

STATISTICS 2023

NAME IN PRINT _____

EXAM TWO

SIGNATURE IN INK _____

FALL 2014

CWID IN INK _____

TRUE OR FALSE. Answer with a capital T or F.

(4 points each)

_____ 1. A discrete random variable has probability on intervals of values, but no probability on specific values.

_____ 2. The mass function for a Poisson random variable can be symmetric, left skewed, or right skewed, depending on the value of the parameter for the variable.

_____ 3. A continuous random variable has probability that is described with a function called a probability density function.

_____ 4. A variable that has a normal distribution has half of its probability on values that are less than the mean and half of its probability on values that are more than the mean.

_____ 5. The mean of the sample mean is equal to the mean of the sampled population, but the variance of the set of all possible sample means is the original variance multiplied by the number of observations in the sample.

Z-TABLE QUESTIONS. Write the answer on the line.

(4 points each)

_____ 6. What is the value of $P(Z < 1.18)$?

_____ 7. What is the value of z_0 , such that the $P(Z < z_0) = 0.0918$

_____ 8. What is the value of $P(-1.62 < Z < -0.64)$?

_____ 9. A promoter is planning an outdoor concert. If it rains the promoter will lose \$22,000, but if it does not rain the profit will be \$54,000. If the chance of rain is .25, what is the expected profit from this concert?

_____ 10. Assume a uniform discrete random variable has 8 possible values. What would be the cumulative probability on three of the possible 8 values?

_____ 11. A new type of car designed by an American car company has a 90% chance of exceeding the MPG fuel use rating on the window sticker. Out of seven cars of this type purchased by local taxi service, what is the probability that more than 5 of them will exceed the MPG rating on the window sticker? Round your answer to 4 digits past the decimal.

_____ 12. An accounting firm is investigating 20 corporations. The probability that the firm will identify some accounting problem in any one of these corporations is 0.15. What is the probability that the firm will identify accounting problems in at most 1 of these corporations? Round your answer to 4 digits past the decimal.

_____ 13. On average there are 1.6 serious injuries per game in division one college football. What is the probability of no injuries in a single game? Round your answer to 4 digits past the decimal.

_____ 14. If there are 3.4 vehicle accidents on a major highway each month, what is the probability that there will be one or more accidents in a randomly chosen month? Round your answer to 4 digits past the decimal.

STATE THE ANSWER. Write the answer on the line.

(4 points each)

Assume that amount of acid needed to clean a specific type of an automotive cylinder is a uniformly distributed random variable between 1 and 3.5 liters. Use this information to answer the next three questions.

_____ 15. What is the average amount of acid needed to clean this special type of an automotive cylinder?

_____ 16. What is the probability that the amount of acid needed to clean this special type of an automotive cylinder is between 1.5 and 2.5 liters?

_____ 17. Twenty percent of the cleaning jobs will use less than how many liters of acid?

At a large state university the time required to walk from the Student Union to the main campus class room buildings is a normally distributed random variable with a mean of 7 minutes and a standard deviation of 1.2 minutes. Use this information to address the remaining questions on this page.

_____ 18. What is the probability that the time required to walk from the Student Union to the main campus class room buildings is between 4.36 and 8.5 minutes?

_____ 19. What is the probability that the time required to walk from the Student Union to the main campus class room buildings is between 8.32 and 9.88 minutes?

_____ 20. Two and one-half percent of the time, the minutes required to walk from the Student Union to the main campus class room buildings are more than what value?

_____ 21. The thirty-third percentile for this distribution of the time required to walk from the Student Union to the main campus class room buildings is equal to what value?

A field medical device injects patients with a specific amount of fluid, but the process has a slight amount of variation. One setting on the device has a mean injection amount of 1.45ml with a standard deviation of 0.02ml. Assume that samples of 100 observations were repeatedly recorded from this setting on the field medical injection device. Consider the set of all sample means that would result from this repeated sampling process. Use this information to answer all the problems on this page.

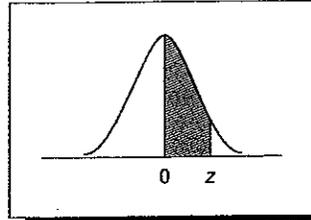
_____ 22. Sixty-seven percent of the resulting sample means from this setting on the field medical injection device is less than how many ml? State your answer with 5 digits past the decimal.

_____ 23. The medicine being injected by the device can be toxic if too much is injected. What percent of the time is the mean of 100 injections greater than 1.4557ml?

_____ 24. The mean of 100 observations from this field medical injection device will be less than what value 10.75% of the time? State your answer with 5 digits past the decimal.

_____ 25. What is the probability that the resulting sample mean is between 1.448ml and 1.454ml?

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.