STATISTICS 2023 **NAME IN PRINT**____

EXAM THREE **SIGNATURE IN INK**_____________________________________

FALL 2014 **CWID IN INK**____

RETAIN THIS EXAM FOR GRADE VERIFICATION ONCE RETURNED TO YOU.
TRUE OR FALSE. Answer with a capital T or F. **(3 points each)**

________ 1. The p-value of a hypothesis test is the probability that the null hypothesis should be rejected.

________ 2. The standard errors of point estimators decrease in magnitude when the sample size decreases.

________ 3. A point estimate is a population parameter used to estimate a sample statistic.

________ 4. The center value of a confidence interval is the estimated standard error for the point estimate for the parameter of interest.

________ 5. In a hypothesis test the researcher makes a claim about the value of a population parameter, and then the sample data are used to decide whether the claim should be rejected.

________ 6. A confidence interval provides a set of reasonable and plausible values for the parameter being estimated and those values would not be rejected if tested in a two tail hypothesis test with the same significance level.

________ 7. When the null hypothesis is not rejected, then it is concluded that the data in the sample provide evidence in support of the claim stated in the null hypothesis.

t-table Questions. Write your answer on the line. **(3 points each)**

______________ 8. What is the $P(t > 2.467)$ if df = 28?

______________ 9. State the value of t_o, if the $P(t > t_o) = .975$ and the df = 18.

_____________ 10. What is the $P(-1.383 < t < 1.383)$ if df = 9?

STATE THE ANSWER. State the answer on the line. (3 points each)

_______________ 11. If a 99% confidence interval to estimate a population mean is (102.3, 203.9) what is the value of the point estimate for the population mean?

_______________ 12. If a 95% confidence interval based on a large sample to estimate a population mean is (46.08, 53.92) then what is the value of the bound of error for the confidence interval?

_______________ 13. How many flights would have to be sampled in order to estimate the average amount of time in minutes that a flight is late with a 95% confidence interval that is 12 minutes wide? Assume the standard deviation of the time a flight is late is 20 minutes.

_______________ 14. What is the point estimate for population proportion if a 96% confidence interval for the proportion of college students who binge drink is (0.11, 0.27)?

_______________ 15. If 392 out of 1000 people surveyed said they preferred Pepsi to Coca-Cola, what is the point estimate for the proportion of people who prefer Pepsi to Coca-Cola? State your answer with 3 digits past the decimal.

_______________ 16. If the rejection region in a two-tail hypothesis test based on a sample with 21 observations drawn from a population whose variance is unknown is below –2.528 and above 2.528 what is the significance level, or alpha value, associated with this hypothesis test?

_______________ 17. What value must the magnitude of the test statistic exceed before the null hypothesis would be rejected with only 2% error rate in a two-tail hypothesis test based only on 15 observations in a situation where the population variance is unknown?

_______________ 18. What is the magnitude of the test statistic if the p-value in a two-tail hypothesis test based on a large sample is equal to 0.0232?

_______________ 19. If a z test statistic value is 2.53 in a right tail hypothesis test where the researcher is attempting to prove that the mean is greater than some specific number, what is the p-value of the test?

_______________ 20. If a z test statistic value is 2.53 in a left tail hypothesis test where the researcher is attempting to prove that the mean is less than some specific number, what is the p-value of the test?

STATE THE ANSWER. State the answer on the line. (3 points each)

A marketing associate who sells through Amazon is interested in estimating the mean price of internet orders placed at one of their new websites. Assume a random sample of 144 internet orders resulted in an observed average order of $158.20 with a standard deviation of $36. Use this information to answer the next four questions.

_______________ 21. What is the numerical value of the point estimate for the mean order price?

_______________ 22. What is the numerical value of the estimated standard error for the point estimate for the mean order price?

________________23. Assume that the estimated standard error of the point estimate for the mean order price is $2.75. What is the numerical value of the bound of error for a 95% confidence interval to estimate the mean order price?

________________24. If the estimated standard error for the point estimate for the mean order price is $2.75, what is the numerical value of the test statistic to test whether the mean order price is $150? Round your answer to two digits past the decimal.

During a recent automotive race eight-hundred fans were surveyed about their attendance at other types of professional sporting events. Out of the 800 fans surveyed, 212 of them answered that they did attend other types of professional sporting events. Use this information to answer the remaining questions on this page.

_______________ 25. Based on this sample what is the numerical value of the point estimate for the proportion of automotive race fans who also attend other professional sports events?

_______________ 26. What is the numerical value of the estimated standard error for the point estimate for the proportion of automotive race fans who also attend other professional sports events? Round the answer to four digits past the decimal.

_______________ 27. Assume that the estimated standard error for the point estimate for the proportion of automotive race fans who also attend other professional sports events is 0.0125. What is the numerical value of the test statistic to test the hypothesis that more than 25% of automotive race fans also attend other professional sports events?

STATE THE ANSWER. State the answer on the line. (3 points each)

A type of a large generator used to supply electricity when the power is out to hospitals and other large health-care facilities is listed to provide 1800kilowatts of power. Measurements of electrical output of twenty-five of these generators resulted in a mean output of 1740kilowatts with a standard deviation of 100kilowatts. Use this data as a random sample to answer the questions on this page.

________________ 28. State the appropriate alternative hypothesis if the research question is, "Do these 25 observations provide evidence that the mean kilowatts of electricity produced by this type of generator is less than the 1800kilowatts at which the generator is listed?"

________________ 29. What is the numerical value of the test statistic to test the null hypothesis that the mean amount of electricity produced by this type of generator is equal to 1800kilowatts?

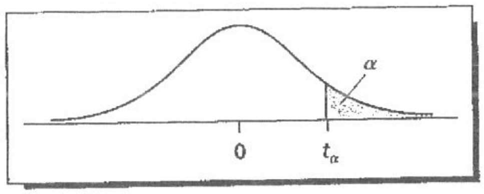
________________ 30. What is the name of the distribution of the test statistic if in fact the mean amount of electricity produced by this type of generator is equal to 1800kilowatts?

________________ 31. If the numerical value of the test statistic in this case was -2.6 then the p-value of the hypothesis test is between what two values?

________________ 32. If the researcher performing this hypothesis test can not tolerate more than 1% chance of rejecting a true null hypothesis, then the test statistic must be less than what value in order to reject the null hypothesis?

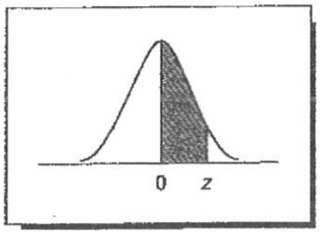
________________ 33. If the p-value of this hypothesis test is equal to .0053 and the significance level chosen by the researcher is 0.05, should the conclusion be that the mean amount of electricity produced by this type of generator is less than 1800k9ilowatts? Answer YES or NO.

A t Table



df	$t_{.100}$	$t_{.050}$	$t_{.025}$	$t_{.01}$	$t_{.005}$	$t_{.001}$	$t_{.0005}$
1	3.078	6.314	12.706	31.821	63.657	318.31	636.62
2	1.886	2.920	4.303	6.965	9.925	22.326	31.598
3	1.638	2.353	3.182	4.541	5.841	10.213	12.924
4	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	1.319	1.714	2.069	2.500	2.807	3.485	3.767
24	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	1.296	1.671	2.000	2.390	2.660	3.232	3.460
120	1.289	1.658	1.980	2.358	2.617	3.160	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.090	3.291

TABLE A.19 A Table of Areas under the Standard Normal Curve



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990

Source: A. Hald, *Statistical Tables and Formulas* (New York: Wiley, 1952), abridged from Table 1. Reproduced by permission of the publisher.