Hypothesis Testing

Single Sample

Population Standard Deviation *Unknown*

State Average (μ) on Benchmark Exam: **193.8**

50 students (n) in your school scored an average of 202.94 (X) with a standard Deviation (s) of **31.55**

Did your school score significantly better than the state average?

Null: There is no difference between the state average and your school.

Population Standard Deviation is **UNKNOWN**

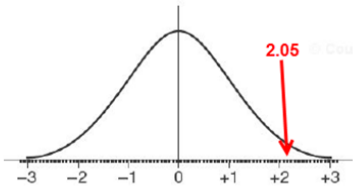
Therefore, compute *t*

$$t = \frac{\overline{X} - \mu}{s_{\overline{x}}} \qquad s_{\overline{x}} = \frac{s}{\sqrt{n}}$$

Square Root of n (50) = 7.07
Standard Error ($s_{\overline{x}}$) = 31.55/7.07 = 4.46

$$t = \frac{202.94 - 193.80}{4.46}$$

***t* = 2.05**



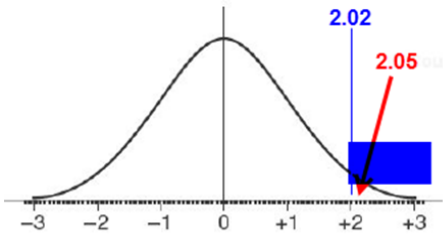
Must use ***t table*** to determine the critical value. (Appendix B in Caldwell's book)

Degrees of freedom (*df*) = n-1
= 50-1
= 49

Family of t Distributions (Two-Tailed Test)

Degrees of Freedom (*df*)	LEVEL OF SIGNIFICANCE					
	.20	.10	.05	.02	.01	.001
5	1.476	2.015	2.571	3.365	4.032	6.869
6	1.440	1.943	2.447	3.143	3.707	5.959
7	1.415	1.895	2.365	2.998	3.499	5.408
8	1.397	1.860	2.306	2.896	3.355	5.041
9	1.383	1.833	2.262	2.821	3.250	4.781
10	1.372	1.812	2.228	2.764	3.169	4.587
11	1.363	1.796	2.201	2.718	3.106	4.437
12	1.356	1.782	2.179	2.681	3.055	4.318
13	1.350	1.771	2.160	2.650	3.012	4.221
14	1.345	1.761	2.145	2.624	2.977	4.140
15	1.341	1.753	2.131	2.602	2.947	4.073
16	1.337	1.746	2.120	2.583	2.921	4.015
17	1.333	1.740	2.110	2.567	2.898	3.965
18	1.330	1.734	2.101	2.552	2.878	3.922
19	1.328	1.729	2.093	2.539	2.861	3.883
20	1.325	1.725	2.086	2.528	2.845	3.850
21	1.323	1.721	2.080	2.518	2.831	3.819
22	1.321	1.717	2.074	2.508	2.819	3.792
23	1.319	1.714	2.069	2.500	2.807	3.768
24	1.318	1.711	2.064	2.492	2.797	3.745
25	1.316	1.708	2.060	2.485	2.787	3.725
26	1.315	1.706	2.056	2.479	2.779	3.707
27	1.314	1.703	2.052	2.473	2.771	3.690
28	1.313	1.701	2.048	2.467	2.763	3.674
29	1.311	1.699	2.045	2.462	2.756	3.659
30	1.310	1.697	2.042	2.457	2.750	3.646
40	1.303	1.684	2.021	2.423	2.704	3.551
50	1.299	1.676	2.009	2.403	2.678	3.496
60	1.296	1.671	2.000	2.390	2.660	3.460
80	1.292	1.664	1.990	2.374	2.639	3.416

Critical Value
2.021
or
2.02



Since 2.05 > 2.02 it is in the critical region, therefore we reject the null hypothesis that there is no difference and conclude that there is a significant difference between your students' and the state average scores.

Instructor created spreadsheet program

TZ SINGLE SAMPLE CALCULATOR

	A	B
1		
2	**POPULATION STANDARD DEVIATION is Known**	
3	Population mean	193.8
4	Population standard deviation	31.55
5	Sample mean	202.94
6	Sample size (n=)	50
7	**Z = (x - μ) / (σ / sqrt(n)) =**	**2.05**
8		
9		
10		
11		
12	**POPULATION STANDARD DEVIATION is Unknown**	
13	Population mean	23.12
14	Sample standard deviation	4.16
15	Sample mean	24.74
16	Sample size (n=)	30
17		
18	**t = (x-m) / (s/sqrt(n)) =**	**2.133**
19		

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23	1.319	1.714	2.069
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