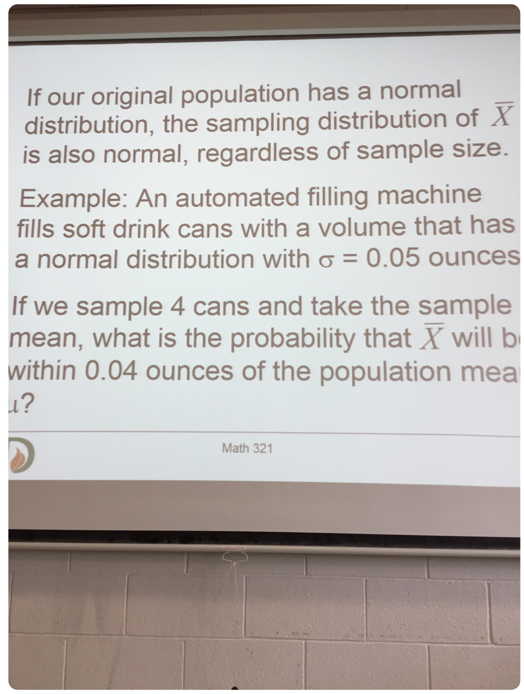
Softdrink: $X \sim N(\mu_x, (0.05)^2)$

$\bar{X} \sim N\left(\mu_x, \left(\frac{0.05}{\sqrt{4}}\right)^2\right)$

$\sigma_{\bar{x}} = \frac{0.05}{2}$

$= 0.025$

mean of sample is same as normal



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

* always

$P(\mu_{\bar{x}}\ 0.04 \le \bar{X} \le \mu_x + 0.04)$

$= P(\mu_{\bar{x}} - 0.04 \le \bar{X} \le \mu_{\bar{x}} + 0.04)$

cumulative

$P(\bar{X} \le \mu_{\bar{x}} + 0.04) - P(\bar{X} \le \mu_{\bar{x}} - 0.04)$

convert to z (standard)

$\Phi z = P(z \le z)$

$P\left(z \le \frac{\mu_{\bar{x}} + 0.04 - \mu_{\bar{x}}}{0.025}\right) - P\left(z \le \frac{\mu_{\bar{x}} - 0.04 - \mu_{\bar{x}}}{0.025}\right)$

$P\left(z \le \frac{0.04}{0.025}\right) - P\left(z \le \frac{-0.04}{0.025}\right)$

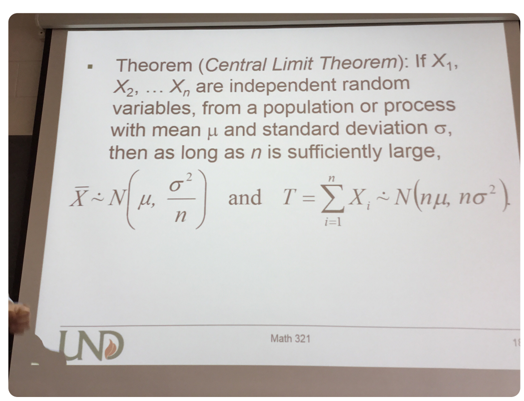
$\Phi(1.6) - \Phi(-1.6) = 0.9452 - .0548 = \boxed{0.8904}$

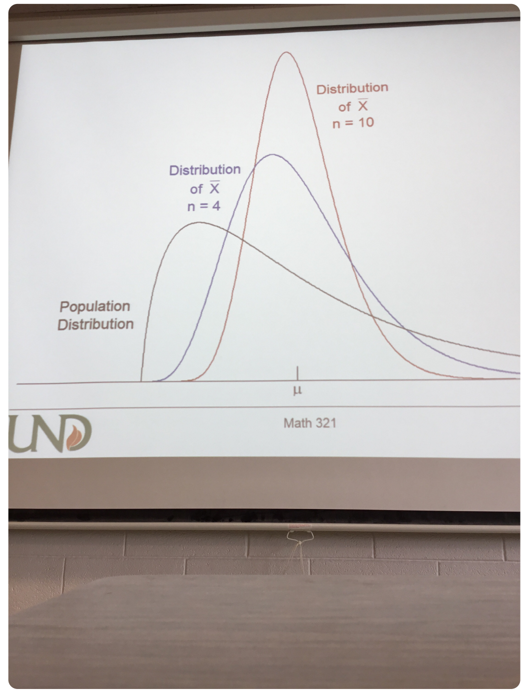
lookup in table

* we knew sampling dist. would be normal

<u>Central Limit Theorem</u>

As long as sample size is big enough, can assume normal distribution





Review

#13, Latest HW

looking for binomial – exactly, at most, at least

a) $P(X \leq 30)$ AT MOST

approx. discrete by continuous

$$\phi\left(\frac{30.5-\mu}{\sigma}\right)$$

$$=\phi\left(\frac{30.5-24}{4.596}\right)$$

$$\approx \boxed{1.414273281}$$

normalized

$P(X \leq 1.41\ldots)$

$np \geq 10$

$n(1-p) \geq 10$

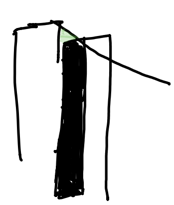
$\mu = np = 24$

$\sigma = \sqrt{np(1-p)}$

$= \sqrt{24(.88)}$

$= 4.59$

add .5 because



c) $P(X \leq 25) - P(X \leq 14)$

$P(15 \leq X \leq 25)$

$$\approx \phi\left(\frac{25.5-24}{\sigma}\right) - \phi\left(\frac{14.5-24}{\sigma}\right)$$

... $\boxed{.6086}$

#35, ch. 3

Demand for magazines

x	1	2	3	4	5	6
$p(x)$	$1/15$	$2/15$	$3/15$	$4/15$	$3/15$	$2/15$
$^3R(x)$	\$4	\$8	\$12	\$12	\$12	\$12

← 3 revenue of 3

- He pays \$2 per magazine
- sells for \$4

How many should he buy? 3 or 4?

① buys 3 $= \$6$

$$E(R(x)) = 4 \cdot \frac{1}{15} + 8 \cdot \frac{2}{15} + 3 \cdot \frac{3}{15}$$
$$12 \cdot 4/15 + 12 \cdot 3/15 + 12 \cdot 2/15$$
$$\sim \$10.93$$
$$\therefore \text{profit} = 10.93 - 6 = \$4.93$$

... same for 4

profit = \$5.33