

ANOVA Data sets (for hand calculations)

For the data set of your choice, run a complete ANOVA. This means that you must state your hypotheses, choose an appropriate level for alpha, complete an ANOVA summary table, calculate η^2 , and write out your conclusions. If you find significant group differences, describe how you would complete your analysis. Show all your calculations and make sure to explain how you determine if the data meet ANOVA assumptions.

Note: You may find that assumptions are not met in several of the examples.

1. Pat, Mark, and Sheri go bowling. Are there significant differences among their average scores? They bowled six games, all in the same bowling alley, on the same lane, and using the same ball.

Pat	Mark	Sheri
157	180	156
148	175	158
150	165	145
140	195	151
160	185	166
167	170	161

2. Nine individuals visited five cities and filled out paperwork for a new car loan. The interest rates they qualified were quoted are reported below. Do the data support the conclusion that a new car loan interest rate depends on the city in which you apply?

City A	City B	City C	City D	City E
13.75	14.25	14.00	15.00	14.50
13.75	13.00	14.00	14.00	14.00
13.50	12.75	13.51	13.75	14.00
13.50	12.50	13.50	13.59	13.90
13.00	12.50	13.50	13.25	13.75
13.00	12.40	13.25	12.97	13.25
13.00	12.30	13.00	12.50	13.00
12.75	11.90	12.50	12.25	12.50
12.50	11.90	12.50	11.89	12.45

3. The following table summarizes times taken to perform a numerical task using three different kinds of keyboard layouts. Does it appear as though the keyboard layout impacts the time needed to complete a task?

Layout 1	Layout 2	Layout 3
23.8	30.2	27.0
25.6	29.9	25.4
24.0	29.1	25.6
25.1	28.8	24.2
25.5	29.1	24.8
26.1	28.6	24.0
23.8	28.3	25.5
25.7	28.7	23.9
24.3	27.9	22.6
26.0	30.5	26.0
24.6		23.4
27.0		

4. A study was conducted to test the question as to whether cigarette smoking is associated with reduced serum-testosterone levels in men aged 35-45. The study involved four groups: nonsmokers, former smokers, light smokers, and heavy smokers. Does it appear as though smoking impacts serum-testosterone levels?

Nonsmokers	Former	Light	Heavy
.44	.46	.37	.44
.44	.50	.42	.25
.43	.51	.43	.40
.56	.58	.48	.27
.85	.85	.76	.34
.68	.72	.60	.62
.96	.93	.82	.47
.72	.86	.72	.70
.92	.76	.60	.60
.87	.65	.51	.54

Math 301 Unit #1 Exam

Name: _____

Use the following information to answer questions #1 - #3:

Samples of size $N = 25$ independent observations were repeatedly taken from a normal distribution with $\mu = 50$ and $\sigma^2 = 4^2 = 16$. For each sample, the sample mean (\bar{X}) and the unbiased estimate of the standard deviation (s^2) were calculated.

- 1) What is the mean of the sampling distribution of the sample means? Circle the correct answer. (1 point)

- a) 10.0
- b) 12.5
- c) 16.0
- d) 25.0
- e) None of the above

- 2) What is the standard deviation (standard error) of the sampling distribution of the sample means? (1 point)

- f) 0.8
- g) 3.2
- h) 4.0
- i) 16.0
- j) None of the above

- 3) What is the mean of the sampling distribution of s^2 ? Circle the correct answer. (1 point)

- k) 4.0
- l) 16.0
- m) 24.0
- n) 25.0
- o) None of the above