"إعادة صياغة حلول الباب الخامس"

أمثلة توزيع t :

① مثال في صفحة 89

$$T \sim t\,(v = df = 14)$$

ⓐ $p(T < t_{.95}) = .95 \Rightarrow t_{.95} = 1.761$

ⓑ $p(T > t) = .95 \Rightarrow 1 - p(T < t) = .95$

$\Rightarrow p(T < t) = 1 - .95 \Rightarrow p(T < t) = .05$

$\Rightarrow t = t_{.05} = -t_{1-.05} = -t_{.95} = -1.761$

② مثال في صفحة 90

يعتمد على ما ذكر فيه من طريقة الحل في ملزمة

أمثلة على توزيع المعاينة لمتوسط العينة $\bar{x}$

① مثال في صفحة 92

Population: normal distribution, $\mu = 800$, $\sigma = 40$

Sample : $n = 16$

$P(\bar{X} < 775) = ?$

as we have a normal distribution + σ is known

then

$$\bar{X} \sim N\left(\mu_{\bar{X}} = \mu = 800, \sigma^2_{\bar{X}} = \frac{\sigma^2}{n} = \frac{(40)^2}{16}\right)$$

so $P(\bar{X} < 775) = P\left(Z < \frac{775-800}{\frac{40}{4}}\right) = P(Z < -2.50)$

$= .00621$

② مثال في صفحة 93

Population: not normal distribution, $\mu = 120$, $\sigma = 15$

Sample : $n = 50$

$P(115 < \bar{X} < 125) = ?$

as we have a non-normal distribution + σ is known + $n \geq 30$

then

$$\bar{X} \sim N\left(\mu_{\bar{X}} = \mu = 120, \sigma^2_{\bar{X}} = \frac{\sigma^2}{n} = \frac{(15)^2}{50}\right)$$

so $P(115 < \bar{X} < 125) = P\left(\frac{115-120}{\frac{15}{\sqrt{50}}} < Z < \frac{125-120}{\frac{15}{\sqrt{50}}}\right)$

$= P(-2.36 < Z < 2.36)$

$= P(Z < 2.36) - P(Z < -2.36)$

$= .99085 - .00914$

$= .98172$

أمثلة على توزيع المعاينة لحاصل الفرق بين متوسطي عينتين $\bar{X}_1 - \bar{X}_2$

① مثال في صفحة 95

	A (1)	B (2)
population:	$\mu_1 = 45$	$\mu_2 = 30$
	$\sigma_1 = 15$	$\sigma_2 = 20$
sample:	$n_1 = 35$	$n_2 = 40$

$P(\bar{X}_1 - \bar{X}_2 > 20) = ?$

as $n_1 \geq 30, n_2 \geq 30$, σ_1 and σ_2 are known

then

$$\bar{X}_1 - \bar{X}_2 \sim N(\mu_{\bar{X}_1 - \bar{X}_2} = \mu_1 - \mu_2 = 45 - 30 = 15,$$

$$\sigma^2_{\bar{X}_1 - \bar{X}_2} = \frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2} = \frac{(15)^2}{35} + \frac{(20)^2}{40})$$

So,

$$P(\bar{X}_1 - \bar{X}_2 > 20) = P(Z > \frac{20-15}{\sqrt{\frac{(15)^2}{35} + \frac{(20)^2}{40}}}) = P(Z > 1.23)$$

$$= 1 - P(Z < 1.23) = 1 - .89065 = .10935$$

أمثلة على توزيع المعاينة لنسبة العينة $\hat{p}$

① مثال في صفحة 98

Population : $p = \frac{45}{100} = .45$ → proportion of femals that visiting clinic

Sample : $n = 35$

① $p(\hat{p} > .4) = ?$

② $p(.4 < \hat{p} < .5) = ?$

→ $\hat{p}$ is the proportion of femals that visiting clinic

as $n \geq 30$

then

$$\hat{p} \sim N(\mu_{\hat{p}} = p = .45 , \sigma^2_{\hat{p}} = \frac{p(1-p)}{n} = \frac{.45(1-.45)}{35})$$

So,

① $$p(\hat{p} > .4) = p(Z > \frac{.4 - .45}{\sqrt{\frac{.45(1-.45)}{35}}}) = p(Z > -0.59)$$

$$= 1 - p(Z < -0.59) = 1 - .27760 = .72240$$

② $$p(.4 < \hat{p} < .5) = p(\frac{.4 - .45}{\sqrt{\frac{.45(1-.45)}{35}}} < Z < \frac{.5 - .45}{\sqrt{\frac{.45(1-.45)}{35}}})$$

$$= p(-0.59 < Z < 0.59) = p(Z < 0.59) - p(Z < -0.59)$$

$$= .72240 - .27760$$

$$= .44480$$

أمثلة على توزيع المعاينة لحاصل الفرق بين نسبتي عينتين $\hat{P}_1-\hat{P}_2$

① مثال في صفحة ١٠٢

	non-Saudi residents (1)	Saudi residents (2)
Population:	$P_1=\frac{40}{100}=.4$ Proportion of non-Saudi residents that have medical insurance	$P_2=\frac{30}{100}=.3$ Proportion of Saudi residents that have medical insurance
Sample :	$n_1=130$	$n_2=120$

$P(.05<\hat{P}_1-\hat{P}_2<.2)=?$

as $n_1 \geq 30$ and $n_2 \geq 30$, then

$\hat{P}_1-\hat{P}_2 \sim N(\mu_{\hat{P}_1-\hat{P}_2}=P_1-P_2=.4-.3=.1,$

$$\sigma^2_{\hat{P}_1-\hat{P}_2}=\frac{P_1(1-P_1)}{n_1}+\frac{P_2(1-P_2)}{n_2}=\frac{.4(.6)}{130}+\frac{.3(.7)}{120})$$

So,

$$P(.05<\hat{P}_1-\hat{P}_2<.2)=P\left(\frac{.05-.1}{\sqrt{\frac{.4(.6)}{130}+\frac{.3(.7)}{120}}}<Z<\frac{.2-.1}{\sqrt{\frac{.4(.6)}{130}+\frac{.3(.7)}{120}}}\right)$$

$=P(-0.83<Z<1.67)$

$=P(Z<1.67)-P(Z<-0.83)$

$=.95154-.20327$

$=.74827$