H_0: has equal sign } H_1: range:

$p = 0.5$ | $p > 0.5$

$H_0: \mu = 1.63$ | $H_1: \mu < 1.63$

$H_1: \mu \neq 1.63$

$H_0: p \leq 0.5$ ⟸ $H_1: p > 0.5$

→ $H_0: p = 0.5$ ⟸ $p \leq 0.5$

Topic 6: test statistic:

assume H_0 is true ⇒ calculate the distn of test statistic.

$H_0: \mu \in (\ )$

vs $H_1: \mu \in (\ )$

---

drug A → H_0: diff in BP = 0

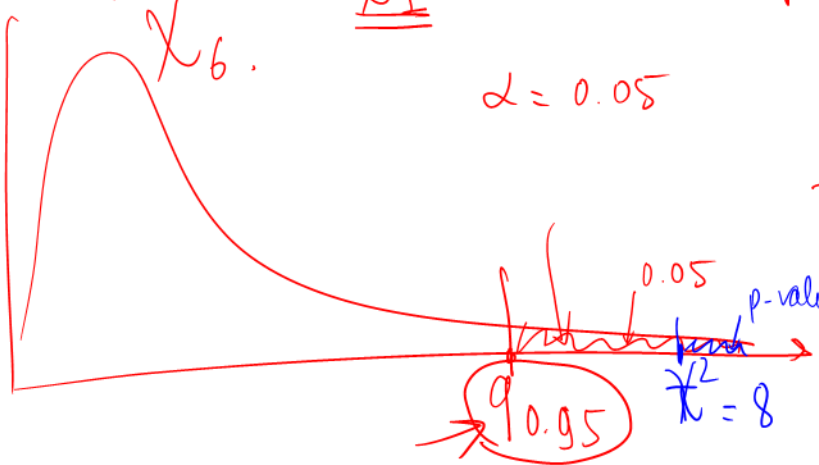
H_1: diff in BP (after − before) < 0.

$H_0: \mu = 1.63\text{m}$ ⟸ vs $H_1: \mu > 1.63\text{m}$.

p-value = 0.2 at $\alpha = 0.05$ we Do not reject H_0.

vs we accept H_0. ✗

→ χ^2_6. χ^2_1



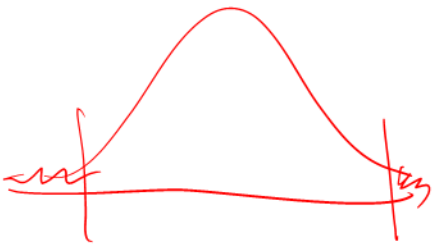
If test statistic > $q_{0.95}$

⇒ p-value < 0.05

⇒ reject H_0 at 0.05.

⇒ $(q_{0.95}; +\infty)$

$X \to Y$.



χ^2 test in Topic 6: $r \times c$ table.
2×2 table

$X - Y$.

- random
- cate ; nominal.
- Expected counts all ≥ 5 (for 2×2 table);
  Expected counts: $\geq 75\%$ of them are ≥ 5 $\Rightarrow$ $r \times c$ table

---

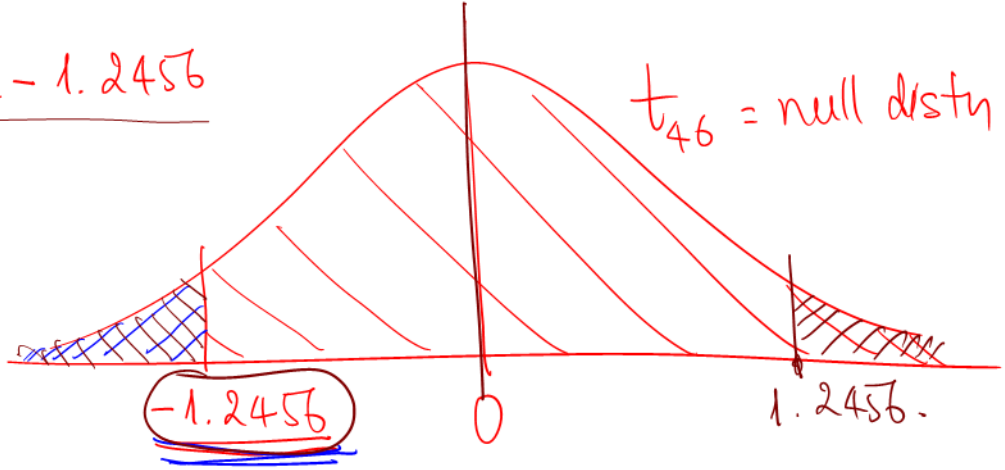
$H_0: \mu = 1.63$ m.
$H_1: \mu > 1.63$ m.

CLT: $n \geq 30 \Rightarrow \overline{X} \sim N(\mu; \sigma^2/n)$

SD of $\overline{X}$ is $\sigma/\sqrt{n}$

n is known but σ is unknown.
$\Rightarrow SD(\overline{X}) = \sigma/\sqrt{n}$ is unknown
$\Rightarrow$ estimated by $\underbrace{s/\sqrt{n}}_{:= SE(\overline{X})}$, s = sample standard deviation.

$T = -1.2456$



p-value (test Right sided) is the right area of test statistic. (red shaded area) (1 - 0.1096)

$H_1: \mu > 3.3$

p-value (test is Left sided): is left area of test statistic (blue shaded area) = 0.1096

$H_1: \mu < 3.3$

p-value (test is 2 sided): is the 2 tail probabilities. (2 shaded area in brown color)

$H_1: \mu \neq 3.3$