Statistic is True

$\mu = 79\%$ $\quad C = 7$

Sample: 5 people 85%

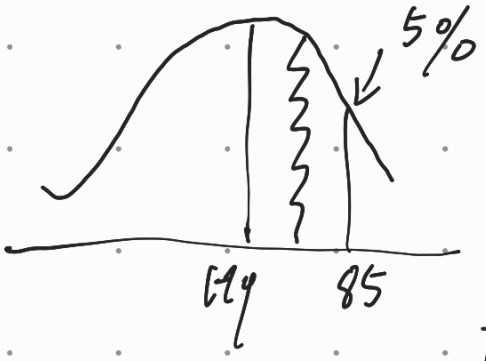
Hypothesis Testing

H_0 NULL. Hypothesis → state of knowledge currenty

$H_0: \mu = 79$

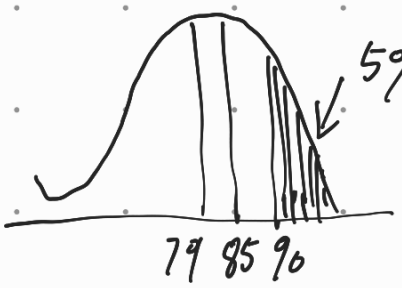
Sample that makes you question the H_0 I am an ah alternative

$H_a: \mu > 79$ $\quad H_a: \mu \neq 79$



Sample Statistic falls in significant Range

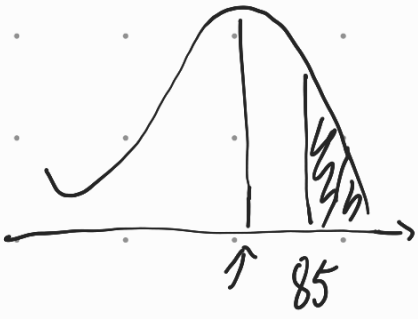
I reject H_0 for H_a w/ sig of $\alpha = .05$

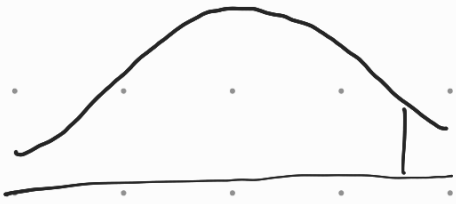


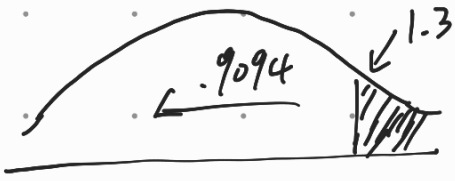
I fail to reject to w $\alpha = .05$

$$P(S \geq 85) \overset{z\text{score}}{\Rightarrow} P\left(Z < \frac{85-90}{\sqrt{100/3}}\right) = P\left(Z \leq \frac{5}{\sqrt{20}}\right)$$

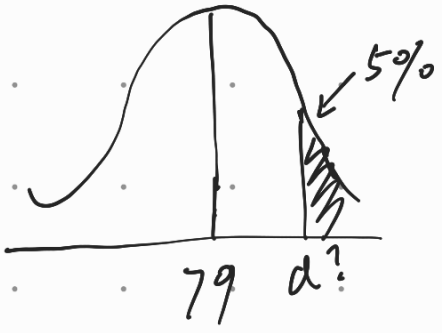
$$= P(Z \geq 1.34)$$





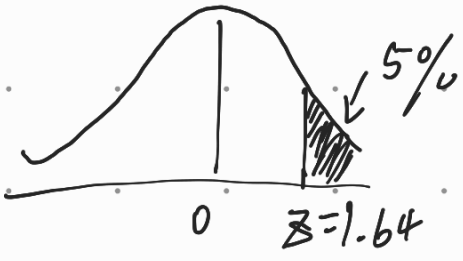


$1 - .9099 = .0901$



$P(X \geq a) = .05$

$$z_a = \frac{a - \bar{x}}{\sqrt{s^2/n}}$$



$$1.64 = \frac{a - 79}{\sqrt{100/5}}$$

$a = 86.33$

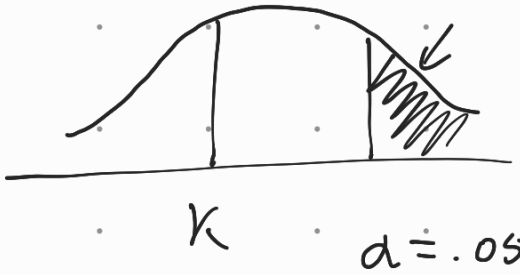
$H_0: \mu = 79$

$H_a: \mu > 79$

$\bar{x} = 85$

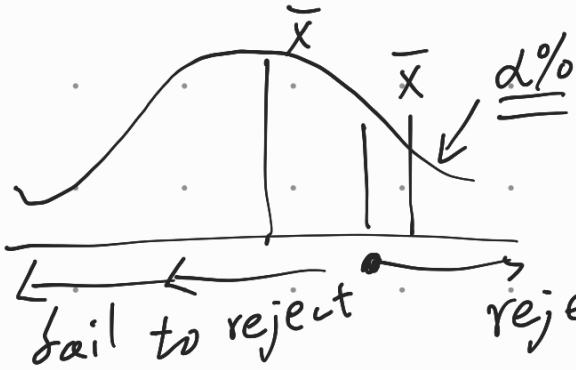
We fail to reject H_0 ($\mu = 79$) for the ($\mu > 79$) with $\alpha = .05$

Right tails test



$H_0 : \mu = k$

$H_a : \mu > k$



H_0 $\mu_x - \mu_y = 0$

H_a $x - e/y = 50$

$H_0 \sim \mu_x - \mu_y = 0$

H_a $\mu_x - \mu_y = 50$

Fail to reject

Fail to reject H_0 for H_a w/

$\alpha = .05$ be $\bar{X} \leq 0$ AND $p \sim q \perp e$

$P(\bar{x} \geq e)$ => How correct you are to not reject

reject

Reject H_0 for H_a w/ $\alpha = .05$

B.C. $l \geq \alpha$ AND. RVAnve $P(\bar{x} \geq e) \not\in$ How wrong you reject

X: Tuna y = Salmon

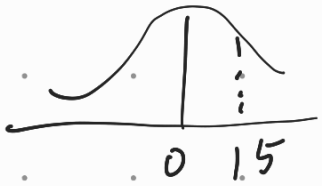
$\bar{x} = 90$ lbs $\bar{y} = 75$ lbs

$\bar{x} - \bar{y} = 15$

$H_0: \mu_x = \mu_y$

$H_0: \mu_x - \mu_y = 0$

$\alpha = .03$ $H_a: \mu_y - \mu_y > 0$

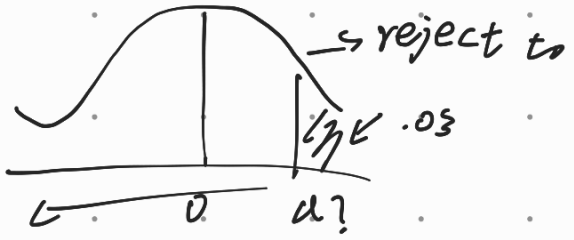


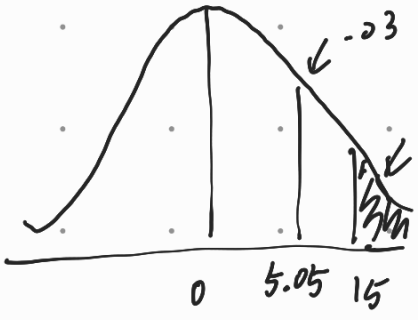
$s_x^2 = 100$

$s_y^2 = 100$

$n_y = 20$

$n_x = 20$





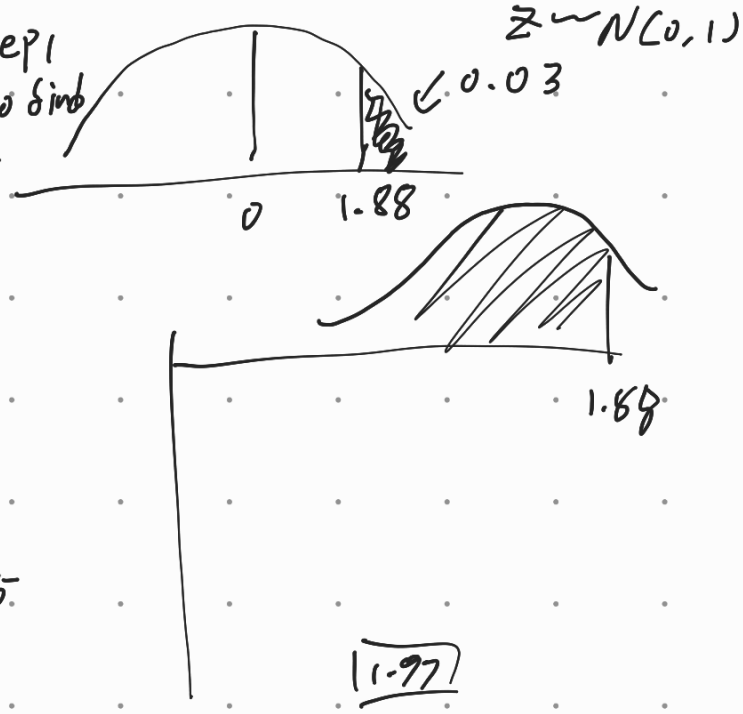
Fail to reject

Step

z to find

Step1 z to find a

$Z \sim N(0,1)$



reject H_0 ($\mu_x - \mu_y = 0$)

for H_a ($\mu_x - \mu_y > 0$)

w $\alpha = .03$ B.C. $15 > 5.95$

P-value 0.

$P(\bar{x} - \bar{y} \geq 15) = P(Z \geq \frac{15-0}{\sqrt{10}})$

$= P(Z > 4.74)$

$= 0$

1.97

$1.88 = \frac{a - 0}{\sqrt{10}}$ $a = 5.95$

$S^2 = \sqrt{\frac{s_x^2}{n_x} + \frac{s_y^2}{n_y}}$

$$P[\bar{w} \le a) = P\left(z \le \frac{a - \bar{w}}{\sqrt{var[\bar{w}]}}\right)$$

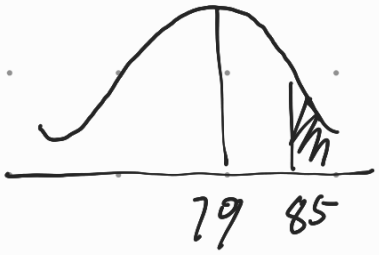
$$a \Rightarrow z_a = \frac{a - E[\bar{w}]}{\sqrt{var[\bar{w}]}} \quad \text{← populate}$$

$$E[\bar{w}] = E[w] \quad \text{← population average}$$

Highway average speed is 79 mph

variance is 70. You sample 5 cars.

$\bar{X} = 85$ $\quad P(\bar{X} \ge \underset{a}{85}) = P\left(z > \frac{a - 79}{\sqrt{var[\bar{x}]}}\right) = P\left(z > \frac{85-79}{\sqrt{195}}\right)$



$$var(\bar{x}) = \frac{var[x]}{n} = \frac{s^2}{n}$$

A single going 85 or more. $\sigma^2 = 12$

$$P(X \ge 85) = P\left(z > \frac{85 - 79}{\sqrt{12}}\right)$$

$\bar{w} = \bar{x} - \bar{y}$ $\qquad E[\bar{w}] = \mu_x - \mu_y = 0$

$var[\bar{w}]$

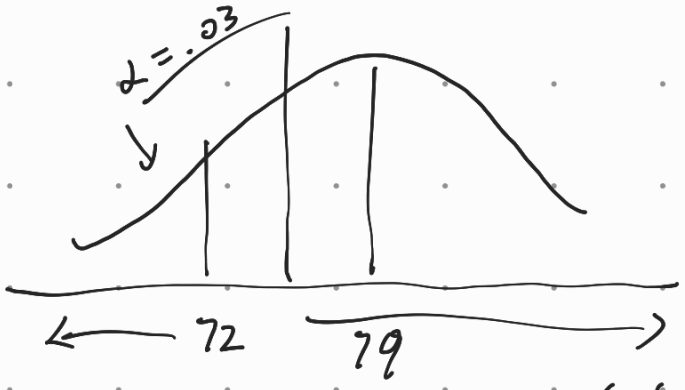
X : salmon : 5, 6, 3 $\quad \bar{X} = \frac{5+6+3}{3} = 4.6$

Y : Tuna 4, 7, 1 $\quad \bar{Y} = \frac{4+7+1}{3} = \frac{12}{3} = 4$

$S_x^2 : \frac{(5-4.6)^2+(6-4.6)^2+(3-4.6)^2}{3} \quad n_x = 3$

$S_y^2 : \frac{(4-4)^2+(7-4)^2+(1-4)^2}{3} \quad n_y = 3$

$$S = \sqrt{\frac{S_x}{n_x} + \frac{S_y}{n_y}}$$



Left

$\bar{X} = 72$

$S^2 = 100$

$n = 5$

fail to reject

Reject

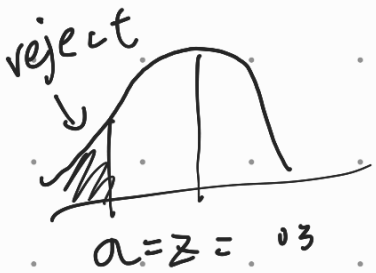
$\alpha = .03$

$H_0 : \mu = 79$

$H_a : \mu < 79$

Step 1:

Find score leads to rejection using z-table



$\Rightarrow$ a? $\frac{a-79}{\sqrt{100/5}} = -1.88$

$a = 70.6$

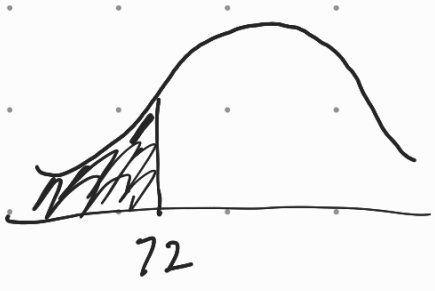
Step 2: make decision reject or fail to reject

Fail to reject $H_0: \mu = 79$

for $H_a (\mu < 79)$ w/ $\alpha = .03$

B.C. $70.6 < 72$ AND

Step 3. p-value of = .0543



$P(\bar{X} < 72) = P(z < \frac{72-79}{\sqrt{20}})$

$P(z < -1.5)$

Right tail

$\alpha = .02$ $H_0: \mu = 85$ $\bar{X} = 90$

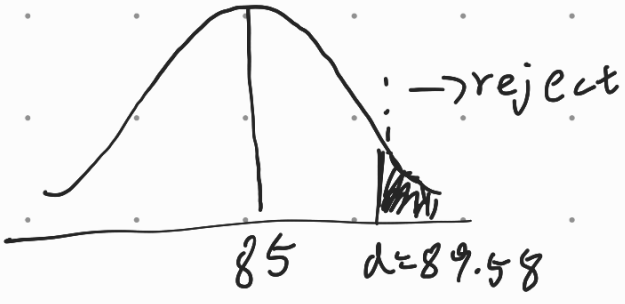
$S^2 = 100$

$n = 20$

step 0. state H_a

$H_a: \mu > 85$

Step 1. Find the cutoff for rejection



$$\frac{\alpha - 85}{\sqrt{100/20}} = 2.05$$

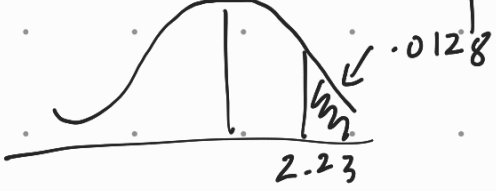
$Z = 2.05$

Step 2 Decide reject or Fail to reject

Reject H_0 ($\mu = 85$) for H_a ($\mu > 85$)

w/ $\alpha = .02$ B.C.: $\bar{x} > 89.58$ AN

Step 3. P-value of .0128



$P(\bar{X} \geq \bar{x}_0) = P\left(Z \geq \frac{\bar{x}_0 - 85}{\sqrt{\frac{100}{20}}}\right)$

$P(Z \geq 2.28) = 0.128$