# Z-test continued

one-sample z test } → last class

two-sample z-test → 2 means compared to each other.

z - 2 samplee prop test

z - 1 sample pop test. } -

## 2-Sample z-test :

$M_1$ , $M_2$ and we want to test which gives better recovery time.

value : recovery time

$M_1$ : $\mu_1$

$M_2$ : $\mu_2$

$H_0$ : $\mu_1 = \mu_2$

$H_a$ : $\mu_1 \neq \mu_2$

1-sample z-test

$$Z = \frac{x - \bar{\mu}}{\sigma}$$

2 sample z-test

$$z = \frac{(x_1 - x_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Ex :

100

$n_1 = 100$

$n_2 = 90$

→ assume the data to be normally distributed

→ sample sizes are sufficiently large ( size ≥ 30)

→ $n_1$ and $n_2$ need not be sample

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<u>2 - prop test</u> :

proportion of sales : ✓✓

$$\frac{\text{people buying}}{\text{people visiting}}$$

$$Z = \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}}$$

$\hat{p}$ = observed proportion

$p$ = assumed prop.

$= \frac{x}{n}$ → total

<u>Assumptions</u>:

→ normal dist

→ sample size > 30

$H_0$ : $\hat{p} = p$

$H_a$ : $\hat{p} \neq p$

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<u>2-sample -prop -test</u>

conversion rate ?

old

new

$H_0 : \quad p_1 = p_2$

$H_a : \quad p_1 \neq p_2$

$$\boxed{Z = \frac{p_1 - p_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}}$$

$$\hat{p} = \frac{x_1 + x_2}{n_1 + n_2}$$

$$p_1 = \frac{x_1}{n_1} \qquad p_2 = \frac{x_2}{n_2}$$