of maintenance on one unit > 2 hours?

X = repair time for randomly selected AC unit

$\mu_x = 1$ hour

$\sigma_x = 1$ hour



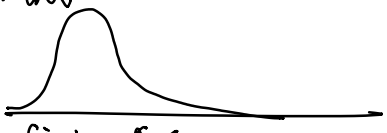


↳ mean + standard distr.

Standard dev spread ($3\times\sigma$) does not fit under bell curve

* not normal *

actually looks like:



time it takes to fix AC

$n = 50$

$\mu_x = 1$ hour

$\sigma_x = 1$ hour

need to convert hour to mins or 75 to 1.25

$P(\bar{x} > 75 \text{ mins})$

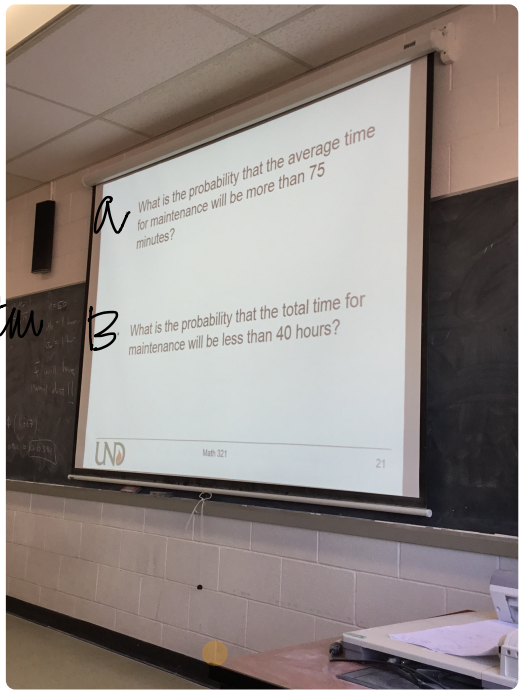
$\bar{x}$ has normal distribution

$= 1 - P(\bar{x} < 1.25 \text{ hours})$

$= 1 - P\left(z < \frac{1.25 - 1}{1/\sqrt{50}}\right)$

$= 1 - \Phi(1.767)$

$1 - 0.9616 = 0.0394$



average time is normally distributed

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b) total time < 40 hours?

hours } T normal distribution

$\mu_T = \mu_x n = 1 * 50 = 50$

$\sigma_T = \sigma_x \sqrt{n} = 1 * \sqrt{50} = \sqrt{50}$

$P(T < 40 \text{ hours})$

$P\left(z < \frac{40 - \mu_T}{\sigma_T}\right)$

$P\left(z < \frac{-10}{\sqrt{50}}\right)$

$\Phi -1.414 = \boxed{.9207}$