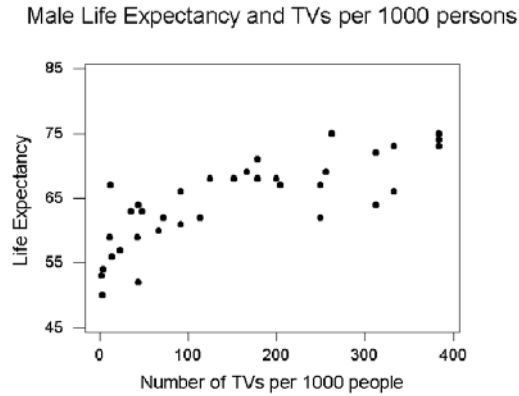


INSTRUCTIONS: Read the questions carefully and completely. Answer each question and show work in the space provided. Partial credit will not be given if work is not shown. When asked to explain, describe, or comment, do so within the context of the problem. Be sure to include units when dealing with quantitative variables.

1. [10 pts] Short answer.

- a) [2] Statistics is about ... _____. (Fill in the blank with one word.)
- b) [2] The least squares slope relating y to x is $b_1=1.50$. Additionally, $\bar{x}=10$, $\bar{y}=20$, $s_x=3.2$ and $s_y=6.0$. What is the value of the correlation coefficient, r , for the linear relationship between y and x ?
- c) [2] What is replication within an experiment?
- d) [2] A college administrator looks at a sample of 25 seniors and calculates the correlation between freshman year gpa and current (senior year) gpa and gets $r = +1.15$. What does this value of r tell you?
- e) [2] A statistic is a summary of _____, while a parameter is a summary, or key number, of _____.

2. [10 pts] Data are collected on the average life expectancy for males and females for 35 of the most populated countries of the world, together with the average number of televisions per 1000 people. Below is a plot of the average male life expectancy, y , versus the average number of TVs per 1000 people, x .



- a) [3] Describe the relationship between male life expectancy and number of TVs.
- b) [3] The correlation between male life expectancy and number of TVs is? Choose from the following: -0.68 , -0.36 , -0.04 , $+0.42$, $+0.79$, $+0.99$. Briefly explain your choice.
- c) [4] A charitable organization looks at these data and decides to buy TVs and ship them to countries with low life expectancies. Will this help raise the life expectancy for those countries? Explain briefly.

3. [20 pts] Aerial photographs and visual sightings are often used to monitor the number and location of wildlife. Often measurements of physical characteristics are necessary to monitor the health of animals. The length of alligators can be estimated quite well from visual sightings or photographs. Weight, however, is a different matter. Below are data on the length (in meters) and weight (in kilograms) for alligators captured in Florida.

Alligator	1	2	3	4	5	6	7	8
Length, x	2.4	1.9	1.5	2.2	2.4	1.6	2.2	1.8
Weight, y	58	23	13	36	50	15	41	16

- a) [3] Answer the questions Who? and What? for these data.

Below are summary information for the two variables Length and Weight.

Length		Weight	
Mean	2.0 m	Mean	31.5 kg
Std Dev	0.3505 m	Std Dev	17.246 kg

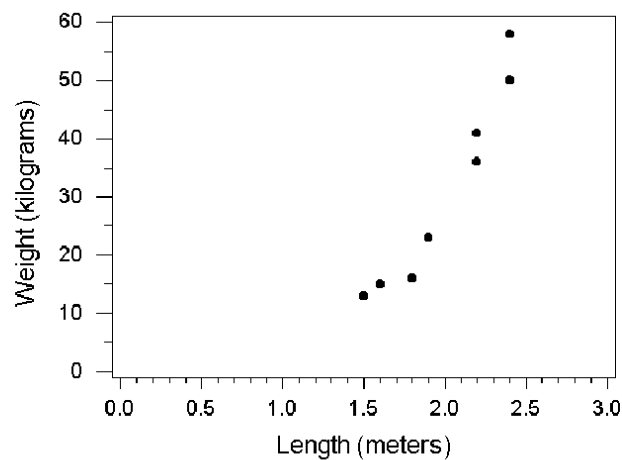
Correlations

	Length	Weight
Length	1.0000	0.9595
Weight	0.9595	1.0000

- b) [4] Compute the least squares slope, b_1 .
- c) [4] Give an interpretation of the slope within the context of the problem.
- d) [3] Compute the least squares y-intercept, b_0 .

e) [3] Give the equation of the least squares regression line and use this line to predict the weight of an alligator with a length of 1.9 meters.

f) [3] Plot the least squares regression line on the graph below. It must be clear to me that you used the equation of the line to plot the line.



4. [10 pts] Below is a list of 10 individuals who wish to attend a national convention. There is only enough money to send two. To be fair the two will be chosen at random.

Angela	Juan	Steve	Lindsay	Mark
Jamil	Kathryn	Samantha	Joshua	Melanie

a) [5] Use the random number table on the formula sheet (start at the left most number in row 3 and read left to right) to select the two. Who are they?

b) [5] If you wanted to be sure that the random selection included one woman and one man, how would you do this?

5. [10 pts] A biology teacher wants to compare the effectiveness of computer software that simulates dissection of a frog with actual dissection. She tests each student in her seventh grade class on their knowledge of the anatomy of the frog (the pre-test). She then divides the students into two groups at random (14 students in each group). The students in one group use the computer dissection software, while the other students dissect real frogs. She re-tests the students (the post-test) on their knowledge of the anatomy of the frog. She then compares the change in test scores (post-test minus pre-test) for the two groups.
- [5] If the teacher wants to see if girls score differently than boys on the pre-test, is this an experiment or an observational (investigative) study? Explain briefly. What are the explanatory and response variables?
 - [5] If the teacher wants to see if there is a difference between the two groups (computer dissection versus real dissection) in terms of change in test scores, is this an experiment or an observational (investigative) study? Explain briefly. What are the explanatory and response variables?
6. [10 pts] A researcher wishes to study the relationship between vigorous exercise and weight loss. Thirty male subjects are available for the study. The researcher lets the subjects select which group (no exercise or vigorous exercise) they want to be in. Ten subjects choose the vigorous exercise group and the remaining subjects choose the no exercise group. The study lasts for 6 weeks. During the 6 weeks, all subjects are on the same diet and consume no more than 2,500 calories per day.
- [2] Identify the treatments.
 - [1] Identify the response variable.

c) [2] Can this be a blind experiment? Explain briefly.

d) [5] Is this a well-designed experiment? If so, explain why. If not, explain why not and indicate how it can be improved.

Formulas

$$\bar{y} = \frac{\sum y}{n} \quad s_y = \sqrt{\frac{\sum (y - \bar{y})^2}{n-1}} \quad \bar{x} = \frac{\sum x}{n} \quad s_x = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

$$r = \frac{\sum z_x z_y}{n-1} \quad z_x = \frac{x - \bar{x}}{s_x} \quad z_y = \frac{y - \bar{y}}{s_y}$$

$$b_1 = r \frac{s_y}{s_x} \quad b_0 = \bar{y} - b_1 \bar{x} \quad \hat{y} = b_0 + b_1 x$$

Table of Random Digits

Row										
1	96299	07196	98642	20639	23185	56282	69929	14125	38872	94168
2	71622	35940	81807	59225	18192	08710	80777	84395	69563	86280
3	03272	41230	81739	74797	70406	18564	69273	72532	78340	36699
4	46376	58596	14365	63685	56555	42974	72944	96463	63533	24152
5	47352	42853	42903	97504	56655	70355	88606	61406	38757	70657