How find p-value from the table for appropriate test?

<u>TABLE C (t test statistic)</u>

<u>Find confidence interval for two-sample problems</u>

Confidence interval for $\mu_1 - \mu_2$ is

$$(\overline{x_1} - \overline{x_2}) \pm t^* \sqrt{\frac{{s_1}^2}{n_1} + \frac{{s_2}^2}{n_2}}$$

find t^* in the body of table C if you know df and level of confidence (95%, 90%, 99%, etc).

To find a confidence interval you need find t^* from table C

- calculate df (degrees of freedom): df is the smaller of $n_1 - 1$ and $n_2 - 1$. If you cannot find calculated df in table C, just round down to the nearest df in this table
- select the column for appropriate level of confidence.

How find t from table C?

1) suppose your df = 4 and level of confidence is 95%:

DEGREES OF FREEDOM	50%	60%	70%	80%	90%	95%
1	1.000	1.376	1.963	3.078	6.314	12.71
2	0.816	1.061	1.386	1.886	2.920	4.303
3	0.765	0.978	1.250	1.638	2.353	3.182
4	0.741	0.941	1.190	1.533	2.132	2.776
5	0.727	0.920	1.156	1.476	2.015	2.571

From the table C → t^*= 2.776.

Similarly, df = 4 and level of confidence is 90%: from the table C → t^* = 2.132.

2) suppose your df = 47 and level of confidence is 95%:

40	0.681	0.851	1.050	1.303	1.684	2.021
50	0.679	0.849	1.047	1.299	1.676	2.009
60	0.679	0.848	1.045	1.296	1.671	2.000
80	0.678	0.846	1.043	1.292	1.664	1.990
100	0.677	0.845	1.042	1.290	1.660	1.984
1000	0.675	0.842	1.037	1.282	1.646	1.962

df=47 isn't in table, so round down df to 40. From the table C → t = 2.021.

Similarly, df = 46 and level of confidence is 90%: from the table C → t^* = 1.684.

Similarly, df = 53 and level of confidence is 90%: from the table C → t^* = 1.676.

<u>TABLE C (find sample size given margin of error and level of confidence)</u>

$$n = \left(\frac{z^*}{m}\right)^2 p^*(1 - p^*)$$

For 90% confidence level $z^* = 1.645$

For 95% confidence level $z^* = 1.960$

For 99% confidence level $z^* = 2.576$

Find p-value for t statisctic: $t = \frac{\bar{x}-\mu_0}{s/\sqrt{n}}$ with df = n – 1

Suppose you calculate t – statistic and df = n – 1. Also suppose your alternative hypothesis is one-sided (has sign > or <)

How find p-value from table C?

1) suppose your df = 80 and t = 1.664

80	0.678	0.846	1.043	1.292	1.664
100	0.677	0.845	1.042	1.290	1.660
1000	0.675	0.842	1.037	1.282	1.646
z^*	0.674	0.841	1.036	1.282	1.645
One-sided P	.25	.20	.15	.10	.05

Select column which contains t for appropriate df, p-value will be in the same column (row for One-sided P): p = 0.05

2) suppose your df = 86 and t = -1.353

80	0.678	0.846	1.043	1.292	1.664
100	0.677	0.845	1.042	1.290	1.660
1000	0.675	0.842	1.037	1.282	1.646
z^*	0.674	0.841	1.036	1.282	1.645
One-sided P	.25	.20	.15	.10	.05
Two-sided P	.50	.40	.30	.20	.10

t value is negative, so take absolute value t=|-1.353|=1.353
df=86 isn't in table, so round down df = 86 to 80. Select columns which contains t for appropriate df, p-value also will be between these columns (row for One-sided P): 0.05 < p < 0.10

TABLE C (one-sample proportion test)

z^*	0.674	0.841	1.036	1.282	1.645	1.960	2.054	2.326	2.576	2.807	3.091	3.291
One-sided P	.25	.20	.15	.10	.05	.025	.02	.01	.005	.0025	.001	.0005
Two-sided P	.50	.40	.30	.20	.10	.05	.04	.02	.01	.005	.002	.001

1) Suppose your alternative hypothesis is one-sided, and you calculate $z = \frac{\hat{p}-p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}} = 2.521$. Find p-value.

z = 2.521 is between $z^* = 2.326$ and $z^* = 2.576$, so p-value also will be between these columns (row for One-sided P): $0.005 < p - value < 0.01$

2) Suppose your alternative hypothesis is two-sided, and you calculate $z = \frac{\hat{p}-p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}} = -2.13$. Find p-value.

|z| = 2.13 is between $z^* = 2.054$ and $z^* = 2.326$, so p-value also will be between these columns (row for Two-sided P): $0.02 < p - value < 0.04$

TABLE D (chi-square test)

Suppose your χ^2 = 8.32 and df = (r – 1) (c – 1) = 2. Select columns which contains χ^2 for appropriate df, p-value also will be between these columns (top row): 0.01 < p < 0.02

	p											
df	**.25**	**.20**	**.15**	**.10**	**.05**	**.025**	**.02**	**.01**	**.005**	**.0025**	**.001**	**.0005**
1	1.32	1.64	2.07	2.71	3.84	5.02	5.41	6.63	7.88	9.14	10.83	12.12
2	2.77	3.22	3.79	4.61	5.99	7.38	7.82	9.21	10.60	11.98	13.82	15.20
3	4.11	4.64	5.32	6.25	7.81	9.35	9.84	11.34	12.84	14.32	16.27	17.73