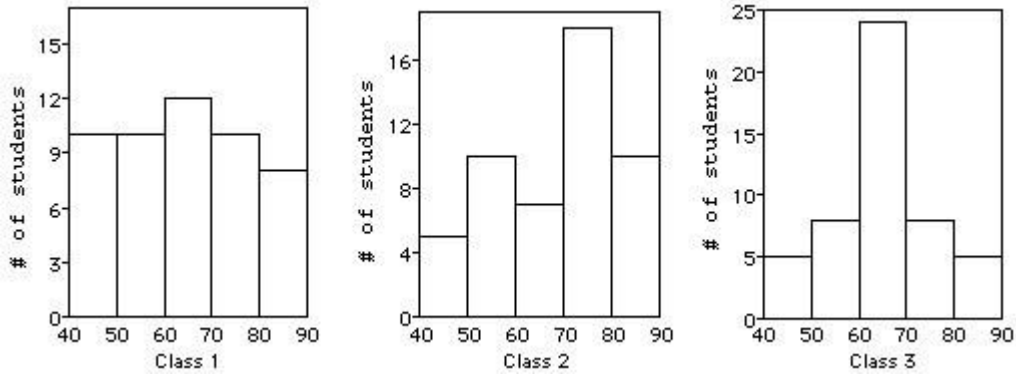


MAT1371 Introduction to statistics
Assignment 3
Due date: Octobre 23, 2019

4.1 Comparing Groups

Three statistics classes (50 students each) took the same test. Shown below are histograms of the scores for the classes. Use the histograms to answer the question.

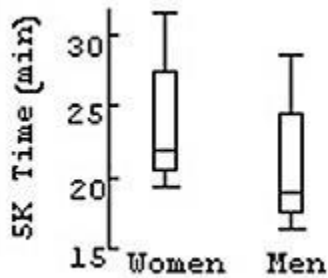


- 1) Which class had the highest mean score?
 A) Class 3
 B) Class 2
 C) Class 1
 D) Class 1 and class 3
 E) None, because the classes had the same mean.

Answer:

4.2 Comparing Boxplots

1) Do men and women run a 5-kilometre race at the same pace? Here are boxplots of the time (in minutes) for a race recently run in Victoria, B.C. Write a brief report discussing what these data show.

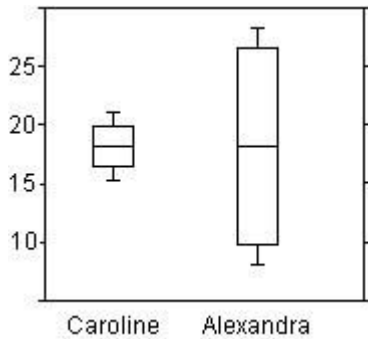


- A) Women appear to run about 3 minutes faster than men, but the two distributions are very similar in shape and spread.

- B) Men appear to run about 3 minutes faster than women, but the two distributions are very similar in shape and spread.
- C) Women appear to run about 3 minutes faster than men, and the two distributions have different IQR.
- D) Men appear to run about 3 minutes faster than women, and the two distributions have different IQR.
- E) Men appear to run about 10 minutes faster than women, but the two distributions are very similar in shape and spread.

Answer:

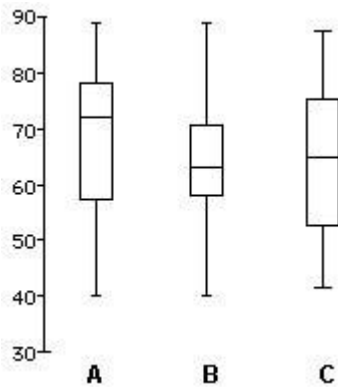
3) Here are boxplots of the points scored during the first 10 games of the basketball season for both Caroline and Alexandra. The coach can take only one player to the state championship. Which one should she take knowing that she would like a safe player?



- A) Alexandra, because she is the more consistent player.
- B) Both of them, because both girls have a median score of about 18 points per game.
- C) Caroline, because she is the more consistent player.
- D) Caroline, because the IQR is the largest.
- E) Alexandra, because the IQR is the largest.

Answer:

4) Match each class with the corresponding boxplot below.



- A) Class 1 is B

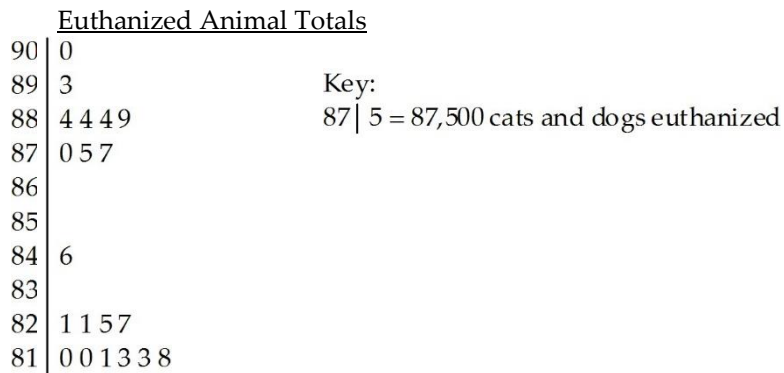
Class 2 is C
 Class 3 is A
 B) Class 1 is B
 Class 2 is A
 Class 3 is C
 C) Class 1 is A
 Class 2 is B
 Class 3 is C
 D) Class 1 is C
 Class 2 is A
 Class 3 is B
 E) Class 1 is C
 Class 2 is B
 Class 3 is A

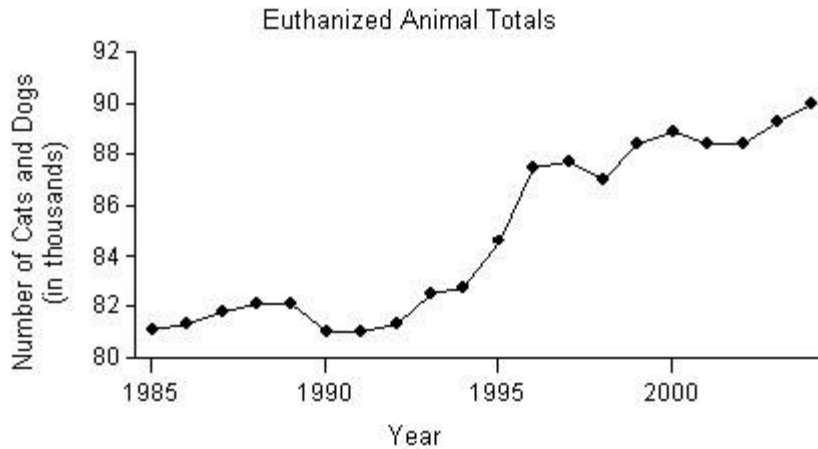
Answer:

4.4 Timeplots: Order, Please!

Describe the distribution (shape, centre, spread, unusual features).

1) The following stem-and-leaf display shows the number of homeless cats and dogs that had to be euthanized each year in a large city for the period 1985-2004. Use both the stemplot and timeplot to describe the distribution.

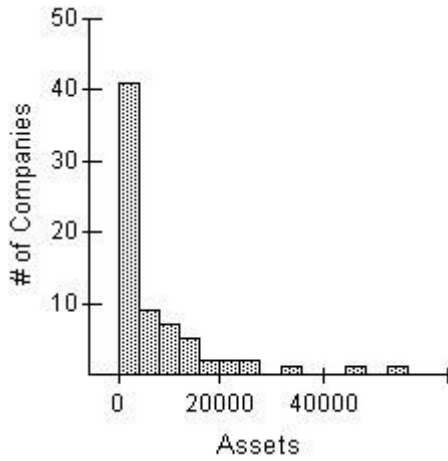




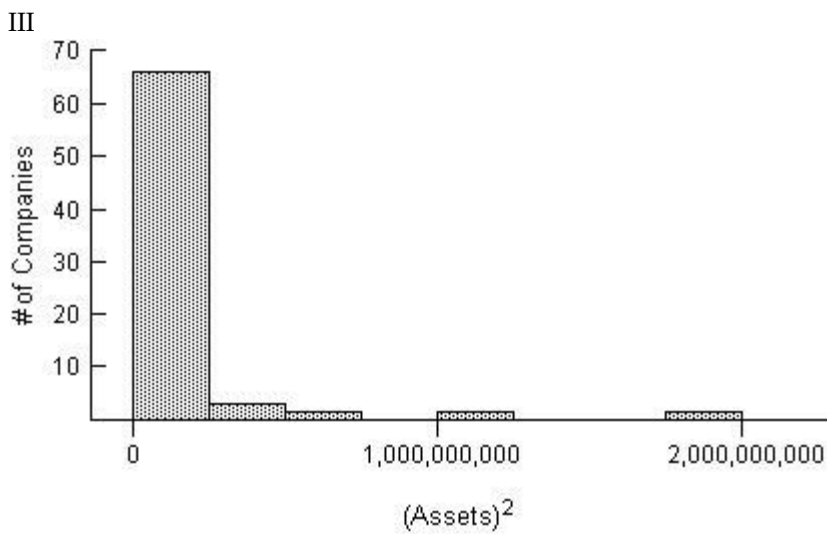
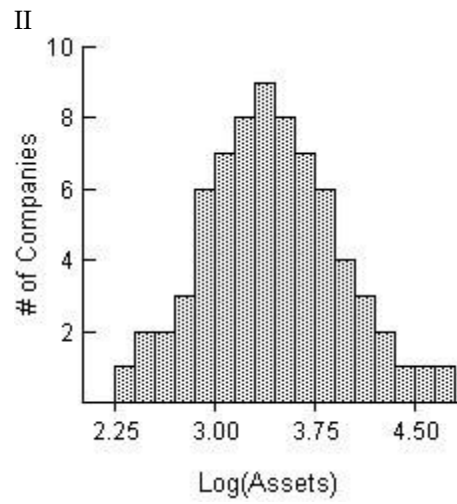
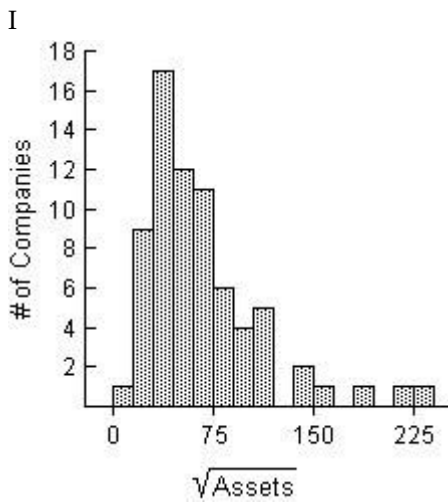
- A) The distribution of the number of cats and dogs that were euthanized is skewed to the right, and has several modes, with gaps in between. One mode is clustered between 87,000 and 90,000 euthanized, a second mode at 84,000, and a third mode with a cluster between 81,000 and 82,000. The timeplot shows that the number of animals euthanized has increased over the period 1985-2004, with a significant increase between 1994 and 1996.
- B) The distribution of the number of cats and dogs that were euthanized is bimodal. The upper cluster is between 87,000 and 90,000 euthanized, with a centre at around 88,400. The lower cluster is between 81,000 and 82,000 euthanized, with a centre at around 81,000. The timeplot shows that the number of animals euthanized has decreased over the period 1985-2004, with a significant decrease between 1994 and 1996.
- C) The distribution of the number of cats and dogs that were euthanized is bimodal. The upper cluster is between 87,000 and 90,000 euthanized, with a centre at around 88,400. The lower cluster is between 81,000 and 82,000 euthanized, with a centre at around 81,000. The timeplot shows that the number of animals euthanized has increased over the period 1985-2004, with a significant increase between 1994 and 1996.
- D) The distribution of the number of cats and dogs that were euthanized is bimodal. The upper cluster is between 89,000 and 90,000 euthanized, with a centre at around 88,400. The lower cluster is between 81,000 and 82,000 euthanized, with a centre at around 81,000. The timeplot shows that the number of animals euthanized has increased over the period 1985-2004, with a significant increase between 1994 and 1996.
- E) The distribution of the number of cats and dogs that were euthanized is skewed to the left, and has several modes, with gaps in between. One mode is clustered between 87,000 and 90,000 euthanized, a second mode at 84,000, and a third mode with a cluster between 81,000 and 82,000. The timeplot shows that the number of animals euthanized has increased over the period 1985-2004, with a significant increase between 1994 and 1996.

Answer:

3) Here is a histogram of the assets (in millions of dollars) of 71 companies.



Which of the following is the most appropriate re-expression of these data? Explain.



Answer:

5.1 Standardizing with z-Scores

Find the number of standard deviations from the mean. Round to the nearest hundredths.

1) A town's average snowfall is 40 cm per year with a standard deviation of 12 cm. How many standard deviations from the mean is a snowfall of 64 cm?

- A) 0.44 standard deviations below the mean
- B) 2.00 standard deviations above the mean
- C) 2.00 standard deviations below the mean
- D) 1.60 standard deviations above the mean
- E) 0.44 standard deviations above the mean

Answer:

2) A town's snowfall in December averages 10 cm with a standard deviation of 10 cm while in February, the average snowfall is 42 cm with a standard deviation of 16 cm. In which month is it more likely to snow 32 cm? Explain.

A) February. Snowfall of 32 cm is $\frac{11}{5}$ from the mean while snowfall of 32 cm is $-\frac{5}{8}$ from the

mean in December.

B) December. Snowfall of 32 cm is $-\frac{5}{8}$ from the mean while snowfall of 32 cm is $\frac{11}{5}$ from the

mean in February.

C) It is equally likely in either month. One can't predict Mother Nature.

D) December. Snowfall of 32 cm is $\frac{11}{5}$ from the mean while snowfall of 32 cm is $-\frac{5}{8}$ from the

mean in February.

E) February. Snowfall of 32 cm is $-\frac{5}{8}$ from the mean while snowfall of 32 cm is $\frac{11}{5}$ from the mean

in December.

Answer:

3) You heard that the average number of years of experience among stockbrokers is 14 years. You can't remember the standard deviation somebody with 8 years' experience has a z-score of -2. Find the standard deviation.

- A) 3 years
- B) 9 months
- C) 6 months
- D) 9 years
- E) 3 months

Answer:

5.2 Shifting and Scaling

Use summary statistics to answer the question.

1) Here are the summary statistics for the monthly payroll for an accounting firm:
lowest salary = \$60,000, mean salary = \$140,000, median = \$100,000, range = \$240,000, IQR = \$120,000, first quartile = \$70,000, standard deviation = \$80,000.

Suppose that business has been good and the company gives every employee a \$10,000 raise.
Give the new value of each of the summary statistics.

- A) Minimum: 60,000; Mean: 140,000; Median: 100,000; Range: 240,000; IQR: 120,000; Q1: 80,000; SD: 80,000
- B) Minimum: 70,000; Mean: 150,000; Median: 100,000; Range: 240,000; IQR: 120,000; Q1: 80,000; SD: 80,000
- C) Minimum: 70,000; Mean: 140,000; Median: 110,000; Range: 240,000; IQR: 120,000; Q1: 80,000; SD: 80,000
- D) Minimum: 70,000; Mean: 150,000; Median: 110,000; Range: 240,000; IQR: 120,000; Q1: 80,000; SD: 80,000
- E) Minimum: 60,000; Mean: 150,000; Median: 110,000; Range: 240,000; IQR: 120,000; Q1: 80,000; SD: 80,000

Answer:

2) The speed vehicles traveled on a local road was recorded for one month. The speeds ranged from 48 km/h to 63 km/h with a mean speed of 57 km/h and a standard deviation of 6 km/h. The quartiles and median speeds were 51 km/h, 60 km/h, and 54 km/h. Suppose increased patrols reduced speeds by 7%. Find the new mean and standard deviation. Express your answer in exact decimals.

- A) Mean: 53.01 km/h, SD: 5.58 km/h
- B) Mean: 53.01 km/h, SD: 6 km/h
- C) Mean: 60.99 km/h, SD: 6.42 km/h
- D) Mean: 3.99 km/h, SD: 0.42 km/h
- E) Mean: 60.99 km/h, SD: 6 km/h

Answer:

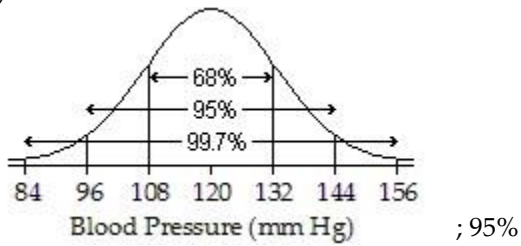
5.3 Density Curves and the Normal Model

Draw the Normal model and use the 68-95-99.7 Rule to answer the question.

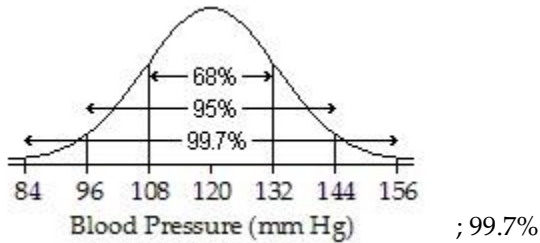
1) The systolic blood pressure of 18-year-old women is normally distributed with a mean of

120 mm Hg and a standard deviation of 12 mm Hg. Draw and label the Normal model for systolic blood pressure. What percentage of 18-year-old women have a systolic blood pressure between 96 mm Hg and 144 mm Hg?

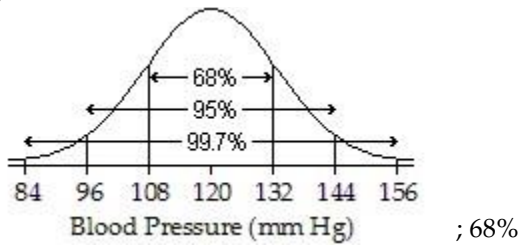
A)



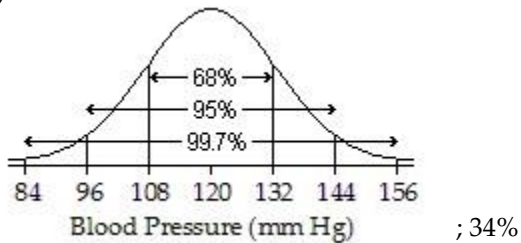
B)



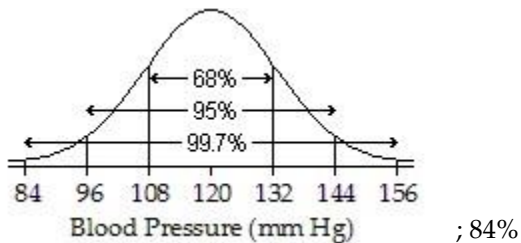
C)



D)



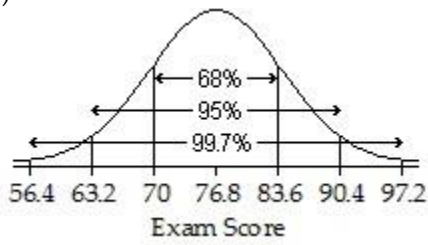
E)



Answer:

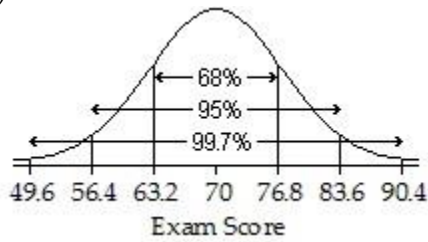
2) An English instructor gave a final exam and found a mean score of 70 points and a standard deviation of 6.8 points. Assume that a Normal model can be applied. Draw and label the Normal model for the exam scores. Describe the scores of the top 2.5%.

A)



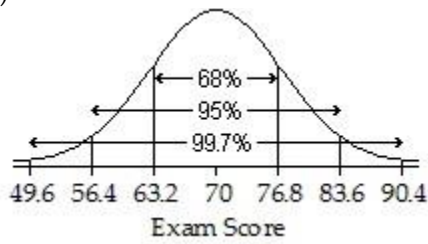
; Higher than 90.4 points

B)



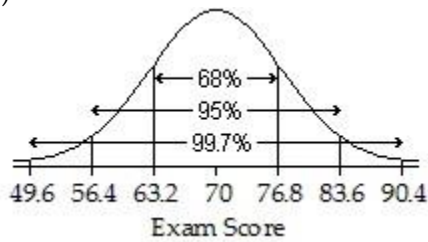
; Higher than 76.8 points

C)



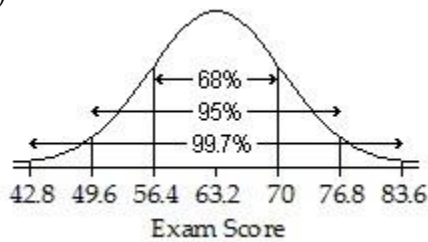
; 83.6 points

D)



; Higher than 83.6 points

E)



; Higher than 76.8 points

Answer:

5.4 Finding Normal Percentiles

1) The volumes of soda in 1 litre cola bottle can be described by a Normal model with a mean of 0.95 L and a standard deviation of 0.04 L. What percentage of bottles can we expect to have a volume less than 0.94 L?

- A) 40.13%
- B) 9.87%
- C) 47.15%
- D) 38.21%
- E) 59.87%

Answer:

2) On a recent English exam, scores averaged 84 points. If 41% of scores fell below 70 points, find an approximate standard deviation (assuming the Normal model is appropriate).

- A) 60.87
- B) -69.57
- C) -669.57
- D) 34.44
- E) 28.7

Answer: