Statistics

Note : For each problem please show all necessary steps!

1. One investor desires to know which of the two stocks is worth investing. The raw data and some summary statistics of the stock prices per share of these two stocks for the last two weeks are given below.

   Stock A : 64.5, 65, 65.5, 64.5, 64.5, 62.5, 60, 58.5, 60.5, 60, 60, 62
   Stock B : 198, 195, 194, 195, 195, 190, 189, 186, 189, 185, 184, 185

N Obs	Variable	Range	Mean	Std Dev	Coefficient of Variation
12	STOCKA	7.00	62.45	2.494	3.9941680
	STOCKB	14.00	190.54	5.047	2.6487388

N Obs	Variable	Skewness	Kurtosis
12	STOCKA	-0.28257	-1.63833
	STOCKB	0.00132	-1.74488

   (a) Which stock price is more stable ? **Why** ? (10 pts.)
   (b) If this investor is a conservative investor, which stock would you suggest to this investor to invest ? (10 pts.)

2. The weekly demand for a certain gas (in thousands of gallons) from a particular facility is a random variable X with probability density function

$$f(x) = \begin{cases} 2\left(1-\frac{1}{x^2}\right) & \text{for } 1 \le x \le 2 \\ 0 & \text{otherwise.} \end{cases}$$

   (a) What is the probability that the weekly demand for this type gas is less than 1.5 thousand gallons ? (5 pts.)
   (b) If 1.5 thousand gallons is in stock at the beginning of the week and no new supply is due in during the week, how much of the 1.5 thousand gallons is expected to be left at the end of the week ? (10 pts.)

3. A local bank employs six telephone information operators who receive requests for information independently of one another, each according to a Poisson process with rate $\lambda = 2$ per minute.
   (a) What is the probability that during a given three-minute period, the first operator receives no requests ? (7 pts.)
   (b) What is the probability that during a given three-minute period, exactly four of the six operators receive no requests ? (10 pts.)
   (c) Give the expression of the probability that during a given one-minute period, all of the operators receive exactly the same number of requests. (8 pts.)

4. Suppose that the time necessary to process an application for a license plate for a newly purchased automobile is normally distributed with $\mu = 6$ and $\sigma = 1.5$ minutes.
   (a) What is the probability that it takes at least 7 minutes to process a single application? (5 pts.)
   (b) If 1000 such applications are processed independently of one another, what is the approximate probability that at least 800 applications take less than 7 minutes to process?(10 pts.)

5. A real estate firm used two independent property appraisers. The firm wanted to know whether the two appraisers were consistent in determining the market value of local buildings. The appraisers each appraised 11 buildings and the following this were collected (values in dollars) :

BUILD	Appraiser	Value	Apprsiser	Value	BUILD	Appraiser	Value	Apprsiser	Value
1	1	25000	2	25500	7	1	38950	2	30590
2	1	28000	2	30000	8	1	38100	2	39500
3	1	44200	2	41100	9	1	34350	2	32750
4	1	53300	2	47600	10	1	25890	2	24900
5	1	55350	2	50100	11	1	48500	2	47300
6	1	32450	2	34125					

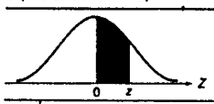
   (a) Five results from different analyses respectively are given below. Which **analyses** do you think are appropriate for answering the above question ? **Why ? Please explain your reasons** ? (15 pts)
   (b) Use the analysis you have chosen and $\alpha = 0.12$ to make the conclusions . (Don't forget write down the null and alternative hypotheses. Do you need any assumptions ?) (10 pts)

Appraiser	N	Mean	Std Dev	Std Error
1	11	38553.636	10682.323	3220.841
2	11	36678.636	8983.652	2708.673

Analysis Methods	Test Statistics	P-value
A : T test (for unequal variance)	T=0.4455	0.6609
B : T test (for equal variance)	T=0.4455	0.6607
C : Paired T test	T=1.835	0.0964
D : One way ANOVA	F= 0.20	0.6607
F : ANOVA from block design	F=3.37	0.0964

Areas of the Standard Normal Distribution

The entries in this table are the probabilities that a standard normal random variable is between 0 and z (the shaded area).



	Second Decimal Place in z									
z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4796	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4974
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.4998									
4.0	0.49997									
4.5	0.499997									
5.0	0.4999997									