30 March 2024 09:09 AM

99 % $\alpha = 1\%$ ✓
95 % $\alpha = 5\%$ ✓
90 % $\alpha = 10\%$

99 %
$\alpha = 1\% = 0.01$
95 %
$\alpha = 5\% = 0.05$
and so on.

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}} \sim t_{(n-1)}$$

s ↑ sample s.d. ; $(n-1)$ ↑ degree of freedom.

$$P\left[\bar{x} - t_{(n-1)}\frac{s}{\sqrt{n}} \le \mu \le \bar{x} + t_{(n-1)}\frac{s}{\sqrt{n}}\right] = 1 - \alpha$$

95%
$\alpha = 5\% = 0.05$
$\frac{\alpha}{2} = \frac{0.05}{2} = 0.025$

$\alpha = \frac{5}{100} = 0.05$
$\alpha/2 = \frac{0.05}{2} = 0.025$

Area under Z curve.

95% confid — two — 0.01
$\alpha = 5\% = 0.05$ — $\alpha/2$, $\alpha/2$
$\alpha/2 = 0.025$ — $\frac{0.01}{2} = 0.005$

99% confi
$\alpha = 1\% = 0.01$

TABLE II
DISTRIBUTION OF STANDARD NORMAL VARIABLE

Values of τ_α (one-tail ... one tail)

α	0.05	0.025	0.01	0.005
Z τ_α	1.645	1.960	2.326	2.576

$$\tau = \frac{\bar{X} - \mu}{\sigma/\sqrt{n}} = 2.1$$

$\tau_{\alpha/2}$ and $\tau_{1-\frac{\alpha}{2}}$

$z = \bigcirc$ ✓
$t = \bigcirc$ ✓

$Z_{0.01} = 2.326$
$Z_{cal} = 3$
$|Z_{cal}| > Z_{0.01}$
reject H_0

$\alpha = 5\%$
$\alpha/2 = 0.025$

TABLE IV
t-DISTRIBUTION*
Values of $t_{\alpha,\nu}$

5%, 1%, $\alpha/2$ 0.25%, 0.5%
$t_{\alpha, \nu}$ ← $(n-1)$ ← (n)

degree of freedom ↓

ν \ α	0.05	0.025	0.01	0.005
1	6.314	12.706	31.821	63.657
2	2.920	4.303	6.965	9.925
3	2.353	3.182	4.541	5.841
4	2.132	2.776	3.747	4.604
5	2.015	2.571	3.365	4.032
6	1.943	2.447	3.143	3.707
7	1.895	2.365	2.998	3.499
8	1.860	2.306	2.896	3.355
9	1.833	2.262	2.821	3.250
10	1.812	2.228	2.764	3.169
11	1.796	2.201	2.718	3.106
12	1.782	2.179	2.681	3.055
13	1.771	2.160	2.650	3.012
14	1.761	2.145	2.624	2.977
15	1.753	2.131	2.602	2.947
16	1.746	2.120	2.583	2.921
17	1.740	2.110	2.567	2.898
18	1.734	2.101	2.552	2.878
19	1.729	2.093	2.539	2.861
20	1.725	2.086	2.528	2.845
21	1.721	2.080	2.518	2.831
22	1.717	2.074	2.508	2.819
23	1.714	2.069	2.500	2.807
24	1.711	2.064	2.492	2.797

TABLE V
F DISTRIBUTION*

95%
$\alpha = 5\%$
$\alpha = 0.05$
$n - 1 = 24$

Testing of hypothesis

greater order

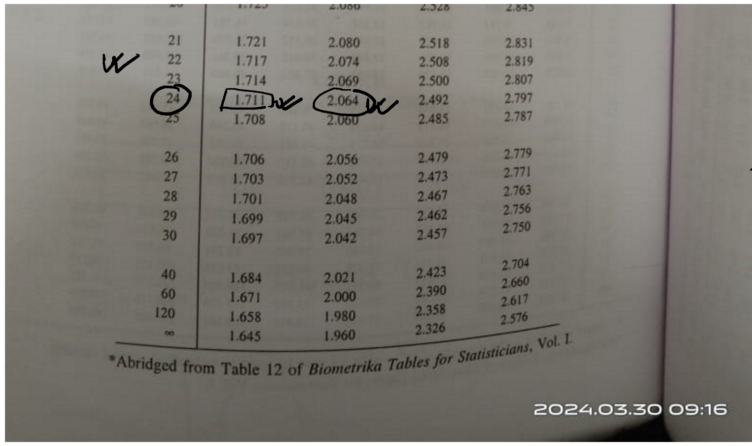
$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$$

95%
$\frac{\alpha}{2} = 5\%/2$

$\frac{\alpha}{2}$ $\alpha/2$

$|50,000 - 2.064 \times (\ )|$

$$\bar{x} - t_{0.025, 24}\frac{s}{\sqrt{n}}$$



20	1.725	2.086	2.528	2.845
21	1.721	2.080	2.518	2.831
22	1.717	2.074	2.508	2.819
23	1.714	2.069	2.500	2.807
24	1.711	2.064	2.492	2.797
25	1.708	2.060	2.485	2.787
26	1.706	2.056	2.479	2.779
27	1.703	2.052	2.473	2.771
28	1.701	2.048	2.467	2.763
29	1.699	2.045	2.462	2.756
30	1.697	2.042	2.457	2.750
40	1.684	2.021	2.423	2.704
60	1.671	2.000	2.390	2.660
120	1.658	1.980	2.358	2.617
∞	1.645	1.960	2.326	2.576

*Abridged from Table 12 of *Biometrika Tables for Statisticians*, Vol. I.

2024.03.30 09:16

$\bar{x} - t_{0.025,24} \cdot \frac{s}{\sqrt{n}}$

$\bar{x} + t_{0.025,24} \cdot \frac{s}{\sqrt{n}}$

Interval estimates for proportion:

$\bar{p} = 80$

$\sigma_{\bar{p}} = \sqrt{\frac{80(1-80)}{400}}$

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

$\sigma_{\bar{p}} = \sqrt{\frac{\bar{p}(1-\bar{p})}{n}}$

$\bar{p} - z\,\sigma_{\bar{p}}$ lower interval point

$\bar{p} + z\,\sigma_{\bar{p}}$ upper " "

$z_{\frac{\alpha}{2}} = 1.960$

$\therefore$ lower int is $80 - 1.960 \times \sqrt{\frac{80 \times 20}{400}}$

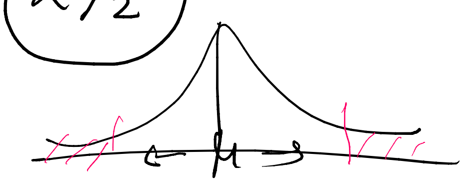
upp . . . $80 + 1.960 \times \sqrt{\frac{80 \times 20}{400}}$

$H_0: \mu = 50$

$H_1: \mu \neq 50$ (two-tail test) $\alpha/2$

$H_1: \mu > 50$ (~~right~~ left-tail) α

$\mu < 50$ (~~left~~ right-tail) α



Decision	Ho is True	Ho is false
Accept Ho	Correct	Type-II error (β)

		error (β)
Reject H_0	Type-I error (α)	Correct.