Practically Infinite Number of Statistical Exercises: The Basics

This mini E-Book gives an unlimited number of basic statistics problems through the use of random number generation and embedded javascript.

Note: Presently works within Adobe Reader but not in Foxit Reader.

Additional Educational Resources - Statistics exercises, how to videos, stock market technical analysis (work in progress) and more at:

www.LearnViaWeb.com - A Website about learning - older

By Arthur Dryver, Ph.D. ©

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Contents

Chapter 1

Descriptive Statistics

First create a random set of data and **then try to calculate the sample mean and variance before checking the results.**

Create Data

Click to calculate the sample mean and variance within two decimal places.

Calculate descriptive statistics

The sample mean, $\bar{x}$, equals ____ and sample variance, s^2, equals ____

Chapter 2

Expectation and Covariance

Calculate the expectation and variance of a discrete random variable.

Click For New Problem

Calculate μ_x and μ_y

The expected value of x, $E[X] = \mu_x =$ [ ], and the expected value of y, $E[Y] = \mu_y =$ [ ].

Calculate Var and Covar

The variances, $\sigma_x^2 =$ [ ], $\sigma_y^2 =$ [ ] and the covariance, $\sigma_{xy} =$ [ ].

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Chapter 3

Probability Distribution Functions

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Click the button to generate exercises on calculating probabilities of the random variables learned within this Chapter. Try to answer it on your own and then click the "Answer" button to check your work. Note that some answers may differ from the computer output due to rounding.

Binomial | Hypergeometric | Poisson | Exponential | Normal

The Answer

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Chapter 4

Introduction to Inferential Statistics

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1: Click For New Problem | Click For Assumptions Made

First "Click For New Problem" and **then try to test** $H_0 : \mu$ [ ] [ ] **. with the alternative** $H_1 : \mu$ [ ] [ ] **.** Assume the data is from a normal distribution and that σ is known and $\sigma =$ [ ] . Use $\alpha = 0.05$

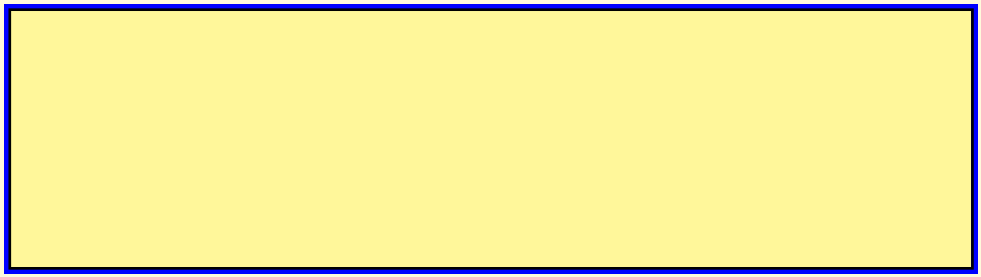
The data for the problem:

The mean, $\bar{x}$, equals [ ] and the standard devation, s, equals [ ]

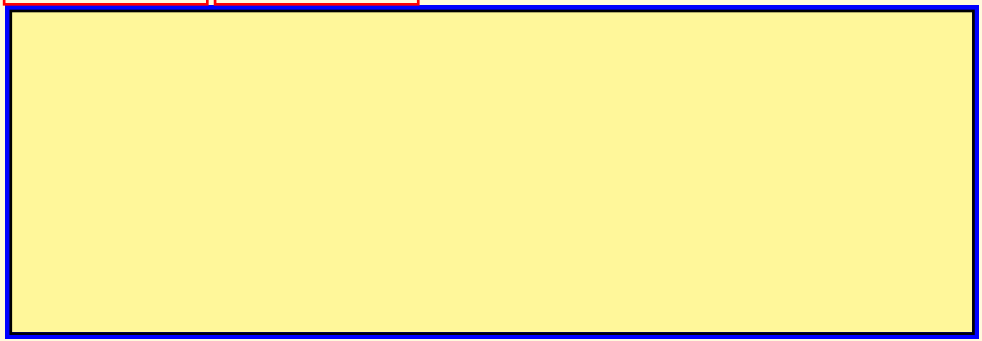
2: Z-value | 3: P-value | 4: Decision | How $P(z \leq Z)$

Click For New Problem | Click For Assumptions Made

First "Click For New Problem" and **then try to test** $H_0 : \mu$ [ ] [ ] **. with the alternative** $H_1 : \mu$ [ ] [ ] **.** Assume the data is from a normal distribution and that σ is known and $\sigma =$ [ ] . Use $\alpha = 0.05$



The Decision | How $P(z \leq Z)$



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Chapter 5

Tables

The Cumulative Standardized Normal Distribution

The area under the cumulative standardized normal distribution from $-\infty$ to Z

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767

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2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990

Critical Values of t

For a given d.f., entry represents the critical value of t *corresponding to a specified upper-tail area* (α)

$d.f./\alpha$	**0.25**	**0.10**	**0.05**	**0.025**	**0.01**	**0.005**
1.00	1.00	3.08	6.31	12.71	31.82	63.66
2.00	0.82	1.89	2.92	4.30	6.96	9.92
3.00	0.76	1.64	2.35	3.18	4.54	5.84
4.00	0.74	1.53	2.13	2.78	3.75	4.60
5.00	0.73	1.48	2.02	2.57	3.36	4.03
6.00	0.72	1.44	1.94	2.45	3.14	3.71
7.00	0.71	1.41	1.89	2.36	3.00	3.50
8.00	0.71	1.40	1.86	2.31	2.90	3.36
9.00	0.70	1.38	1.83	2.26	2.82	3.25
10.00	0.70	1.37	1.81	2.23	2.76	3.17
11.00	0.70	1.36	1.80	2.20	2.72	3.11
12.00	0.70	1.36	1.78	2.18	2.68	3.05
13.00	0.69	1.35	1.77	2.16	2.65	3.01
14.00	0.69	1.35	1.76	2.14	2.62	2.98
15.00	0.69	1.34	1.75	2.13	2.60	2.95
16.00	0.69	1.34	1.75	2.12	2.58	2.92
17.00	0.69	1.33	1.74	2.11	2.57	2.90
18.00	0.69	1.33	1.73	2.10	2.55	2.88
19.00	0.69	1.33	1.73	2.09	2.54	2.86
20.00	0.69	1.33	1.72	2.09	2.53	2.85

21.00	0.69	1.32	1.72	2.08	2.52	2.83
22.00	0.69	1.32	1.72	2.07	2.51	2.82
23.00	0.69	1.32	1.71	2.07	2.50	2.81
24.00	0.68	1.32	1.71	2.06	2.49	2.80
25.00	0.68	1.32	1.71	2.06	2.49	2.79
26.00	0.68	1.31	1.71	2.06	2.48	2.78
27.00	0.68	1.31	1.70	2.05	2.47	2.77
28.00	0.68	1.31	1.70	2.05	2.47	2.76
29.00	0.68	1.31	1.70	2.05	2.46	2.76
30.00	0.68	1.31	1.70	2.04	2.46	2.75
∞	0.67	1.28	1.64	1.96	2.33	2.58

Critical Values of χ^2

For a specified degrees of freedom ($d.f.$), the critical value of χ^2 corresponding to a specified upper-tail area (α)

	UPPER-TAIL AREAS							
$d.f./\alpha$	**0.990**	**0.975**	**0.950**	**0.9000**	**0.100**	**0.050**	**0.025**	**0.010**
1	0.000	0.001	0.004	0.016	2.706	3.841	5.024	6.635
2	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210
3	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345
4	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277
5	0.554	0.831	1.145	1.610	9.236	11.070	12.833	15.086
6	0.872	1.237	1.635	2.204	10.645	12.592	14.449	16.812
7	1.239	1.690	2.167	2.833	12.017	14.067	16.013	18.475
8	1.646	2.180	2.733	3.490	13.362	15.507	17.535	20.090
9	2.088	2.700	3.325	4.168	14.684	16.919	19.023	21.666
10	2.558	3.247	3.940	4.865	15.987	18.307	20.483	23.209
11	3.053	3.816	4.575	5.578	17.275	19.675	21.920	24.725
12	3.571	4.404	5.226	6.304	18.549	21.026	23.337	26.217
13	4.107	5.009	5.892	7.042	19.812	22.362	24.736	27.688
14	4.660	5.629	6.571	7.790	21.064	23.685	26.119	29.141
15	5.229	6.262	7.261	8.547	22.307	24.996	27.488	30.578
16	5.812	6.908	7.962	9.312	23.542	26.296	28.845	32.000