A doctor has discovered a defect in a new medicine. The defect is expected to affect 30% of the medicine products that were produced. If 40 boxes of the medicine are selected at a random, find the following probabilities.

1. Find the probability that less than 8 boxes of the medicine would contain the defect.

The amount of time that a sample of students at a college spends studying physics each week is shown.

Time Spent Studying Physics (hours)							
12	30	27	23	13	19		
27	33	39	20	31	26		

2. Construct a box plot.

Tim want to compare the average amount of time per day in hours that employed men and women work. He surveyed 12 men and 12 women chosen at random and recorded the working hours.

Women	6	7	7	7	6.5	7.5
	7.5	6.5	8	8	7	6
Men	8	8	8.5	7.5	7.5	8.5
	8	8	7.5	9	7	8.5

3. Calculate mean and sample standard deviation for each data set.

State whether the statements are true or false.

4. If the null hypothesis is rejected, it means that the value of ρ is significantly different from 0.

Marks of all the students in math exam are shown in the table below.

Marks (percent)							
63	76	86	74	92	89		
73	93	66	96	78	84		
98	81	78	87	91	69		
79	86	82	81	72	82		

5. The data given above has a symmetric distribution. Summarize the center and spread of the data using either the mean and standard deviation or the five-number summary. Justify your choice.

A machine used to fill mango boxes dispenses slightly different amounts into each box. Suppose the weight of mangoes in 180 boxes is normally distributed with a mean of 2.2 kilograms and a standard deviation of 0.05 kilograms.

6. Approximately how many boxes of mangoes weigh less than 2.10 kilograms?

7. A recent study reports that high-school age students play video games for 4.5 hours per day. The variable is normally distributed with a standard deviation of 1.1 hours. If a sample of 17 high-school students is selected, find the probability that they play video games for more than 5 hours per day on an average.

Consider the data set below where row A represents the explanatory variable and row B represents the response variable.

A	1	2	3	4	5	6	7
В	114	123	137	131	146	140	171
A	8	9	10	11	12	13	14
В	153	179	188	193	203	215	210

8. Make a scatter plot of the data and identify the relationship.

Scores obtained by girls and boys on a math exam are shown in the table below.

Scores obtained by girls (percent)							
76	81	83	79	82	76		
84	77	71	82	78	84		

Scores obtained by boys (percent)							
72	73	69	74	73	77		
68	76	74	66	71	79		

9. Construct a percentile graph of the data.

The time taken by the students in a swimming school to learn swimming is a random variable with a normal distribution. The average learning time is 48 hours with a standard deviation of 4 hours.

10. Find the probability that the average time it will take a group of 15 students to learn swimming is between 43 and 49 hours.

The age of students selected for a quiz competition are normally distributed with $\mu = 18$ years and $\sigma = 2$ years. Find each probability, and use a graphing calculator to sketch the corresponding area under the curve.

11. Find P(15 < X < 22).

You toss a coin 30 times to see how many heads occur. The random variable represents the number of heads.

12. Determine whether the experiment is a binomial experiment or can be reduced to a binomial experiment.

13. A survey of 250 randomly selected cars of a same model in a city shows that average maintenance per month for that model is approximately \$173.35. Assume a normal distribution with a standard deviation of \$55.54. Find a 95% confidence interval for the average maintenance per month for all the cars of that model in the city.

14. A survey of 250 randomly selected samples shows that average kitchen remodeling cost of a 200-square-foot kitchen is \$14,913. Assume a normal distribution with a standard deviation of \$3,125. Use a 99% confidence level to find the maximum error of estimate for the mean kitchen remodeling cost of a 200-square-foot kitchen.

According to a recent survey, 57% of college students own an MP3 player. Five students chosen at random are asked if they own an MP3 player.

15. Construct a binomial distribution for the random variable *X*, which represents the number of students who own an MP3 player.

Find areas under normal distribution curves for the following questions.

16. What percentage of the area under the normal curve lies to the right of $\mu + 2\sigma$?



A doctor has discovered a defect in a new medicine. The defect is expected to affect 30% of the medicine products that were produced. If 40 boxes of the medicine are selected at a random, find the following probabilities.

17. Find the probability that more than 13 boxes of the medicine would contain the defect.

Consider the data set below where row A represents the explanatory variable and row B represents the response variable.

A	1	2	3	4	5	6	7
В	114	123	137	131	146	140	171
A	8	9	10	11	12	13	14
В	153	179	188	193	203	215	210

18. Calculate and interpret the correlation coefficient.

Tim want to compare the average amount of time per day in hours that employed men and women work. He surveyed 12 men and 12 women chosen at random and recorded the working hours.

Women	6	7	7	7	6.5	7.5
	7.5	6.5	8	8	7	6
Men	8	8	8.5	7.5	7.5	8.5
	8	8	7.5	9	7	8.5

19. Construct two 95% confidence intervals for the average duration per day in hours for which employed men and women work. Then, make a statement comparing the effectiveness of the two intervals. Assume the data is normally distributed with the sample mean and standard deviation as follows.

For women: $\overline{x} = 7$, s = 0.65For men: $\overline{x} = 8$, s = 0.54

Classify each random variable X as *discrete* or *continuous*. Explain your reasoning.

20. X represents weight of a football player chosen at random.

Indicate the answer choice that best completes the statement or answers the question.

The table gives the frequency distribution of the average annual rainfall in inches for 50 randomly selected cities.

Class	Frequency
Boundaries	(f)
0-9.5	4
9.5-19.5	7
19.5-29.5	5
29.5-39.5	12
39.5-49.5	15
49.5-59.5	7

21. Construct a percentile graph of the data.



22. The vegetable salad preparation time for students of a cooking school is a random variable with a normal distribution. The average preparation time is 2.9 hours with a standard deviation of 1.6 hours. Find the probability that the average time it will take a class of 36 students to learn to prepare vegetable salad is less than 3.1 hours.

a. 71.81%	b. 74.82%
c. 77.33%	d. 73.52%

The table shows the populations (in thousands) during a recent year for a sample of 25 cities.

]	Population (Thousands)								
154	286	334	182	216					
281	89	236	273	314					
342	123	469	389	134					
225	312	167	243	429					
269	373	371	412	261					

23. Construct a histogram.



In a certain class, 65% of the students took French during their senior year. Seven students chosen at random are asked if they took French during their final year.

24. Find the variance of this distribution to the nearest hundredth.

a. 1.59 b. 0.65 c. 1.26 d. 4.55

The table given below shows the probability distribution of a situation.

X	1	2	3	4	5
P(X)	0.06	0.4	0.14	0.33	0.07

25. Find the variance of the probability distribution to the nearest hundredth.

a. 2.95 b. 1.95 c. 1.25 d. 1.28

26. Write the null and alternative hypotheses. State which hypothesis represents the claim.

Jessica claims that she can walk 3 miles per hour.

a. $H_0: \mu = 3$
 $Ha: \mu \neq 3$ (Claim)b. $H_0: \mu = 3$ (Claim)
 $Ha: \mu \neq 3$ c. $H_0: \mu \neq 3$
 $Ha: \mu = 3$ (Claim)d. $H_0: \mu \neq 3$ (Claim)
 $Ha: \mu = 3$

27. Construct a scatter plot that best represents the data in the table below. Then calculate the correlation coefficient.

x	у
3	2.9
4	3.5
5	4.1
6	4.5
7	5.2
8	5.6
10	6.1







The table gives the frequency distribution of the average annual rainfall in inches for 50 randomly selected cities.

Date:

Class	Frequency
Boundaries	(f)
0-9.5	4
9.5-19.5	7
19.5-29.5	5
29.5-39.5	12
39.5-49.5	15
49.5-59.5	7

28. The percentile graph of the data is given below. Estimate the percentile rank that an average annual rainfall of 50 inches would have in this distribution and interpret its meaning.



- a. A city with an average annual rainfall of 50 inches would be in the 86th percentile, which means that 86% of the cities have a lower average annual rainfall.
- b. A city with an average annual rainfall of 50 inches would be in the 7th percentile, which means that 7% of the cities have a lower average annual rainfall.
- c. A city with an average annual rainfall of 50 inches would be in the 15th percentile, which means that 15% of

the cities have a lower average annual rainfall.

d. A city with an average annual rainfall of 50 inches would be in the 56th percentile, which means that 56% of the cities have a lower average annual rainfall.

In a certain class, 65% of the students took French during their senior year. Seven students chosen at random are asked if they took French during their final year.

29. Find the mean of this distribution to the nearest hundredth.

a. 1.26 b. 4.55

c. 1.59 d. 0.65

The table shows the populations (in thousands) during a recent year for a sample of 25 cities.

Population (Thousands)				
154	286	327	182	216
271	89	236	273	314
342	123	469	345	134
225	373	167	243	473
298	373	338	390	261

30. Use the graph shown below to describe the shape of the distribution.



- a. positively skewed distributionc. negatively skewed distribution
- b. symmetrical distributiond. bimodal distribution

For each claim k, use the specified information to calculate the test statistic and determine whether there is enough evidence to reject the null hypothesis. Then make a statement regarding the original claim.

31. *k*: $\mu = 1290$, $\alpha = 0.1$, $\overline{x} = 1300$, s = 38, n = 50

- a. $z \approx 0.26$; hypothesis is rejected; claim is rejected
- b. $z \approx 1.86;$ hypothesis is rejected; claim is rejected
- c. $z\approx 0.26;$ hypothesis is rejected; claim is not rejected
- d. $z \approx 1.86$; hypothesis is not rejected; claim is not rejected

32. Construct a scatter plot that best represents the data in the table below. Then calculate the correlation coefficient.

x	у
7	5.6
8	5.4
9	6.2
10	6.3
11	7.1
12	7.4
14	8.4



The table gives the frequency distribution of the average annual rainfall in inches for 50 randomly selected cities.

Class Boundaries	Frequency (f)
0-9.5	3
9.5-19.5	9
19.5-29.5	5

29.5-39.5	11
39.5-49.5	16
49.5-59.5	6

33. Construct a percentile graph of the data.



34. The calculated correlation coefficient r for 25 listed points of certain x and y coordinates is about 0.861. Test the significance of this correlation coefficient at 5% level.

- a. There is a significant correlation between the *x* and *y* coordinates.
- b. There is no significant correlation between the *x* and *y* coordinates.

The weights of 890 young deer tagged and weighed in a research study are normally distributed with a mean of 74 pounds and a standard deviation of 2.5 pounds.

35. Approximately how many deer weigh more than 79 pounds?

a. 45 deer	b. 24 deer
c. 21 deer	d. 22 deer

Name:	Class:	Date:

36. The average collection period is the approximate amount of time it takes for a business to receive payments owed, in terms of receivable from its customers and clients.

The average collection period for a certain company based on a survey of 140 randomly selected clients is 90 days. Assume a normal distribution with a standard deviation of 18 days. Use a 99% confidence level to find the maximum error of estimate for the collection period.

a. 4.89 b. 9.78 c. 3.92 d. 7.84

The table shows the populations (in thousands) during a recent year for a sample of 25 cities.

Population (Thousands)				
154	286	123	182	216
96	89	236	273	314
342	123	469	147	134
225	169	167	243	173
485	373	111	135	261

37. Use the graph shown below to describe the shape of the distribution.



a. symmetrical distribution b. negativery skewed distribution	a. symmetrical distribution	b. negatively skewed distribution
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c. positively skewed distribution

d. bimodal distribution

38. Find a 95% confidence interval if \overline{x} = 35.7, σ = 6.8, and n = 90.

a. $34.24 \le \mu \le 37.16$	b. $34.3 \le \mu \le 37.1$
c. $35.2 \le \mu \le 36.2$	d. $34.4 \le \mu \le 37$

39. A poll of 90 randomly selected investors showed that investments in a certain company gives on an average 30% returns per year. Assume from past studies that the standard deviation is 8%. Find 99% confidence interval for the average percent returns for all of the investors.

a. $26.24 < \mu < 33.76$	b. 27.83 < <i>μ</i> < 32.17
c. $25.66 < \mu < 34.34$	d. 22.48 < <i>µ</i> < 37.52

The weights of 890 young deer tagged and weighed in a research study are normally distributed with a mean of 74 pounds and a standard deviation of 2.5 pounds.

40. What percent of deer weigh between 69 and 76.5 pounds?

a. 50% b. 81.5% c. 80% d. 47%

41. A study conducted with a random sample of size n = 16 results in a confidence interval of $24.34 < \mu < 29.66$. If the interval was created using a 95% confidence level, find the sample standard deviation. Assume the variable is normally distributed.

a. 10 b. 10.86 c. 5 d. 5.43

42. Find a 98% confidence interval if \overline{x} = 71.3, σ = 6.4, and n = 99.

a. $69.89 \le \mu \le 72.71$	b. $69.41 \le \mu \le 73.19$
c. $69.8 \le \mu \le 72.8$	d. $68.61 \le \mu \le 73.99$

43. Pages of 680 books are normally distributed with $\mu = 21$ pages and $\sigma = 3$ pages. Find the probability P(17 < X < 25) with the help of the graphing calculator. Round your answer to the nearest integer.

a. 80% b. 77% c. 81% d. 82%

44. For a certain city, the average number of accidents is 45 accidents per day. Assume that this variable is normally distributed with a standard deviation of approximately 9 accidents. If a random sample of 17 days is selected, find the probability that the mean number of accidents is greater than 41.

a. 91.14% b. 96.66% c. 94.15% d. 92.85%

45. Suppose an agronomist used four test plots to determine the relationship between the wheat yield y (in bushels per acre) and the amount of fertilizer x (in hundreds of pounds per acre), used for the yield. The results are shown in the table. Find the least squares regression line for the data using the regression capabilities of a graphing calculator. Then use this model to estimate the yield for a fertilizer application of 150 pounds per acre. Round off your answer to one decimal place.

Fertilizer, x	1.0	1.5	2.0	2.5
Yield, y	30	41	50	57

a. $\hat{\mathcal{Y}} = 21x + 17$; 48.5 bushels per acre	b. $\hat{\mathcal{Y}} = 28x + 17$; 59 bushels per acre
c. $\hat{y} = 18x + 13$; 40 bushels per acre	d. $\hat{\mathcal{Y}} = 18x + 8$; 35 bushels per acre

The table shows the populations (in thousands) during a recent year for a sample of 25 cities.

Population (Thousands)

154	286	327	182	216
271	89	236	273	314
342	123	469	345	134
225	373	167	243	473
298	373	338	390	261

46. Construct a histogram.



The table given below shows the probability distribution of a situation.

X	1	2	3	4	5
P(X)	0.06	0.4	0.14	0.33	0.07

47. Find the mean score to the nearest hundredth.

a. 1.95 b. 1.28 c. 3.05 d. 2.95

48. An office stationary supplier finds that its sales force drives an average of 1460 miles per month per person, with a standard deviation of 140 miles. Assume that the number of miles driven by a salesperson is closely approximated by a normal distribution. Find the shortest and longest distances driven by the middle 95% of the sales force by using the graphing calculator. Round off your answer to the nearest integer.

a. Shortest distance = 1046 miles b. Shortest distance = 1186 miles

Longest distance = 1874 miles	Longest distance $=$ 1874 miles
c. Shortest distance $= 1186$ miles	d. Shortest distance $= 1046$ miles
Longest distance = 1734 miles	Longest distance $= 1734$ miles

For each claim k, use the specified information to calculate the test statistic and determine whether there is enough evidence to reject the null hypothesis. Then make a statement regarding the original claim.

49. $k: \mu > 70, \alpha = 0.025, \overline{x} = 74.6, s = 4.4, n = 16$

- a. $t \approx 4.18$; hypothesis is not rejected; claim is not rejected
- b. $t \approx 1.05$; hypothesis is not rejected; claim is rejected
- c. $t \approx 1.05$; hypothesis is rejected; claim is rejected
- d. $t \approx 4.18$; hypothesis is rejected; claim is not rejected

50. Construct a scatter plot that best represents the data in the table below. Then calculate the correlation coefficient.

x	у
9	6.4
10	7.2
11	7.6
12	8.2
13	8.3
14	9.1
16	10.2





51. A film magazine reported that 18% of the film stars would be attending the marriage ceremony of a business tycoon. If 30 film stars are selected at random, find the probability that fewer than 5 of the film stars will be attending the business tycoons marriage ceremony.

a. 35.5% b. 37% c. 34.6% d. 33.4%

52. Find a 90% confidence interval if $\overline{x} = 60$, $\sigma = 10$, and n = 180.

a. $59.07 \le \mu \le 60.93$ b. $58.77 \le \mu \le 61.23$ c. $58.86 \le \mu \le 61.14$ d. $58.58 \le \mu \le 61.42$

53. The maker of a video player maker has discovered a defect in a new video model. The defect is expected to affect 22% of the video players that have been produced. What is the probability that there are at least 6 and at most 11 video players with the defect in a random sample of 32 video players?

a. 75.3% b. 72.9% c. 71.7% d. 73.8%

The table gives the frequency distribution of the average annual rainfall in inches for 50 randomly selected cities.

Class	Frequency
Boundaries	(f)
0-9.5	3
9.5-19.5	9
19.5-29.5	5
29.5-39.5	11
39.5-49.5	16
49.5-59.5	6

54. The percentile graph of the data is given below. Estimate the percentile rank that an average annual rainfall of 50 inches would have in this distribution and interpret its meaning.



- a. A city with an average annual rainfall of 50 inches would be in the 88th percentile, which means that 88% of the cities have a lower average annual rainfall.
- b. A city with an average annual rainfall of 50 inches would be in the 6th percentile, which means that 6% of the cities have a lower average annual rainfall.
- c. A city with an average annual rainfall of 50 inches would be in the 16th percentile, which means that 16% of the cities have a lower average annual rainfall.
- d. A city with an average annual rainfall of 50 inches would be in the 56th percentile, which means that 56% of the cities have a lower average annual rainfall.

The table gives the frequency distribution of the average annual rainfall in inches for 50 randomly selected cities.

Class	Frequency
Boundaries	(f)
0-9.5	5
9.5-19.5	8
19.5-29.5	6
29.5-39.5	12
39.5-49.5	15
49.5-59.5	4

55. Construct a percentile graph of the data.

a.

b.



56. Construct a scatter plot that best represents the data in the table below. Then calculate the correlation coefficient.

x	у
5	3.9
6	4.7
7	5.2
8	5.3
9	5.9
10	6.1
12	7.4

b.



The table shows the populations (in thousands) during a recent year for a sample of 25 cities.

]	Population (Thousands)				
154	286	334	182	216	
281	89	236	273	314	
342	123	469	389	134	
225	312	167	243	429	
269	373	371	412	261	

57. Use the graph shown below to describe the shape of the distribution.

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- b. positively skewed distribution
- c. symmetrical distribution d. bimodal distribution

58. Suppose a store manager wants to know the demand y for an energy bar as a function of price x. The daily sales of three different energy bars (different prices) are shown in the table. Use the regression capabilities of a graphing calculator to find the least squares regression line for the data.

Price, x	\$1.29	\$1.49	\$1.69
Demand, y	324	229	164

a. $\hat{\mathcal{Y}} = -400x + 835$ b. $\hat{\mathcal{Y}} = -397x + 838$ c. $\hat{\mathcal{Y}} = -400x + 785$ d. $\hat{\mathcal{Y}} = -390x + 838$

59. Find a 99% confidence interval if \overline{x} = 73.3, σ = 7.9, and n = 43.

a. $71.92 \le \mu \le 74.68$ b. $70.2 \le \mu \le 76.4$ c. $68.66 \le \mu \le 77.94$ d. $69.68 \le \mu \le 76.92$

The table gives the frequency distribution of the average annual rainfall in inches for 50 randomly selected cities.

Class	Frequency
Boundaries	(f)
0-9.5	5
9.5-19.5	8
19.5-29.5	6
29.5-39.5	12
39.5-49.5	15
49.5-59.5	4

60. The percentile graph of the data is given below. Estimate the percentile rank that an average annual rainfall of 50 inches would have in this distribution and interpret its meaning.



- a. A city with an average annual rainfall of 50 inches would be in the 92nd percentile, which means that 92% of the cities have a lower average annual rainfall.
- b. A city with an average annual rainfall of 50 inches would be in the 4th percentile, which means that 4% of the cities have a lower average annual rainfall.
- c. A city with an average annual rainfall of 50 inches would be in the 15th percentile, which means that 15% of the cities have a lower average annual rainfall.
- d. A city with an average annual rainfall of 50 inches would be in the 62nd percentile, which means that 62% of the cities have a lower average annual rainfall.

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Answer Key

1. about 6%

In this binomial experiment, n = 40, p = 0.3, and q = 0.7. The mean is $\mu = np = 12$ and the standard deviation is $\sigma = \sqrt{npq} \approx 2.8983$. Since np = 40(0.3) or 12 and nq = 40(0.7) or 28 are both greater than 5, the normal distribution can be used to approximate the binomial distribution.

Rewrite the problem with the continuity factor included by subtracting 0.5 unit from 8. Find the corresponding *z*-value for *X*. Use a graphing calculator to find the area between z = -4 and z = -1.5526. The approximate area to the left of z = -1.5527 is 0.06023.



2. [10,50] scl10 by [0,1] scl 0.125



Mean is the sum of the numbers in a set of data divided by the number of items. Standard deviation is the average amount by which individual items deviate from the mean of all the data.

4. true

5. Since the data has a symmetric distribution, use the mean and standard deviation. The mean score is 81.5% with standard deviation of 9.1% from this value.

6.5 boxes



To determine the number of boxes of mango that weigh less than 2.10 kilogram, find the corresponding area under the curve. 2.10 is -2σ from the mean. Because 95% of the data values fall within two standard deviations from the mean, each trial represents 2.5% of the data. The area to the left of 2.10 is 2.5% of 180 or 4.5 \approx 5.

7. about 3%

Since the variable is normally distributed, the distribution of the sample means will be approximately normal with $\mu = 4.5$ 1.1

and $\varpi_{\overline{x}} = \frac{1.1}{\sqrt{17}}$ or about 0.26679. Find the *z*-value.

Use a graphing calculator to find the area between z = 1.8743 and z = 4. The area to the right of a *z*-value of 1.8743 is 0.03042.



8. [0,16] scl: 2 by [100, 240] scl: 20

From the graph, it appears that the data has a positive linear correlation.



10.83.40%.



Find the standard deviation of the sample means, 1.033. Use the *z*-value formula for a sample mean to find the corresponding *z*-values for 43 and 49. Use a graphing calculator to find the area between z = -4.84 and z = 0.97. The area between *z*-values of -4.84 and 0.97 is 0.833976.

11. Approximately 91% of the students' age is between 15 and 22.



Find the corresponding *z*-value for X = 15 and X = 22. The *z*-values are -1.5 and 2 respectively. A graphing calculator shows the area between z = -1.5 and z = 2 is 0.910443.

- 12. Binomial experiment
- 13. between \$166.47 and \$180.23

In a 95% of confidence interval, 2.5% of the area lies in each tail. Corresponding z-value is 1.960.

$$CI = \overline{x} \pm z \cdot \frac{\sigma}{\sqrt{n}}$$
$$\approx 173.35 \pm 6.88$$

Add and subtract the margin of error. A 95% confidence interval is $166.47 < \mu < 180.23$.

14. \$509.13

In a 99% of confidence interval, 0.5% of the area lies in each tail. Corresponding z-value is 2.576.

$$E = z \cdot \frac{\sigma}{\sqrt{n}}$$
$$\approx 509.13$$

15. This is a binomial experiment in which n = 5, p = 0.57, and q = 1 - 0.57 = 0.43. The probability distribution of *X* is shown below:

X	0	1	2	3	4	5
P(X)	0.01	0.10	0.26	0.34	0.23	0.06

16. 2.5%

17. about 30.2%

In this binomial experiment, n = 40, p = 0.3, and q = 0.7. The mean is $\mu = np = 12$ and the standard deviation is $\sigma = \sqrt{npq} \approx 2.8983$. Since np = 40(0.3) or 12 and nq = 40(0.7) or 28 are both greater than 5, the normal distribution can be used to approximate the binomial distribution.

Rewrite the problem with the continuity factor included by adding 0.5 unit to 13. Find the corresponding *z*-value for *X*. Use a graphing calculator to find the area between z = 0.5175 and z = 4. The approximate area to the right of z = 0.5176 is 0.3024.

18. The correlation coefficient r is about 0.9754. Because r is close to 1, this suggests that the data has a strong positive linear correlation.

19. The confidence interval for men provides for more precise estimation as compared to the confidence interval for women.

In a 95% of confidence interval, 2.5% of the area lies in each tail. Corresponding *t*-value is 2.201. The confidence interval for women is:

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$$CI = \overline{x} \pm t \cdot \frac{s}{\sqrt{n}}$$
$$\approx 7 \pm 0.41$$

$$6.59 < \mu < 7.41$$

The confidence interval for men is:

$$CI = \overline{x} \pm t \cdot \frac{s}{\sqrt{n}}$$
$$\approx 8 \pm 0.34$$

 $7.66 < \mu < 8.34$

20. Continuous; weight of a football player can assume any value.

21. a

22. c

23. d

24. a

25. c

26. b

27. b

28. a

29. b

30. c

31. b

32. d

33. a

34. a

35. d

36. c

37. c

38. b			
39. b			
40. b			
41. d			
42. c			
43. d			
44. b			
45. c			
46. d			
47. d			
48. c			
49. d			
50. b			
51. d			
52. b			
53. c			
54. a			
55. a			
56. b			
57. c			
58. a			
59. b			
60. a			