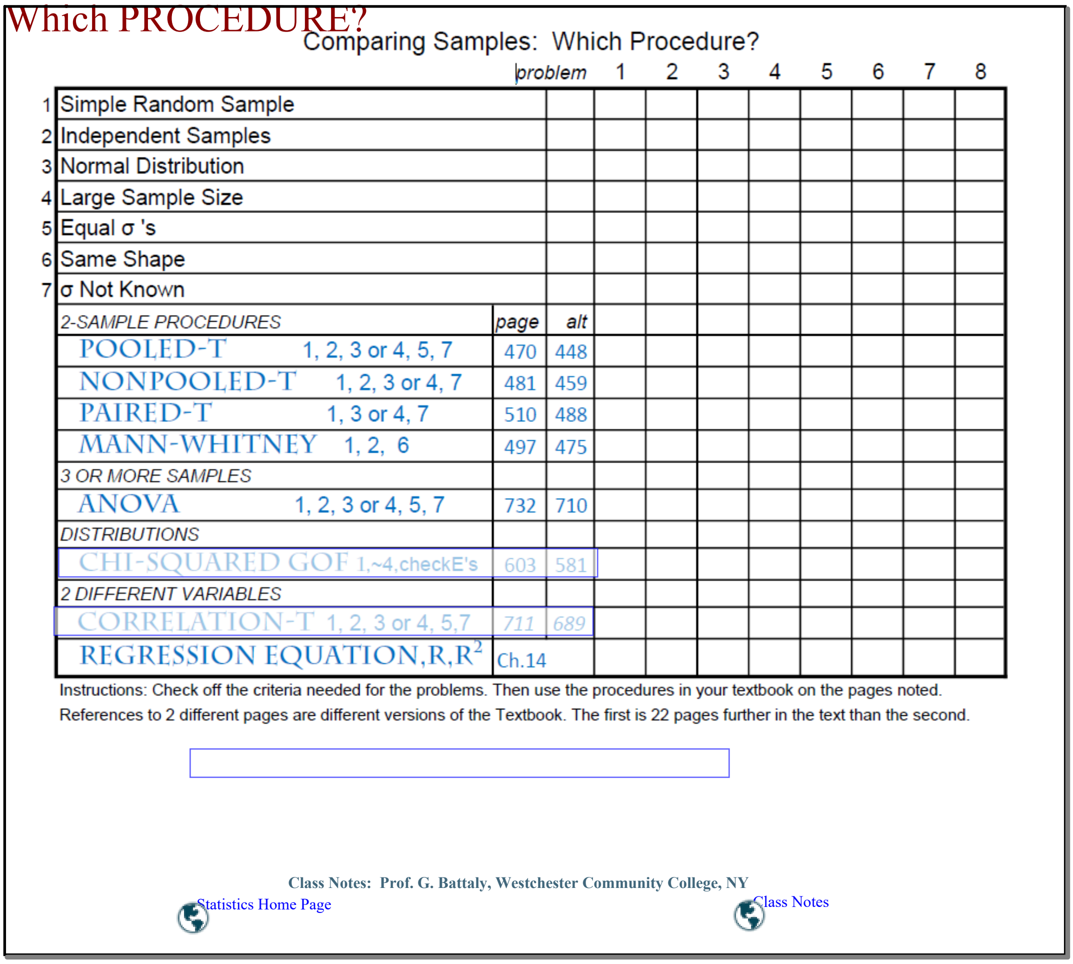

Which PROCEDURE?

Comparing Samples: Which Procedure?

		page	alt	problem 1	2	3	4	5	6	7	8
1	Simple Random Sample										
2	Independent Samples										
3	Normal Distribution										
4	Large Sample Size										
5	Equal σ 's										
6	Same Shape										
7	σ Not Known										
	2-SAMPLE PROCEDURES	*page*	*alt*								
	POOLED-T 1, 2, 3 or 4, 5, 7	470	448								
	NONPOOLED-T 1, 2, 3 or 4, 7	481	459								
	PAIRED-T 1, 3 or 4, 7	510	488								
	MANN-WHITNEY 1, 2, 6	497	475								
	3 OR MORE SAMPLES										
	ANOVA 1, 2, 3 or 4, 5, 7	732	710								
	DISTRIBUTIONS										
	CHI-SQUARED GOF 1,~4,checkE's	603	581								
	2 DIFFERENT VARIABLES										
	CORRELATION-T 1, 2, 3 or 4, 5,7	711	689								
	REGRESSION EQUATION,R,R^2	Ch.14									

Instructions: Check off the criteria needed for the problems. Then use the procedures in your textbook on the pages noted.
References to 2 different pages are different versions of the Textbook. The first is 22 pages further in the text than the second.

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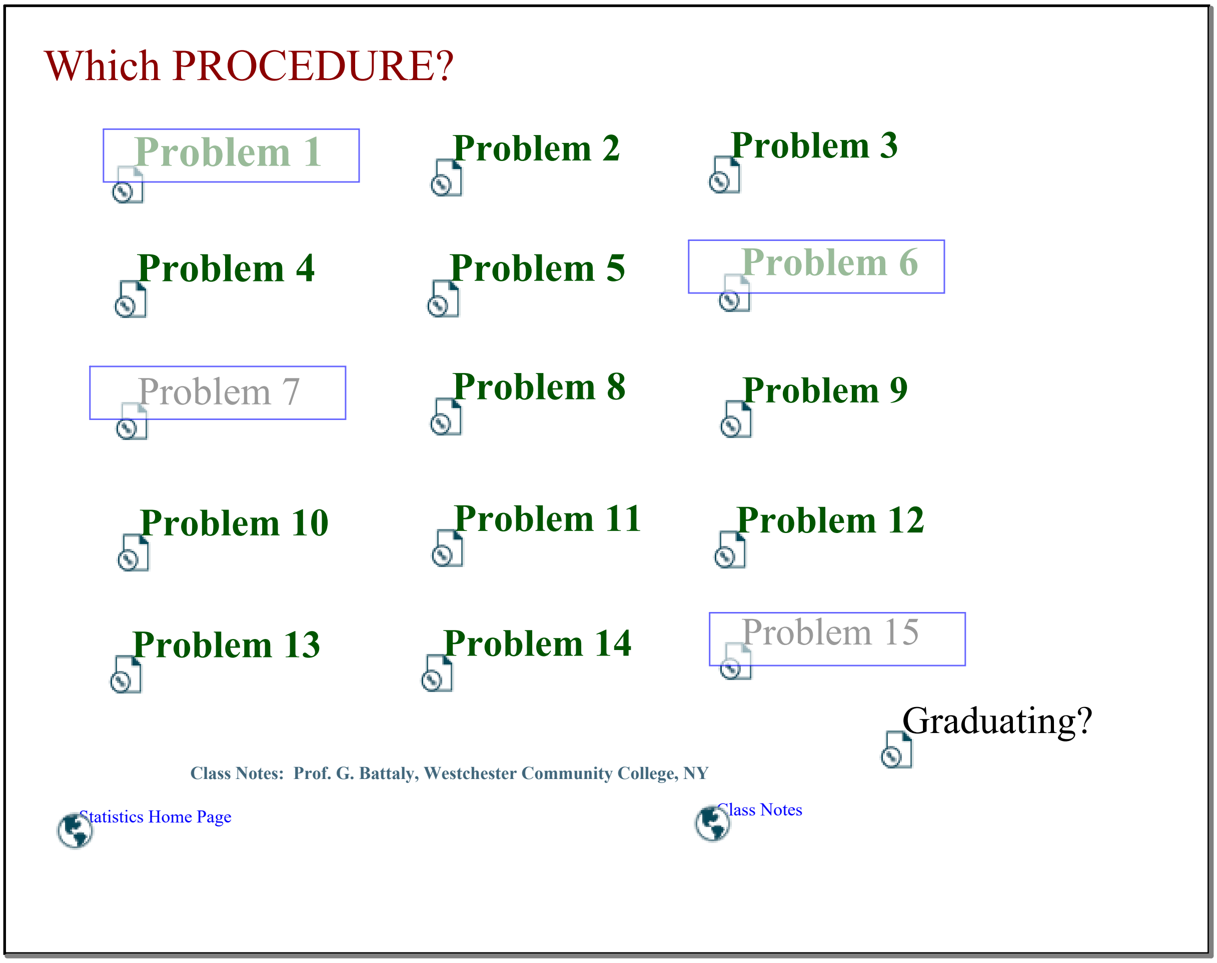

Which PROCEDURE?

Problem 1 Problem 2 Problem 3

Problem 4 Problem 5 Problem 6

Problem 7 Problem 8 Problem 9

Problem 10 Problem 11 Problem 12

Problem 13 Problem 14 Problem 15

Graduating?

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NOT COVERED spr 2024

Which PROCEDURE?

1.

M&M Colors. Consumer affairs for M&M/MARS have reported the color distribution of M&Ms as that noted as percentage on the table below. Three randomly selected bags of M&Ms resulted in the average numbers indicated. Do the data provide sufficient evidence to conclude that the color distribution of M&Ms differs from that reported? Use α = 0.05.

Color	Percentage	Sample Average
Brown	30	152
Yellow	20	114
Red	20	106
Orange	10	51
Green	10	43
Blue	10	43

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Class Notes

Chi_Square Goodness of Fit

Which PROCEDURE?

5. Independent random samples of 15 midwestern households and 14 southern households provided the following data on last year's vehicle miles of travel in thousands of miles. At the 5% significance level, does there appear to be a difference in last year's mean vehicle miles traveled for midwestern and southern households? (Assume normal distribution.)

	MIDWEST			SOUTH	
16.2	10.8	20.3	22.2	15.8	17.5
12.9	11.2	20.9	19.2	18	18.2
17.3	16.6	9.6	9.3	12.2	22.8
14.6	16.6	15.1	24.6	20.1	11.5
18.6	24.4	18.3	20.2	16	
mean		16.23			17.69
stdev		4.06			4.42

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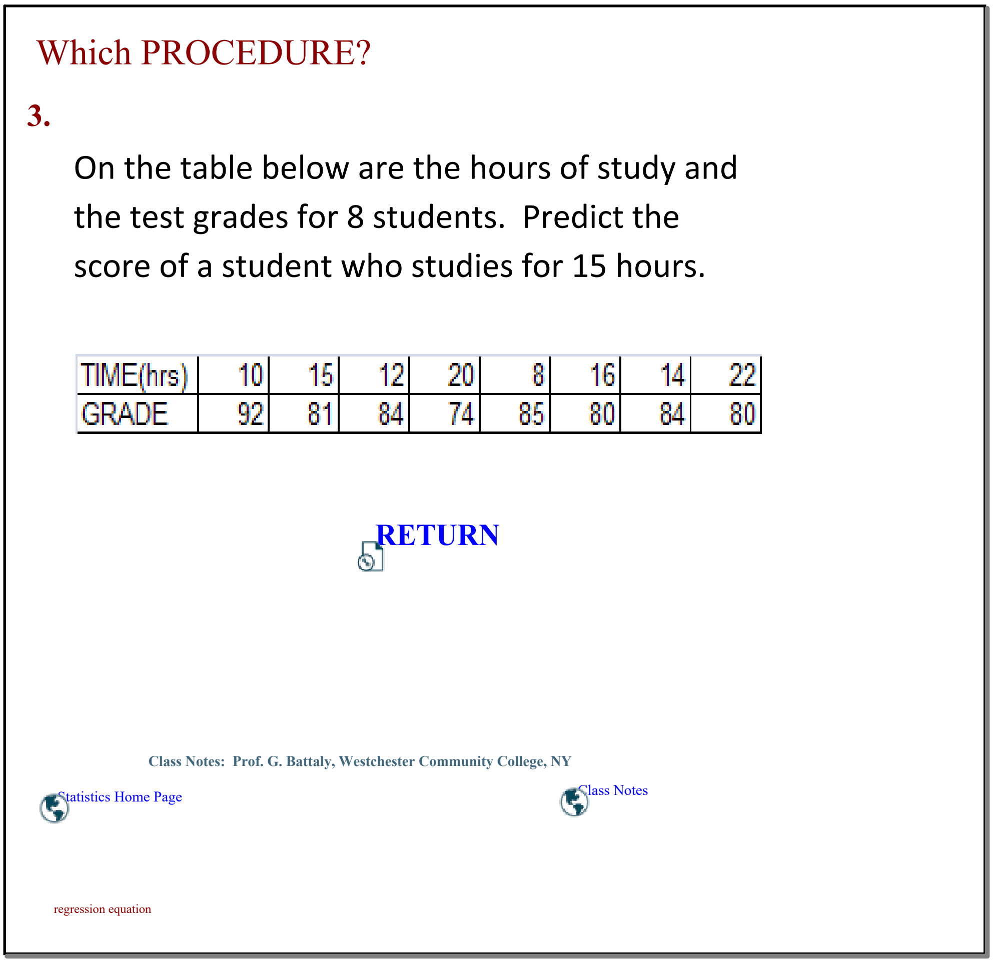
Class Notes

pooled - t test



Which PROCEDURE?

3.

On the table below are the hours of study and the test grades for 8 students. Predict the score of a student who studies for 15 hours.

TIME(hrs)	10	15	12	20	8	16	14	22
GRADE	92	81	84	74	85	80	84	80

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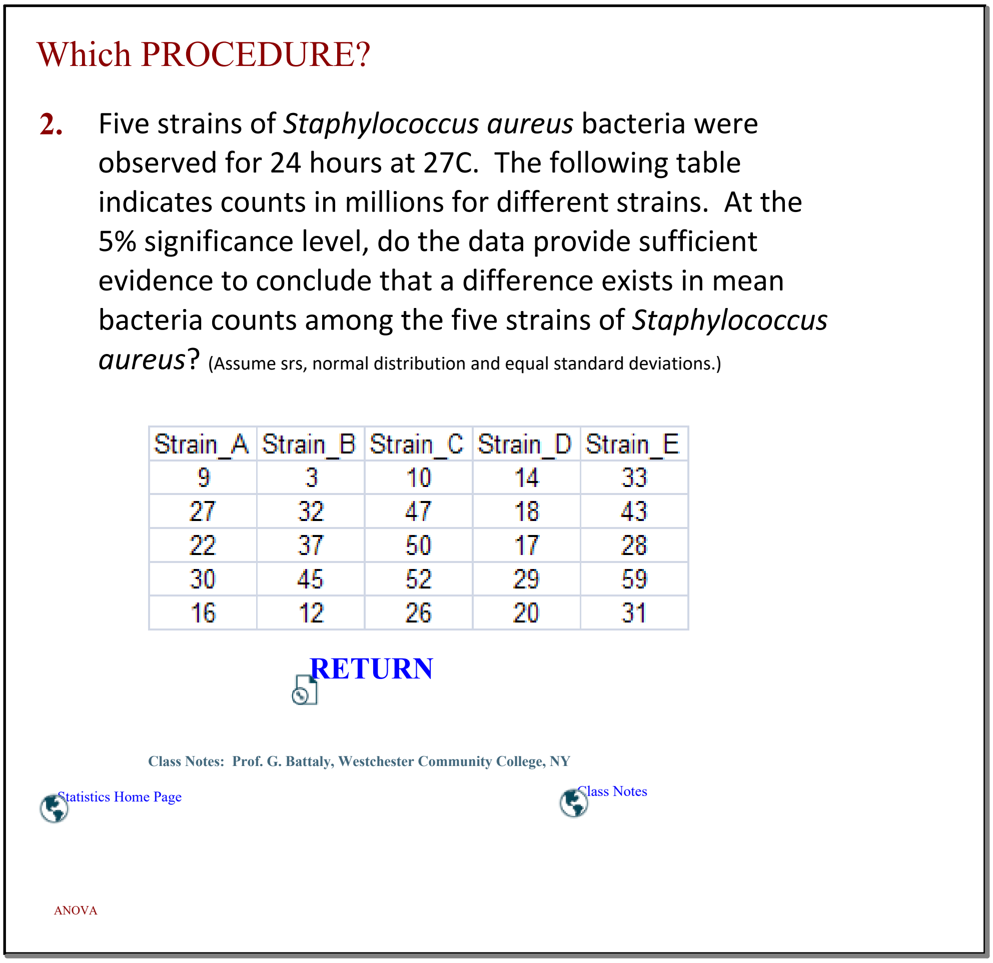
regression equation



Which PROCEDURE?

2. Five strains of *Staphylococcus aureus* bacteria were observed for 24 hours at 27C. The following table indicates counts in millions for different strains. At the 5% significance level, do the data provide sufficient evidence to conclude that a difference exists in mean bacteria counts among the five strains of *Staphylococcus aureus*? (Assume srs, normal distribution and equal standard deviations.)

Strain_A	Strain_B	Strain_C	Strain_D	Strain_E
9	3	10	14	33
27	32	47	18	43
22	37	50	17	28
30	45	52	29	59
16	12	26	20	31

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ANOVA

Which PROCEDURE?

4. Sediment ammonium concentrations in the seagrass beds of Corpus Christi Bay (CCB) were compared with that in Lower Laguna Madre (LLM) using independent random samples. Summary statistics follow. At the 1% significance level, is there sufficient evidence to conclude that the mean sediment ammonium concentration in CCB exceeds that in LLM? (Assume normal distributions.)

	CCB	LLM
MEAN	115.1	24.3
STANDEV	79.4	10.5
n	51	19

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Class Notes

non-pooled t Test

Which PROCEDURE?

10. The ages and price data for 10 randomly selected used Corvettes are noted below. The price is in hundreds of dollars. What percent of the variation is explained by a regression line? Does the regression line appear to be useful for making predictions for the price of a 5 year old Corvette?

AGE	6	6	6	2	2	5	4	5	1	4
PRICE	270	260	275	405	364	295	335	308	405	305

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Class Notes

Coefficient of Determination

Which PROCEDURE?

9. In a study of the picoplankton in San Francisco Bay, the following number of picoplankton concentration in units of 10^7 cells per liter resulted from independent samples in the North and South Bays. At the 5% significance level, do the data provide sufficient evidence to conclude that the mean concentrations of the picoplankton population differ between the North and South Bays? (Assume the populations have the same shape.)

NORTH	16.2	11.2	24.8	36.4	15	23.6	12.1
SOUTH	9.8	18.7	26	7.4	15		

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Class Notes

Mann-Whitney

Which PROCEDURE?

8. Patients with glaucoma in one eye were checked for corneal thickness. A random sample was selected of both the glaucoma eye and the normal eye, resulting in the following data. At the 10% significance level, do the data provide sufficient evidence to conclude that mean corneal thickness is greater in normal eyes than in eyes with glaucoma? (Assume normal distribution.)

NORMAL	GLAUCOMA
484	488
478	478
492	480
444	426
436	440
398	410
464	458
476	460

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Class Notes

Paired t test

Which PROCEDURE?

7. Members of the American Statistical Association were asked which method they preferred for receiving ballots for annual elections. At the 5% significance level, do the data provide sufficient evidence to conclude that degree and preference are associated?

	PhD	MA	Other
Mail	65	18	3
Email	166	71	2
Both	84	23	5
N/A	73	55	1

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Chi_Square Independence

Which PROCEDURE?

6. In an article on pre-natal development, crown-rump measurements were taken for randomly selected developing fetuses. The table below shows ages in weeks and length of crown-rump in millimeters. At the 1% significance level, are the age and crown-rump of fetuses linearly correlated? (Assume equal standard deviations, normal populations, and independent sampling.)

age (wks)	10	10	13	13	18	19	19	23	25	28
crown-rump (mm)	66	66	108	106	161	166	177	228	235	280

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Correlation t-Test

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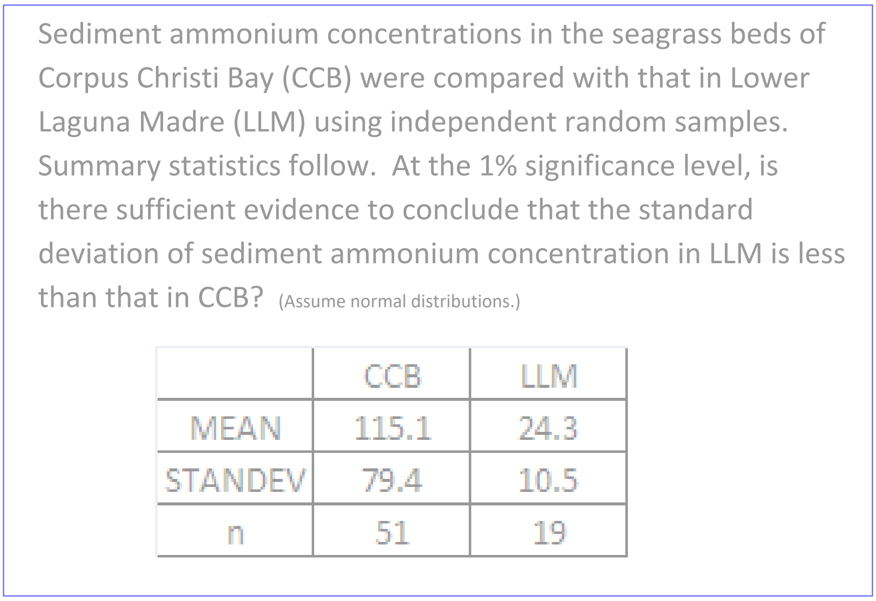
Which PROCEDURE?



Sediment ammonium concentrations in the seagrass beds of Corpus Christi Bay (CCB) were compared with that in Lower Laguna Madre (LLM) using independent random samples. Summary statistics follow. At the 1% significance level, is there sufficient evidence to conclude that the standard deviation of sediment ammonium concentration in LLM is less than that in CCB? (Assume normal distributions.)

	CCB	LLM
MEAN	115.1	24.3
STANDEV	79.4	10.5
n	51	19

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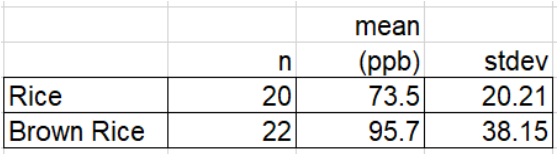
2 sample standard deviation F-test

Which PROCEDURE?

arsenic in baby cereal article

11. It's no secret that infants ingest traces of arsenic with every bite of rice cereal. Widespread reporting on the problem began in 2017, when tests by Consumer Reports found arsenic in rice and rice-based foods, including infant rice cereal. Rice readily absorbs arsenic from the environment, about 10 times more of it than other grains.

At the 5% significance level, is there a difference in arsenic levels in the 2 types of rice? (Assume srs, independence, and normal distr.)



	n	mean (ppb)	stdev
Rice	20	73.5	20.21
Brown Rice	22	95.7	38.15

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Class Notes

pooled-t test

Which PROCEDURE?

12. Twelve cars were equipped with radial tires and driven over a test course. Then, using the same drivers, the same cars were equipped with regular belted tires and driven over the same course. After each run, the cars' gas economy (in km/l) was measured. Is there evidence that radial tires produce better fuel economy? (A normal probability plot is approximately a straight line. Use $\alpha = 0.05$)

radial	belted
4.2	4.1
4.7	4.9
6.6	6.2
7.0	6.9
6.7	6.8
4.5	4.4
5.7	5.7
6.0	5.8
7.4	6.9
4.9	4.7
6.1	6.0
5.2	4.9

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Statistics Home Page Class Notes

paired-t test

Which PROCEDURE?

13. The table below lists the number of hours of study and the number of hours of sleep for students at a local community college. What is the strength of the correlation between these variables?

study	sleep
2.5	10.0
4.0	9.0
5.5	7.5
7.0	6.0
8.0	7.0
9.5	6.5

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Statistics Home Page Class Notes

correlation coefficient

Which PROCEDURE?

14. Independent random samples of 17 sophomores and 13 juniors attending a large university yield the following data on grade point averages. (Sophomore GPA: mean=2.840, s=0.520; Junior GPA: mean=2.981, s=0.309)

At the 5% significance level, do the data provide sufficient evidence to conclude that the mean GPAs of the sophomores and juniors at the university differ? (Assume normal distribution.)

Soph	Junior
3.04	2.56
1.71	2.77
3.30	2.70
2.88	3.00
2.11	2.98
2.60	3.47
2.92	3.26
3.60	3.20
2.28	3.19
2.82	2.65
3.03	3.00
3.13	3.39
2.86	2.58
3.49	
3.11	
2.13	
3.27	

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either pooled-t or non pooled-t

Which PROCEDURE?

In an article on pre-natal development, crown-rump measurements were taken for developing fetuses. The table below shows ages in weeks and length of crown-rump in millimeters. At the 1% significance level, are the age and crown-rump of fetuses linearly correlated? (Assume equal standard deviations, normal populations, and independent sampling.)

age (wks)	10	10	13	13	18	19	19	23	25	28
crown-rump (mm)	66	66	108	106	161	166	177	228	235	280

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Correlation t-Test

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Which PROCEDURE?

15. The ankle brachial index (ABI) compares the blood pressure of a patient's arm to the blood pressure of the patient's leg. The ABI can be an indicator of different diseases, including arterial diseases. A healthy (or normal) ABI is 0.9 or greater.
In a study by M. McDermott et al. titled "Sex Differences in Peripheral Arterial Disease: Leg Symptoms and Physical Functioning" (Journal of the American Geriatrics Society, Vol. 51, No. 2, \pp. 222–228), the researchers obtained the ABI of 187 randomly selected women with peripheral arterial disease. The results were a mean ABI of 0.64 with a standard deviation of 0.15. At the 1% significance level, do the data provide sufficient evidence to conclude that, on average, women with peripheral arterial disease have an unhealthy ABI?

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1 Sample t-Test

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Sophomores: any graduating this semester?

Congratulations!

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Attachments

📎 cheerNurses.mp4