

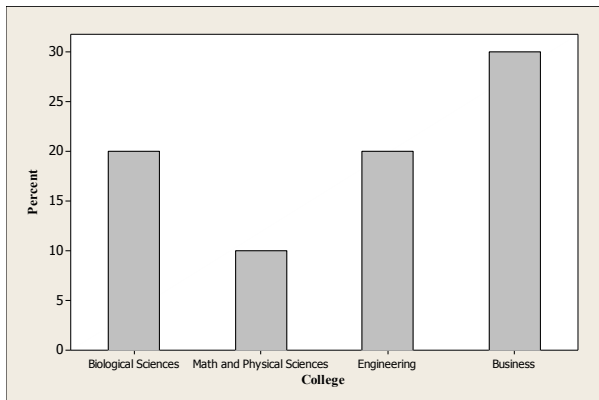
Test 1
Chapters 1, 2, 4, and 5

1. Would a pie chart be appropriate or inappropriate to illustrate the distribution of the following data? **Explain why or why not.** (3 points)

Facebook visitors by age in years

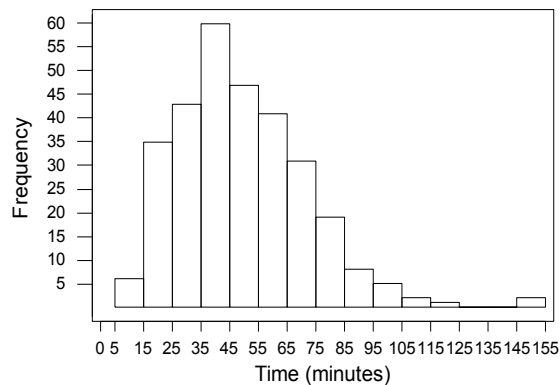
Under 25	26.8%
25-34	23%
35-49	31.5%;
Over 49	18.7%

2. A large university is divided into six colleges, with most students graduating from four of these colleges. The following bar chart gives the distribution of the percent graduating from the four most popular colleges in 2003. Could this distribution be displayed using a pie chart? **Why or why not?** (3 points)



3. The histogram below shows the time visitors to a museum spent browsing an exhibit on a Saturday. There were 300 visitors that day.

- The shape of the distribution is _____. (2 points)
- The *number* of visitors that spent less than 25 minutes at the museum that day is closest to _____. (3 points)
- The *percent* of visitors spending more than 85 minutes at the museum is closest to _____. (3 points)



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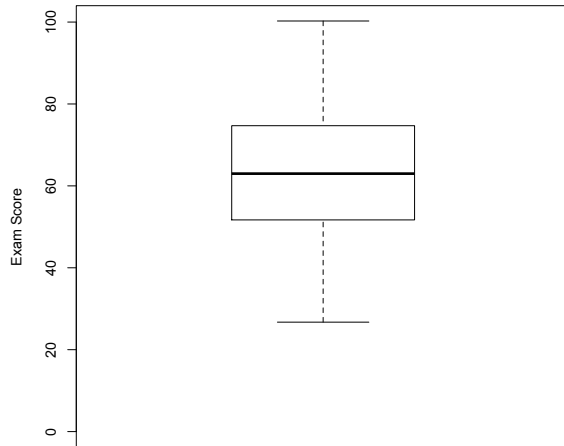
4. Flower lengths for the H. CARIBAEA RED Heliconia are listed below. Make a **stem plot**, **histogram**, or **boxplot** to illustrate the distribution. (9 pts)

41.90	42.01	41.93	43.09	41.47	41.69	39.78	40.57
39.63	42.18	40.66	37.87	39.16	37.40	38.20	38.07
38.1	37.97	38.79	38.23	38.87	37.78	38.01	

5. The mean and standard deviation provide the best numerical summary for a distribution whose shape is _____. (2 points)
6. The 5-number summary includes what five numbers? (5 points)

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7. The exam scores (out of 100 points) for all students taking an introductory Statistics course are used to construct the following boxplot.
- Approximate the **5-number summary** and the **interquartile range** from the boxplot. (6 points)
 - Approximately 25% of student scores exceeded _____ points. (2 points)



8. At a highway weigh station, a simple random sample of 12 tractor trailers gave the following measures of weight in tons. **Use your calculator but show how you would do standard deviation by hand.**

16 24 28 30 31

- Calculate the sample mean of this data. (9 points)
- Calculate the sample standard deviation of this data. (9 points)
 - mean: 24.9; standard deviation 5.7
 - mean: 24.9; standard deviation 6.1
 - mean: 25.8; standard deviation 6.1
 - mean: 25.8; standard deviation 5.7

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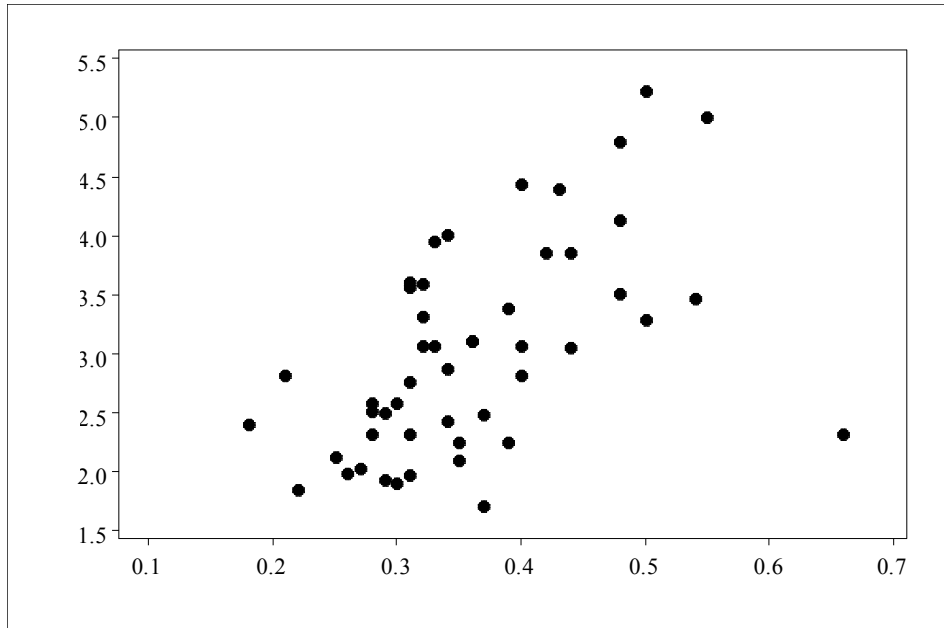
9. At a weight loss center, a sample of the number of pounds lost by 10 different patients over the last 12 months of 2011 gave the following data.

3.7 11.6 16.3 16.7 18.5 22.4 23.1 23.4 27.6 28.7

- a. Find the 5-number summary for this data. (9 points)
- b. Identify any data points that are outliers, if there are any. Use numerical calculations to determine whether a point is an outlier. (9 points)

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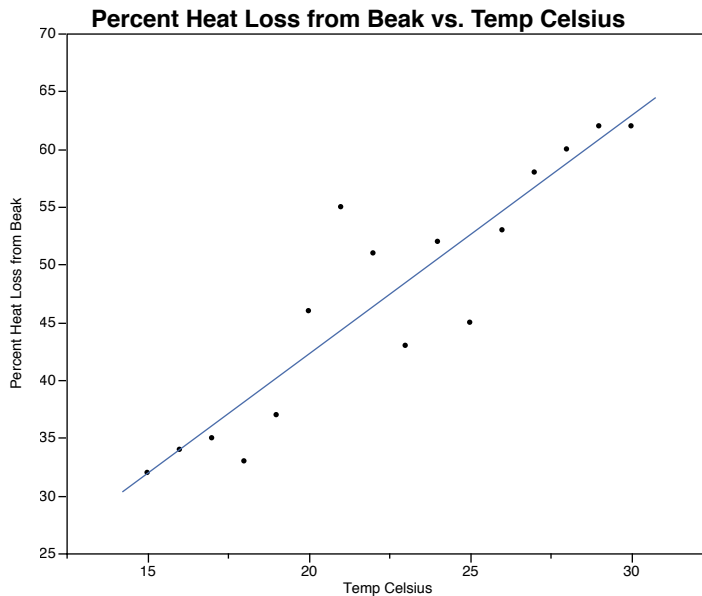
10. The volume of oxygen consumed (in liters per minute) while a person is at rest and while he or she is exercising (running on a treadmill) was measured for each of 50 subjects. The goal is to determine if the volume of oxygen consumed during aerobic exercise can be estimated from the amount consumed at rest. The results are plotted below.



- What is the explanatory variable? (2 points)
- Label the vertical and horizontal axes in the above scatterplot. (4 points)
- Describe the form, shape, direction, and strength of the relationship. (4 points)
- If an outlier exists in the above scatterplot, **circle it and state whether you think it is influential**, i.e., would it influence the regression line? (2 points)

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11. The toco toucan, the largest member of the toucan family, possesses the largest beak relative to its body size of all birds. The large surface area may be an important mechanism for radiating heat and cooling the bird. The following scatter plot illustrates the relationship between the percent of total body heat loss from the beak and temperature in degrees Celsius.



$$r = 0.914$$

$$\bar{x} = 22.5^{\circ}\text{C}$$

$$s_x = 4.76^{\circ}\text{C}$$

$$\bar{y} = 47.38\%$$

$$s_y = 10.75\%$$

- Calculate the slope of the regression line. (9 points)
- Explain what the slope means in terms of this study. (5 points)
- Calculate the intercept of the regression line. (9 points)
- The least-squares line would predict the percent heat loss from a toucan's beak at 24 degrees Celsius to be _____. (3 points)
- The residual for the point (24, 52) is _____. (3 points)
- The temperature in degrees Celsius explains _____ % of the percent of total body heat loss from the beak. (5 points)

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13. **EXTRA CREDIT:** Ebola is a threat to both people and gorillas. To study the spread of the virus, researchers matched “distance,” the number of home ranges that separated 6 gorilla groups from the first group infected, with “time,” the number of days before deaths began in each later group. The next two questions relate to this study.

- a. Calculate the correlation between distance and time.
(**EXTRA CREDIT:** 5 points)

Distance	1	3	4	4	4	5
Time	4	21	33	41	43	46

- b. If the time in days were replaced by time in number of weeks until deaths began in each later group (fractions allowed so 4 days would be $\frac{4}{7}$ of a week), Would the correlation between distance and time change? **Explain why or why not.** (**EXTRA CREDIT:** 5 points)