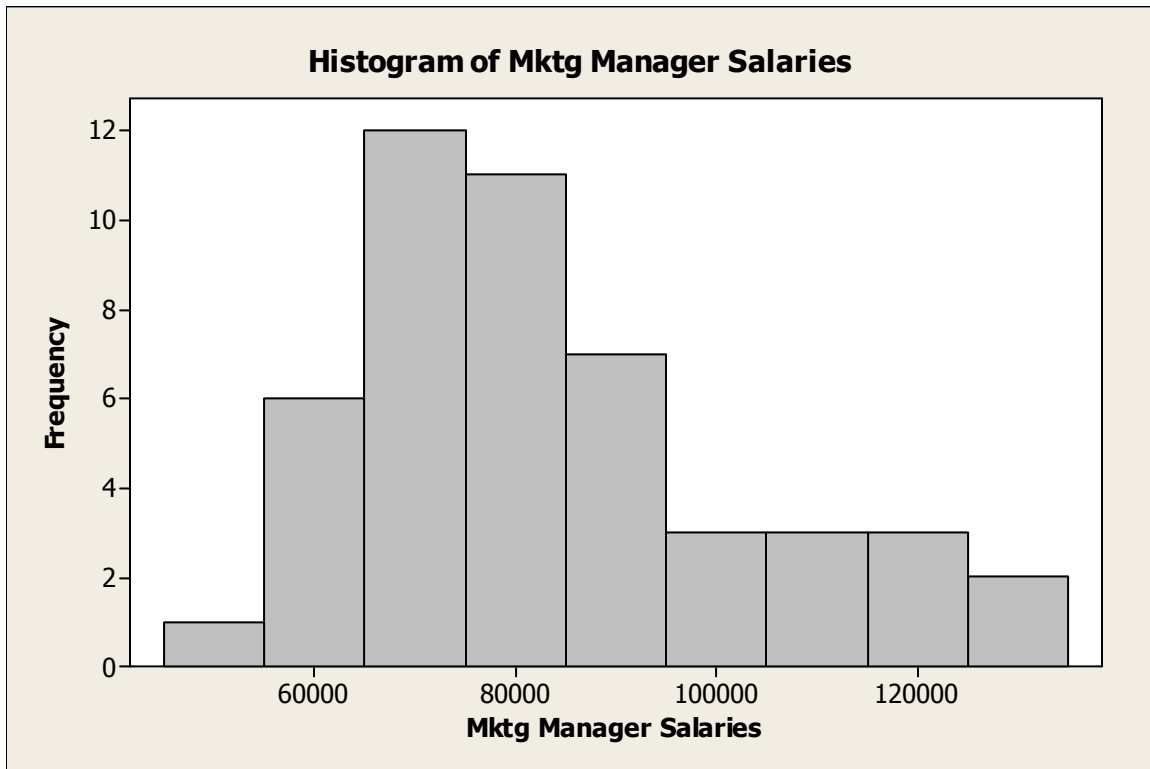


**Chapter 3: Displaying and Describing Quantitative Data – Quiz A**  
Name \_\_\_\_\_

3.1.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

1. Following is a histogram of salaries (in \$) for a sample of U.S. marketing managers. Comment on the shape of the distribution.



3.7.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

2. Following is the five-number summary of salaries (in \$) for a sample of U.S. marketing managers displayed in question 1.

Min	Q1	Median	Q3	Max
46360	69693	77020	91750	129420

- Would you expect the mean salary for this sample of marketing managers to be higher or lower than the median? Explain.
- Which would be a more appropriate measure of central tendency for these data, the mean or median? Explain.
- Calculate the range.
- Calculate the IQR.

**3.1.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.**

3. Suppose the marketing manager who was earning \$129,420 got a raise and is now earning \$140,000. Indicate how this change would affect the following summary statistics (increase, decrease, or stay about the same):

- Mean
- Median
- Range
- IQR
- Standard deviation

**3.1.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.**

4. The following table shows data on total assets (\$ billion) for a small sample of U.S. banks. Prepare a stem and leaf display. Comment on the shape of the distribution.

<i><b>BANK</b></i>	<i><b>ASSETS (\$ billion)</b></i>
State Street Bank and Trust	160.5
Discover Bank	63.9
BancWest	72.8
Citizens Bank	130.0
Northern Trust	83.8
Huntington Bank	53.8
Key Bank	91.8
People's United	27.9

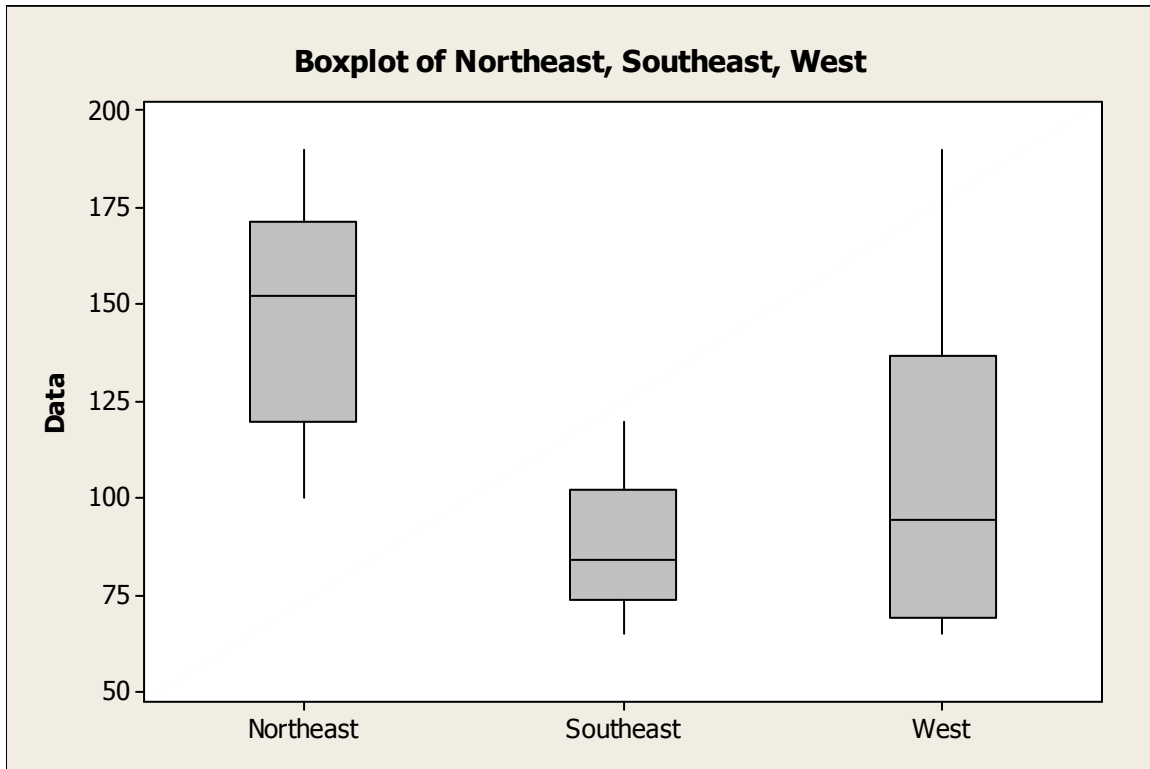
**3.6.2 Standardize values and use them for comparisons of otherwise disparate variables.**

5. For the data on total assets (\$ billion) for a small sample of U.S. banks provided in the previous question:

- Calculate the mean.
- Calculate the standard deviation.
- Standardize the asset value of State Street Bank and Trust (find the  $z$  score). Interpret its meaning.

3.7.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

6. The following boxplots show monthly sales revenue figures (\$ thousands) for a discount office supply company with locations in three different regions of the U.S. (Northeast, Southeast, and West).

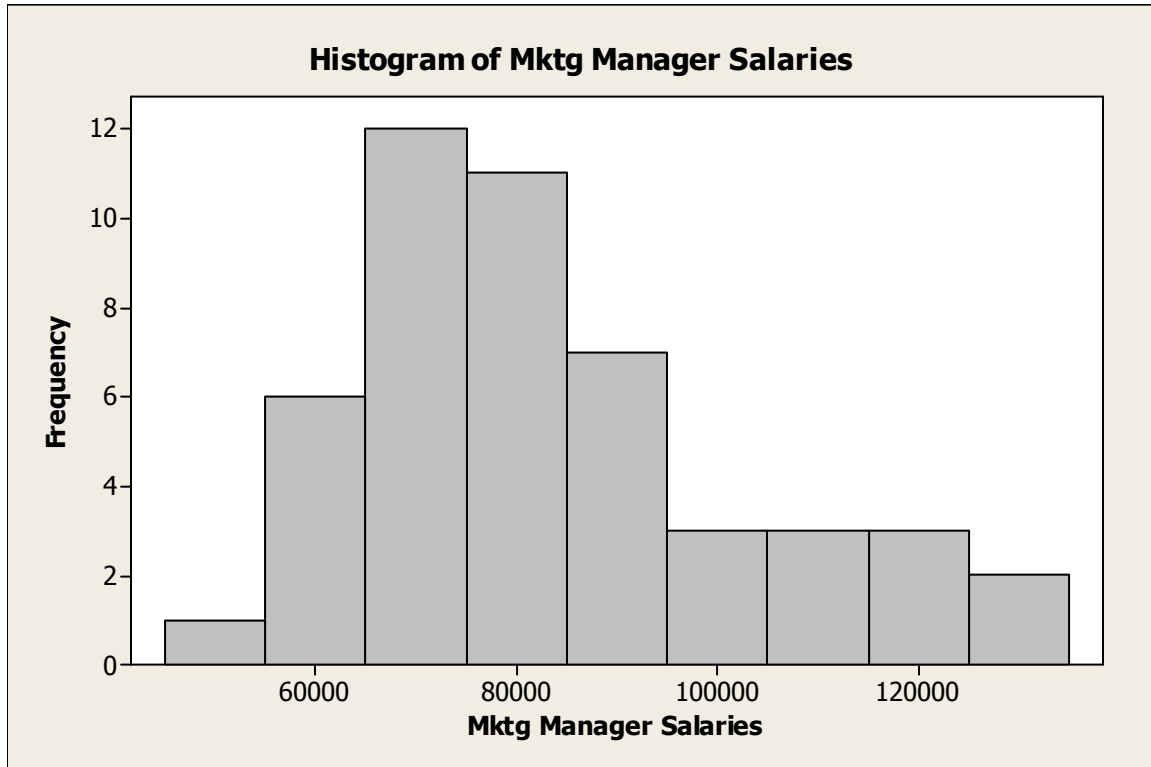


- Which region has the highest median sales revenue?
- Which region has the lowest median sales revenue?
- Which region has the most variable sales revenue values? Explain.

**Chapter 3: Displaying and Describing Quantitative Data – Quiz A – Key**

1. Following is a histogram of salaries (in \$) for a sample of U.S. marketing managers. Comment on the shape of the distribution.

The distribution is unimodal and skewed right.



2. Following is the five-number summary of salaries (in \$) for a sample of U.S. marketing managers displayed in question 1.

Min	Q1	Median	Q3	Max
46360	69693	77020	91750	129420

a. Would you expect the mean salary for this sample of marketing managers to be higher or lower than the median? Explain.

We would expect the mean salary to be higher than the median because the distribution is skewed right (the sample mean is \$82,549).

b. Which would be a more appropriate measure of central tendency for these data, the mean or median? Explain.

The median is preferred over the mean when the distribution is skewed.

c. Calculate the range.

\$83,060.

d. Calculate the IQR.

\$22,057.

3. Suppose the marketing manager who was earning \$129,420 got a raise and is now earning \$140,000. Indicate how this change would affect the following summary statistics (increase, decrease, or stay about the same):

a. Mean

Increase.

b. Median

Stay the same.

c. Range

Increase.

d. IQR

Stay the same.

e. Standard deviation

Increase.

4. The following table shows data for total assets (\$ billion) for a small sample of U.S. banks (late 2013). Prepare a stem and leaf display. Comment on the shape of the distribution.

<i><b>BANK</b></i>	<i><b>ASSETS (\$ billion)</b></i>
State Street Bank and Trust	160.5
Discover Bank	63.9
BancWest	72.8
Citizens Bank	130.0
Northern Trust	83.8
Huntington Bank	53.8
Key Bank	91.8
People's United	27.9

**Stem-and-Leaf Display: ASSETS (\$ billion)**

Stem-and-leaf of ASSETS (\$ billion) N = 8  
 Leaf Unit = 10

```

1 0 2
2 0 5
4 0 67
4 0 89
2 1
2 1 3
1 1
1 1 6
```

The shape of the distribution is skewed right.

5. For the data on total assets (\$ billion) for a small sample of U.S. banks provided in the previous question:

a. Calculate the mean.

\$85.6 (billion).

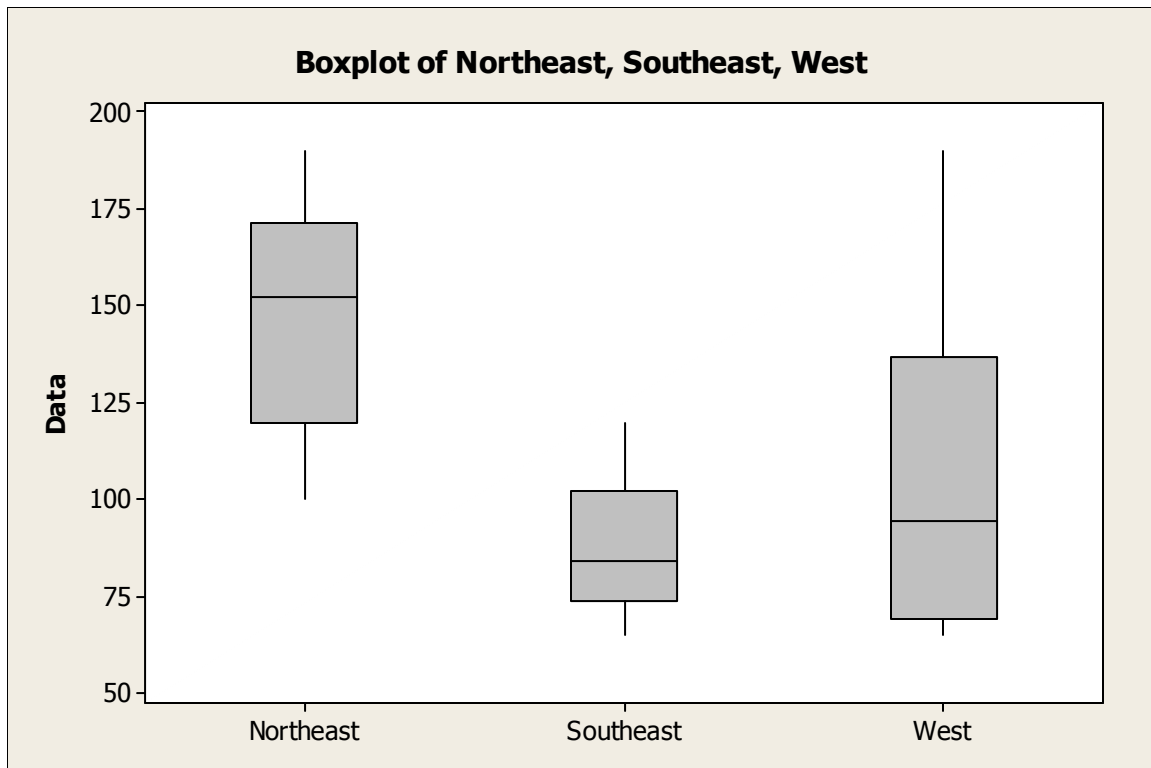
b. Calculate the standard deviation.

\$42.4 (billion)

c. Standardize the asset value of State Street Bank and Trust (find the  $z$  score). Interpret its meaning.

$$z = \frac{x - \mu}{\sigma} = \frac{160.5 - 85.6}{42.4} = 1.77 \text{ (this value is almost 2 standard deviations above the mean).}$$

6. The following boxplots show monthly sales revenue figures (\$ thousands) for a discount office supply company with locations in three different regions of the U.S. (Northeast, Southeast, and West).



a. Which region has the highest median sales revenue?

Northeast.

b. Which region has the lowest median sales revenue?

Southeast.

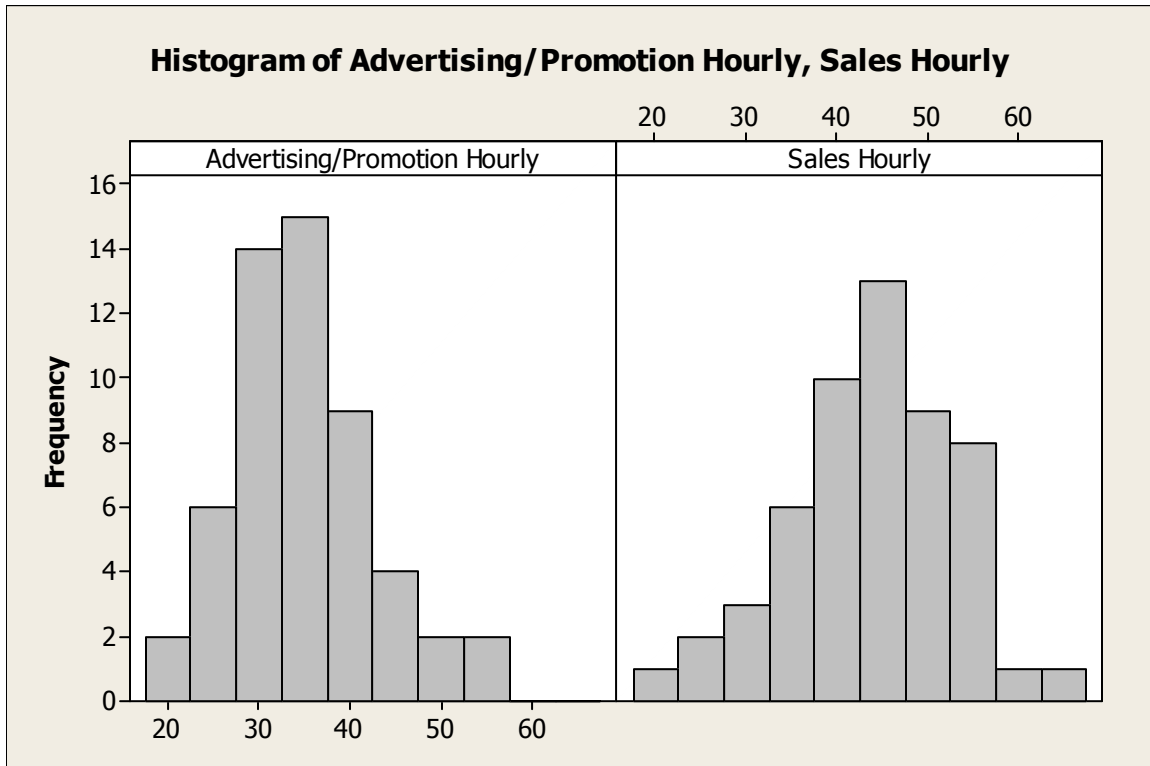
c. Which region has the most variable sales revenue values? Explain.

West. It has the largest range and IQR.

**Chapter 3: Displaying and Describing Quantitative Data – Quiz B**  
 Name \_\_\_\_\_

**3.2.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.**

1. Data were collected on the hourly wage (\$) for two types of marketing managers: (1) advertising / promotion managers and (2) sales managers. The results were used to create the following histograms.



- Describe the hourly wage distribution for advertising/promotion managers.
- Describe the hourly wage distribution for sales managers.
- Compare the hourly wages for the two types of marketing managers based on the histograms.



3.7.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

2. Following is the five number summary of the hourly wages (\$) for advertising / promotion managers displayed in question 1.

Min	Q1	Median	Q3	Max
19.64	29.36	34.18	40.86	57.26

- Would you expect the mean salary for this sample of marketing managers to be higher or lower than the median? Explain.
- Which would be a more appropriate measure of central tendency for these data, the mean or median? Explain.
- Calculate the range.
- Calculate the IQR.

3. Following is the five number summary of the hourly wages (\$) for sales managers displayed in question 1.

Min	Q1	Median	Q3	Max
20.94	37.64	44.77	49.34	67.11

Suppose there had been an error and that the lowest hourly wage for sales managers was \$18.50 instead of \$20.94. Indicate how this change would affect the following summary statistics (increase, decrease, or stay about the same):

- Mean
- Median
- Range
- IQR
- Standard deviation

**3.2.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.**

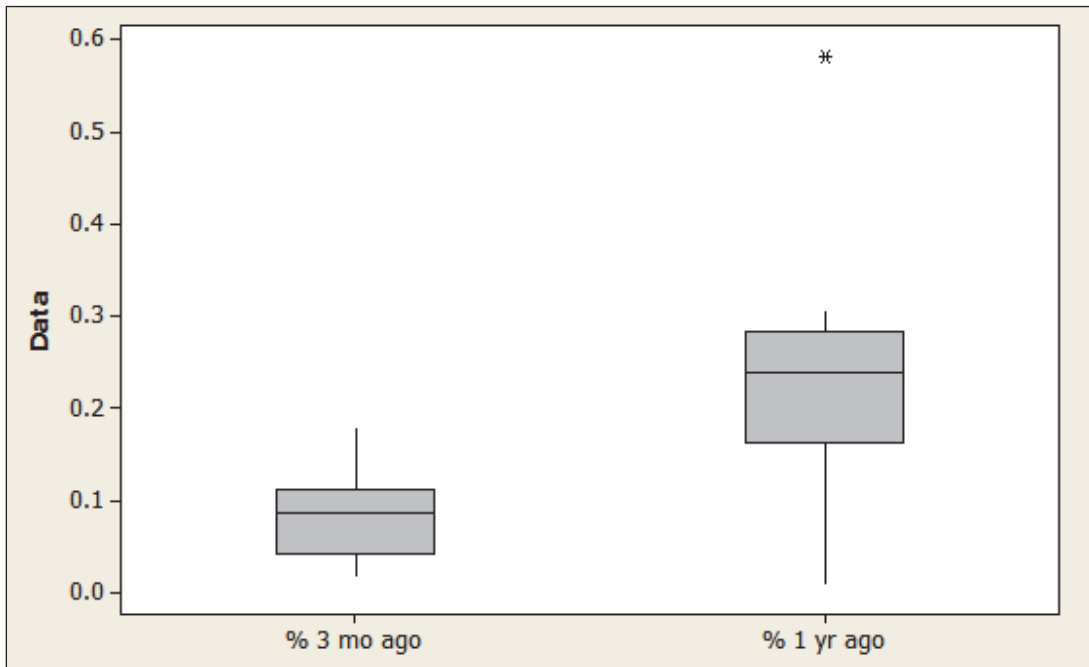
4. The following table shows representative recent closing share prices in late 2013 for a small sample of companies based in India.

<b><i>COMPANY</i></b>	<b><i>CLOSING SHARE PRICE</i></b>
20 Microns	30.95
ABC Paper	24.30
Bank of MA	36.20
Photoquip	37.00
Saksoft	67.20
Marg LTD	13.99
Galaxy ENT	10.40
Sonatasoft	68.75
EDynamics	49.95
DB Corp.	287.95

- Calculate the mean.
- Calculate the standard deviation.
- Standardize the share price for DP Corp. (find the  $z$  score). Interpret its meaning.

### 3.7.3 Make and interpret time plots for time series data.

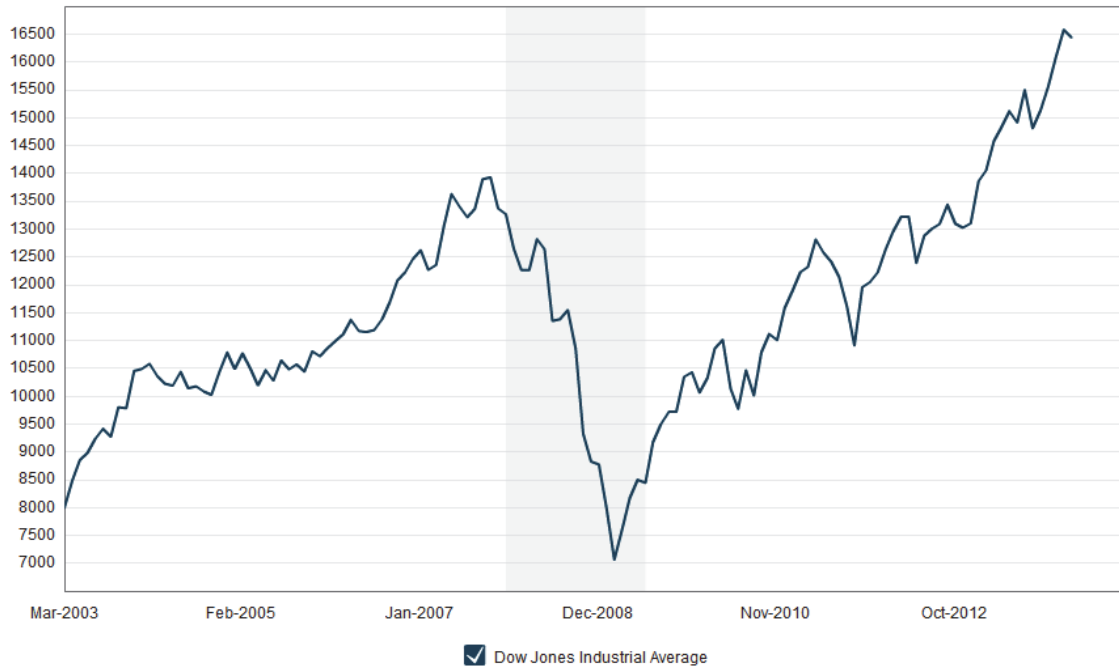
5. The following boxplots show the closing share prices for a sample of oil companies' percentage change from today and 3 months ago or 1 year ago.



- For which timeframe was the median closing share percentage higher?
- For which timeframe were the closing share prices more variable? Explain.
- Which distribution is more symmetric? Explain.

## 3.2.1 Make and interpret time plots for time series data.

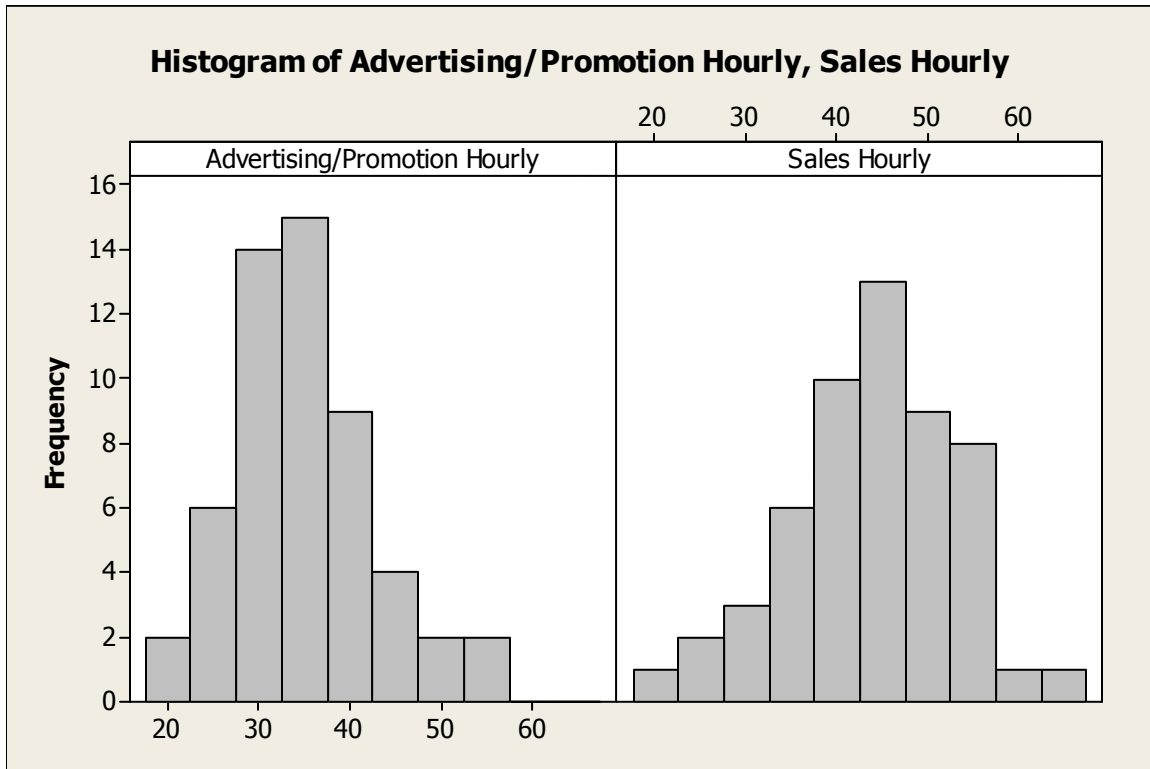
6. Following is a time series graph for monthly closing price for the Dow Jones Industrial Average (beginning March 2003).



- a. Are the closing prices for the Dow Jones Average from October 2004 through December 2006 fairly stationary? Explain.
- b. What was the most volatile period of time for the Dow Jones average? Explain.
- c. Would a histogram provide a good summary of these stock prices? Explain.

**Chapter 3: Displaying and Describing Quantitative Data – Quiz B – Key**

1. Data were collected on the hourly wage (\$) for two types of marketing managers: (1) advertising / promotion managers and (2) sales managers. The results were used to create the following histograms.



a. Describe the hourly wage distribution for advertising/promotion managers.

Unimodal and right skewed.

b. Describe the hourly wage distribution for sales managers.

Unimodal and left skewed.

c. Compare the hourly wages for the two types of marketing managers based on the histograms.

It appears that sales managers earn a higher hourly wage compared to advertising/promotion managers.

2. Following is the five number summary of the hourly wages (\$) for advertising / promotion managers displayed in question 1.

Min	Q1	Median	Q3	Max
19.64	29.36	34.18	40.86	57.26

a. Would you expect the mean salary for this sample of marketing managers to be higher or lower than the median? Explain.

We would expect the mean salary to be higher than the median because the distribution is skewed right (the sample mean is \$35.05).

b. Which would be a more appropriate measure of central tendency for these data, the mean or median? Explain. .

The median is preferred over the mean when the distribution is skewed.

c. Calculate the range.

\$37.62

d. Calculate the IQR.

\$11.50

3. Following is the five number summary of the hourly wages (\$) for sales managers displayed in question 1.

Min	Q1	Median	Q3	Max
20.94	37.64	44.77	49.34	67.11

Suppose there had been an error and that the lowest hourly wage for sales managers was \$18.50 instead of \$20.94. Indicate how this change would affect the following summary statistics (increase, decrease, or stay about the same):

a. Mean

Decrease.

b. Median

Stay the same.

c. Range

Increase.

d. IQR

Stay the same.

e. Standard deviation

Increase.

4. The following table shows representative recent closing share prices in late 2013 for a small sample of companies based in India.

<i>COMPANY</i>	<i>CLOSING SHARE PRICE</i>
20 Microns	30.95
ABC Paper	24.30
Bank of MA	36.20
Photoquip	37.00
Saksoft	67.20
Marg LTD	13.99
Galaxy ENT	10.40
Sonatasoft	68.75
EDynamics	49.95
DB Corp.	287.95

a. Calculate the mean.

\$62.7

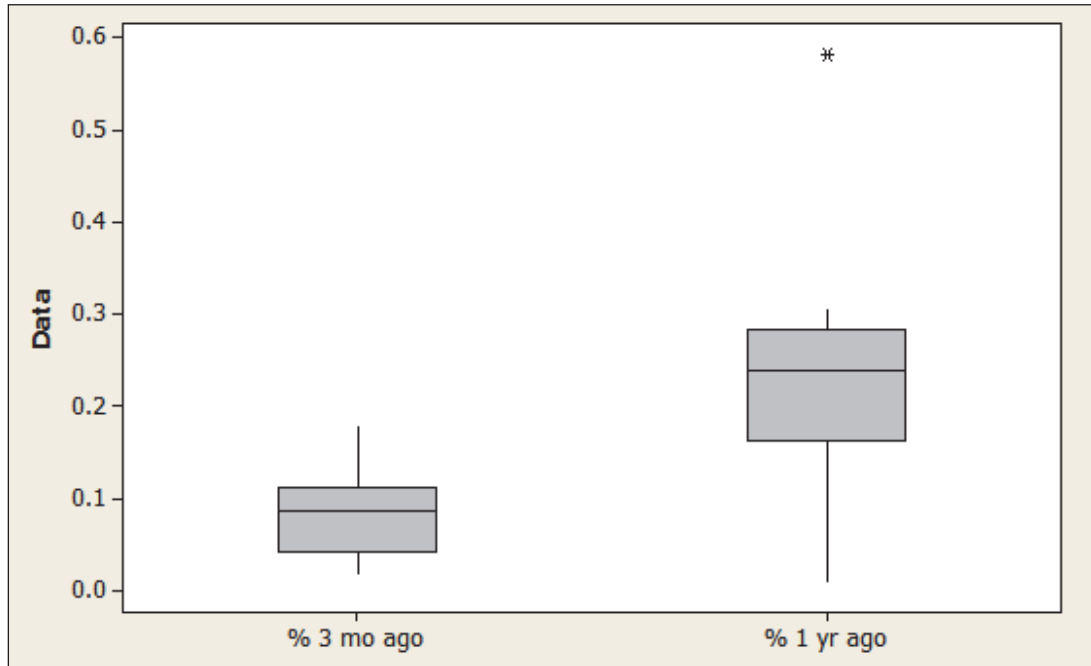
b. Calculate the standard deviation.

\$81.6

c. Standardize the share price for DP Corp. (find the  $z$  score). Interpret its meaning.

$$z = \frac{x - \mu}{\sigma} = \frac{287.95 - 62.7}{81.6} = 2.76$$
 (this value is almost 3 standard deviations above the mean).

5. The following boxplots show the closing share prices for a sample of oil companies' percentage change from today and 3 months ago or 1 year ago.



a. For which timeframe was the median closing share percentage higher?

% 1 yr ago

b. For which timeframe were the closing share prices more variable? Explain.

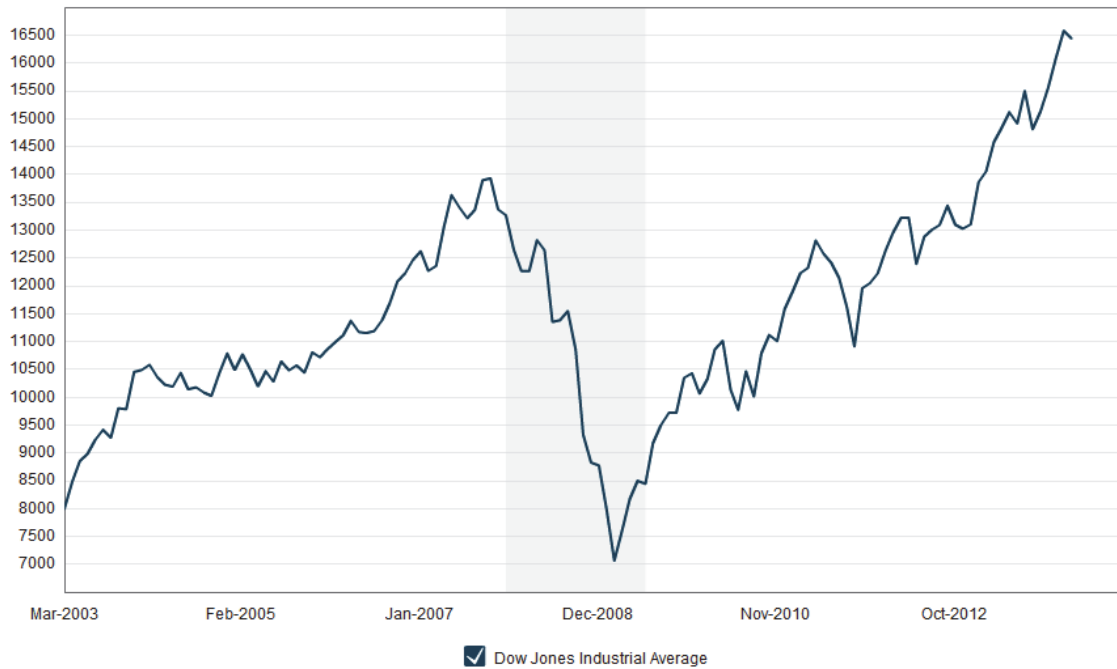
% 1 yr ago; the range and IQR are higher.

c. Which distribution is more symmetric? Explain.

Close, the % 3 months ago is more condensed and symmetric with no outliers.



6. Following is a time series graph for monthly closing price for the Dow Jones Industrial Average (beginning March 2003).



a. Are the closing prices for the Dow Jones Average from October 2004 through December 2006 fairly stationary? Explain

Yes, more than other time periods. This period of time is fairly stable with a slight upward trend.

b. What was the most volatile period of time for the Dow Jones average? Explain.

The most volatile period of time occurs from about April 2007 through December 2008. Stocks show a severe decrease from 14000 to 7000 during that time. The stocks have shown a steady increase ever since late 2008..

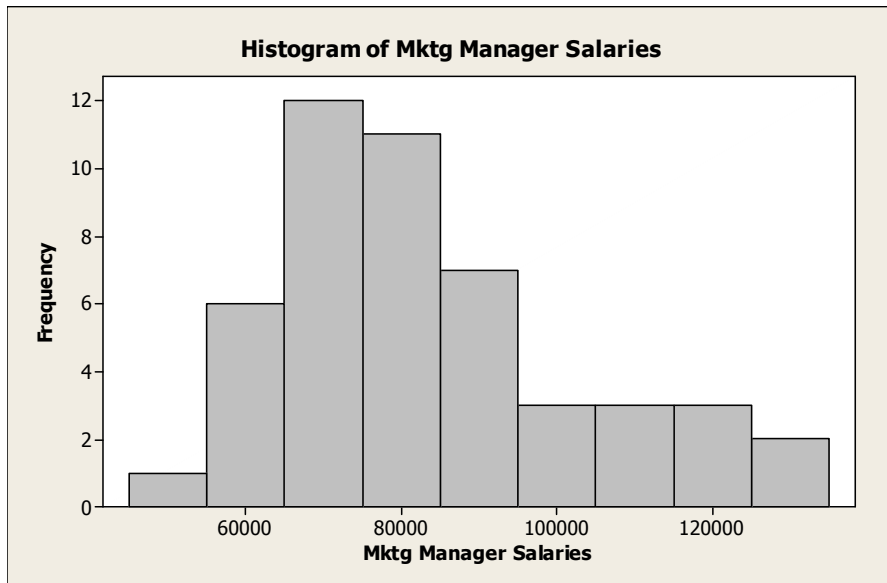
c. Would a histogram provide a good summary of these stock prices? Explain.

No, because these data are not stationary.

**Chapter 3: Displaying and Describing Quantitative Data – Quiz C – Multiple Choice**  
**Name** \_\_\_\_\_

3.7.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

1. Below is a histogram of salaries (in \$) for a sample of U.S. marketing managers.



The shape of this distribution is

- A. symmetric.
- B. bimodal.
- C. right skewed.
- D. left skewed.
- E. normal.

3.7.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

2. Here is the five number summary for salaries of U.S. marketing managers.

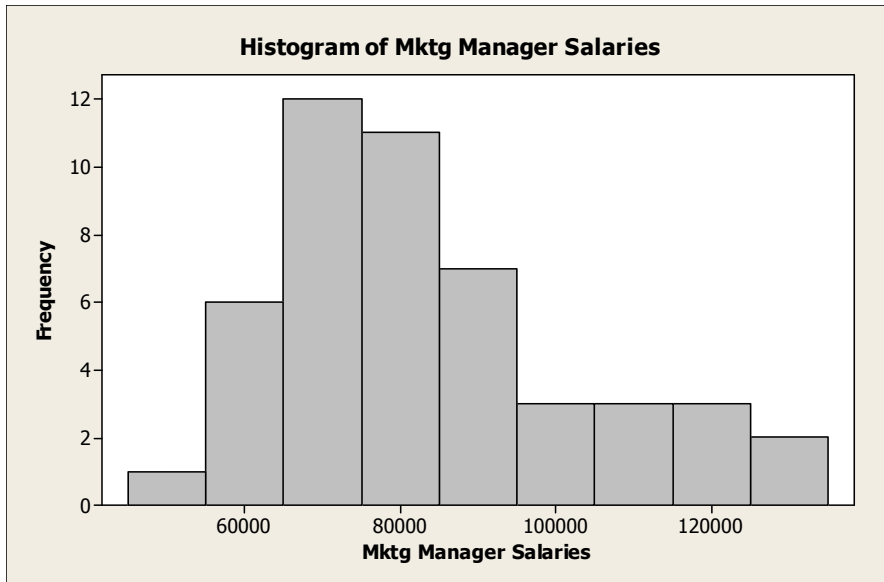
Min	Q1	Median	Q3	Max
46360	69693	77020	91750	129420

The IQR is

- A. \$83,060.
- B. \$22,057.
- C. \$69,693.
- D. \$77,020.
- E. \$14,566.

3.3.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

3. Below is a histogram of salaries (in \$) for a sample of U.S. marketing managers.



The most appropriate measure of central tendency for these data is the

- A. median.
- B. mean.
- C. mode.
- D. range.
- E. standard deviation.

3.7.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

4. Consider the five number summary for salaries of U.S. marketing managers.

Min	Q1	Median	Q3	Max
46360	69693	77020	91750	129420

Suppose the marketing manager who was earning \$129,420 got a raise and is now earning \$140,000. Which of the following statement is true?

- A. The mean would increase.
- B. The median would increase.
- C. The range would increase.
- D. Both A and C.
- E. All of the above.

**3.3.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.**

5. The following table shows data for total assets (\$ billion) for a small sample of U.S. banks (late 2013).

<i>BANK</i>	<i>ASSETS (\$ billion)</i>
State Street Bank and Trust	160.5
Discover Bank	63.9
BancWest	72.8
Citizens Bank	130.0
Northern Trust	83.8
Huntington Bank	53.8
Key Bank	91.8
People's United	27.9

The mean for the total assets data (\$ billion) is

- A. \$78.3.
- B. \$56.3.
- C. \$85.6.
- D. \$120.5.
- E. \$42.4.

**3.4.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.**

6. The following table shows representative recent closing share prices for a small sample of companies based in India in late 2013.

<i>COMPANY</i>	<i>CLOSING SHARE PRICE</i>
20 Microns	30.95
ABC Paper	24.30
Bank of MA	36.20
Photoquip	37.00
Saksoft	67.20
Marg LTD	13.99
Galaxy ENT	10.40
Sonatasoft	68.75
EDynamics	49.95
DB Corp.	287.95

The standard deviation in closing share prices is

- A. \$81.6.
- B. \$25.8.
- C. \$36.6.
- D. \$62.7.
- E. \$67.6.

**3.6.2 Standardize values and use them for comparisons of otherwise disparate variables.**

7. The following table shows representative recent closing share prices in late 2013 for a small sample of companies based in India.

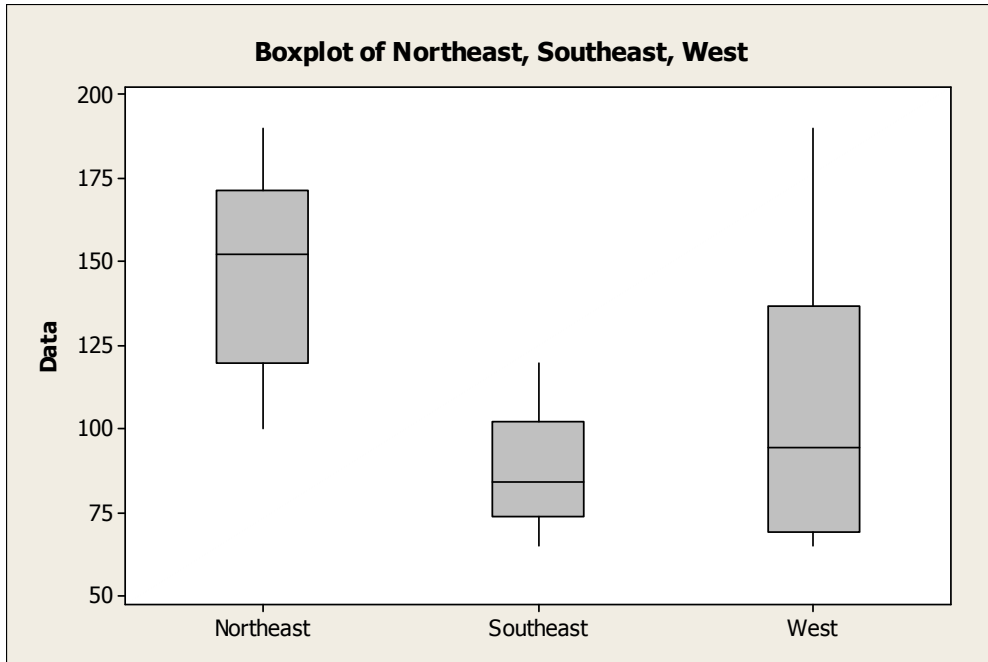
<b>COMPANY</b>	<b>CLOSING SHARE PRICE</b>
20 Microns	30.95
ABC Paper	24.30
Bank of MA	36.20
Photoquip	37.00
Saksoft	67.20
Marg LTD	13.99
Galaxy ENT	10.40
Sonatasoft	68.75
EDynamics	49.95
DB Corp.	287.95

The  $z$  score for the share price for ABC Paper is

- A. 2.76.
- B. 0.47.
- C. -2.76.
- D. -1.49.
- E. -0.47.

**3.7. Interpret boxplot displays of distributions.**

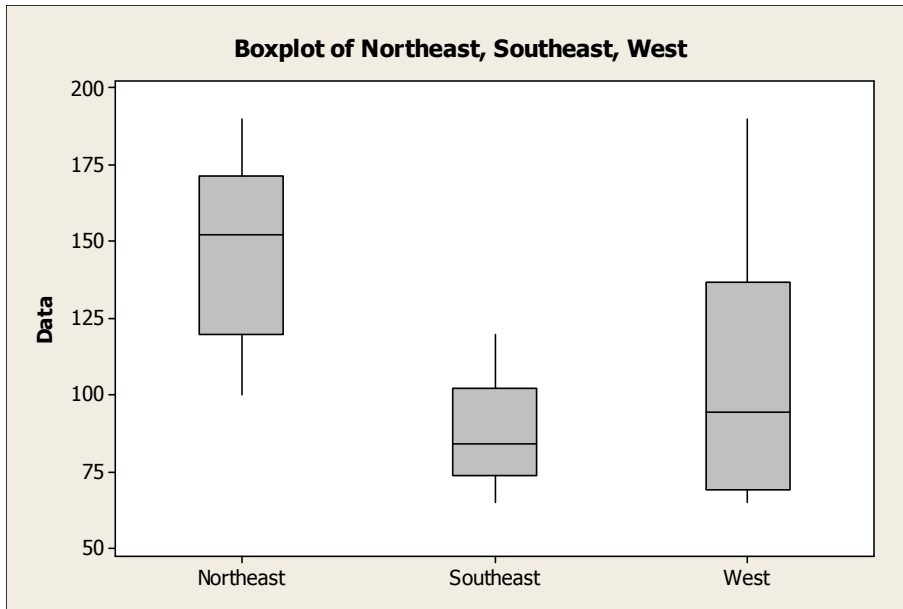
8. The following boxplots show monthly sales revenue figures (\$ thousands) for a discount office supply company with locations in three different regions of the U.S. (Northeast, Southeast, and West). Which of the following statements is true?



- A. The Northeast has the lowest mean sales revenue.
- B. The Southeast has the lowest median sales revenue.
- C. The West has the lowest mean sales revenue.
- D. The West has the lowest median sales revenue.
- E. None of the above.

**3.7.3 Make and interpret time plots for time series data.**

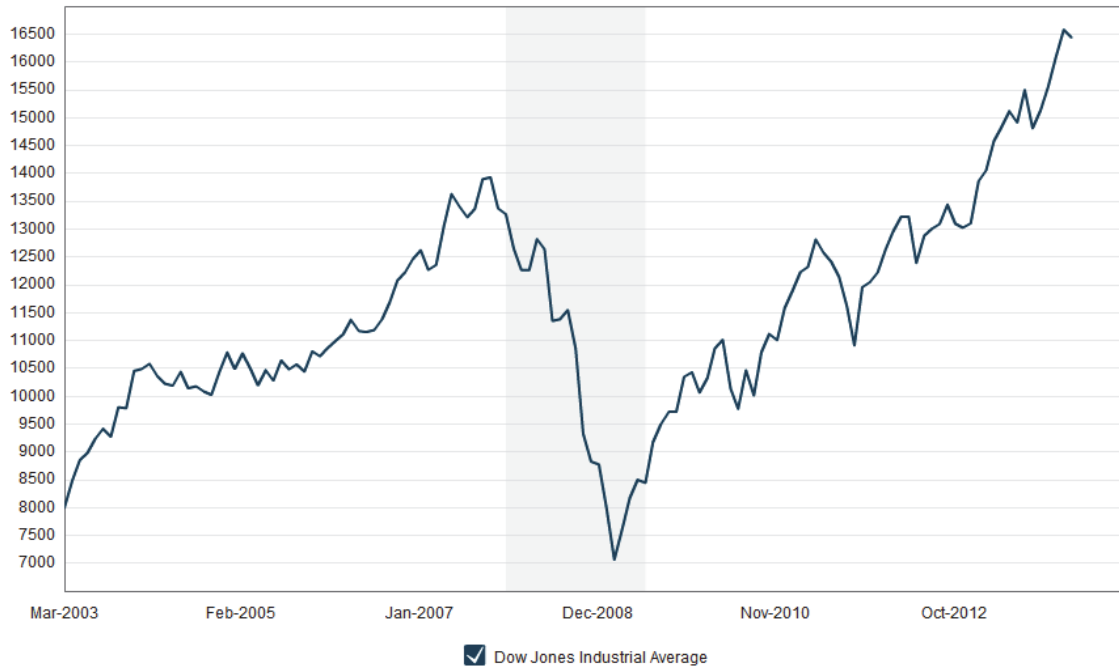
9. The following boxplots show monthly sales revenue figures (\$ thousands) for a discount office supply company with locations in three different regions of the U.S. (Northeast, Southeast, and West). Which of the following statements is false?



- A. The West has the most variable sales revenues.
- B. The West has the largest IQR.
- C. The Southeast has the smallest IQR.
- D. The Northeast has the most variable sales revenues.
- E. The Southeast has the least variable sales revenues.

## 3.2.1 Make and interpret time plots for time series data.

10. Following is a time series graph for monthly closing price for the Dow Jones Industrial Average (beginning March 2003). Which of the following statements is true?



- A. A histogram would provide a good representation of these data.
- B. The data show an upward trend since late 2008.
- C. The data show a 50% drop in the Dow Jones Average by the end of 2008.
- D. Both A and C.
- E. Both B and C.



***Chapter 3: Displaying and Describing Quantitative Data – Quiz C – Key***

1. C
2. B
3. A
4. D
5. C
6. A
7. E
8. B
9. D
10. E

**Chapter 3: Displaying and Describing Quantitative Data – Quiz D – Multiple Choice Name \_\_\_\_\_**

**3.3.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.**

1. The following table shows total assets (\$ billion) for a small sample of U.S. banks.

<b>BANK</b>	<b>ASSETS (\$ billion)</b>
Bank of New York	88
Regions Financial	80
Fifth Third Bank	58
State Street Bank and Trust	92
Branch Banking and Trust Company	81
Chase Bank	70
Key Bank	89
PNC Bank	84

The mean for these data is

- A. \$ 80.25 billion.
- B. \$ 100.35 billion.
- C. \$ 75.68 billion.
- D. \$ 84 billion.
- E. \$ 89 billion.

**3.4.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.**

2. The following table shows total assets (\$ billion) for a small sample of U.S. banks.

<b>BANK</b>	<b>ASSETS (\$ billion)</b>
Bank of New York	88
Regions Financial	80
Fifth Third Bank	58
State Street Bank and Trust	92
Branch Banking and Trust Company	81
Chase Bank	70
Key Bank	89
PNC Bank	84

The standard deviation for these data is

- A. \$12.78 billion.
- B. \$ 11.27 billion.
- C. \$ 127.01 billion.
- D. \$ 21.67 billion.
- E. \$ 34 billion.

3.6.2 Standardize values and use them for comparisons of otherwise disparate variables.

3. The following table shows total assets (\$ billion) for a small sample of U.S. banks.

<i>BANK</i>	<i>ASSETS (\$ billion)</i>
Bank of New York	88
Regions Financial	80
Fifth Third Bank	58
State Street Bank and Trust	92
Branch Banking and Trust Company	81
Chase Bank	70
Key Bank	89
PNC Bank	84

The  $z$ -score for the total assets of Fifth Third Bank is

- A. 1.25.
- B. -1.25.
- C. -2.5.
- D. 1.97.
- E. -1.97.

3.6.2 Standardize values and use them for comparisons of otherwise disparate variables.

4. The ASQ (American Society for Quality) regularly conducts a salary survey of its membership, primarily quality management professionals. Based on the most recently published mean and standard deviation, a quality control specialist calculated the  $z$ -score associated with his own salary and found it was -2.50. This tells him that his salary is

- A. 2 and a half times more than the average salary.
- B. 2 and a half times less than the average salary.
- C. is 2.5 standard deviations above the average salary.
- D. is 2.5 standard deviations below the average salary.
- E. much higher than the average salary.

3.7.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

5. Consider the five number summary of hourly wages (\$) for a sample of sales managers.

Min	Q1	Median	Q3	Max
20.94	37.64	44.77	49.34	67.11

The range for these data is

- A. \$11.70
- B. \$46.17
- C. \$67.11
- D. \$20.94
- E. \$44.77

3.7.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

6. Consider the five number summary of hourly wages (\$) for a sample of sales managers.

Min	Q1	Median	Q3	Max
20.94	37.64	44.77	49.34	67.11

The IQR for these data is

- A. \$11.70
- B. \$46.17
- C. \$67.11
- D. \$20.94
- E. \$44.77

3.7.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

7. Consider the five number summary of hourly wages (\$) for a sample of sales managers. Suppose the mean hourly wage is \$38.50. What can we say about the shape of the distribution?

Min	Q1	Median	Q3	Max
20.94	37.64	44.77	49.34	67.11

- A. The distribution of hourly wages for sales managers is symmetric.
- B. The distribution of hourly wages for sales managers is skewed right.
- C. The distribution of hourly wages for sales managers is skewed left.
- D. The distribution of hourly wages for sales managers is bimodal.
- E. None of the above.

3.7.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

8. Consider the five number summary of hourly wages (\$) for a sample of advertising / promotion managers.

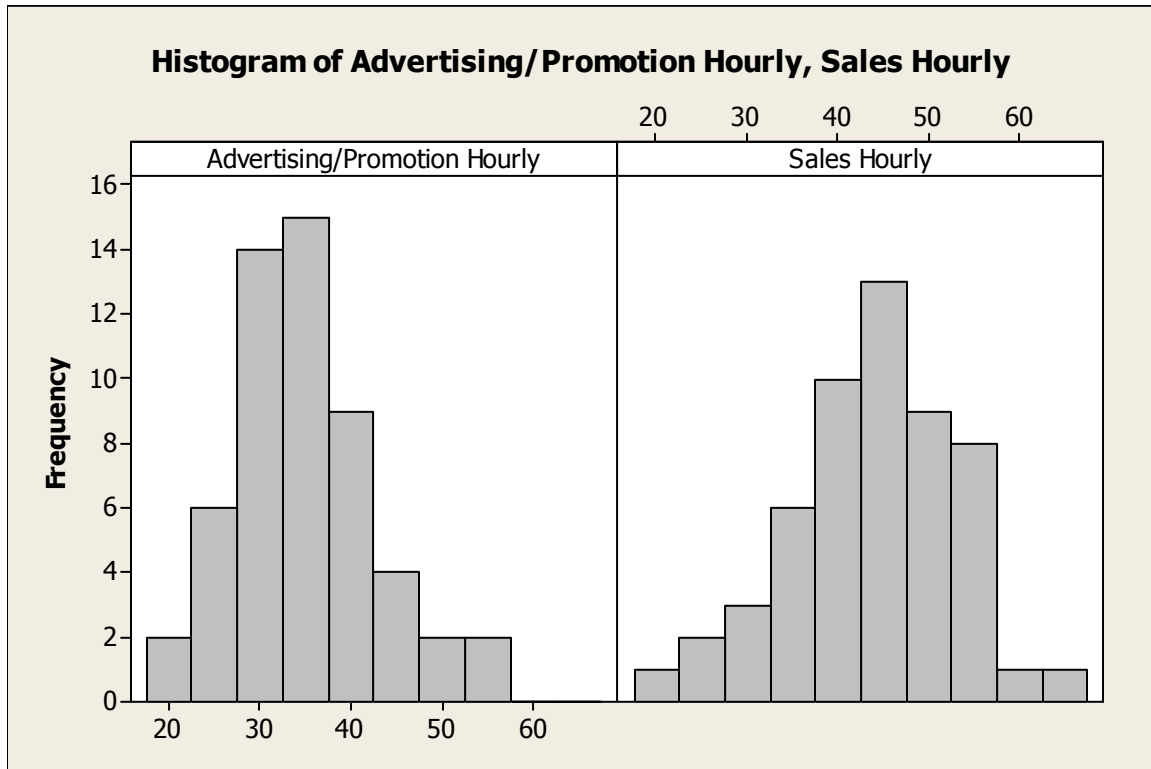
Min	Q1	Median	Q3	Max
19.64	29.36	34.18	40.86	57.26

Suppose there had been an error and that the lowest hourly wage was \$15.50 instead of \$19.64. This would result in

- A. an increase in the median.
- B. an increase in the standard deviation.
- C. a decrease in the range.
- D. a decrease in the IQR.
- E. an increase in the mean.

3.2.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

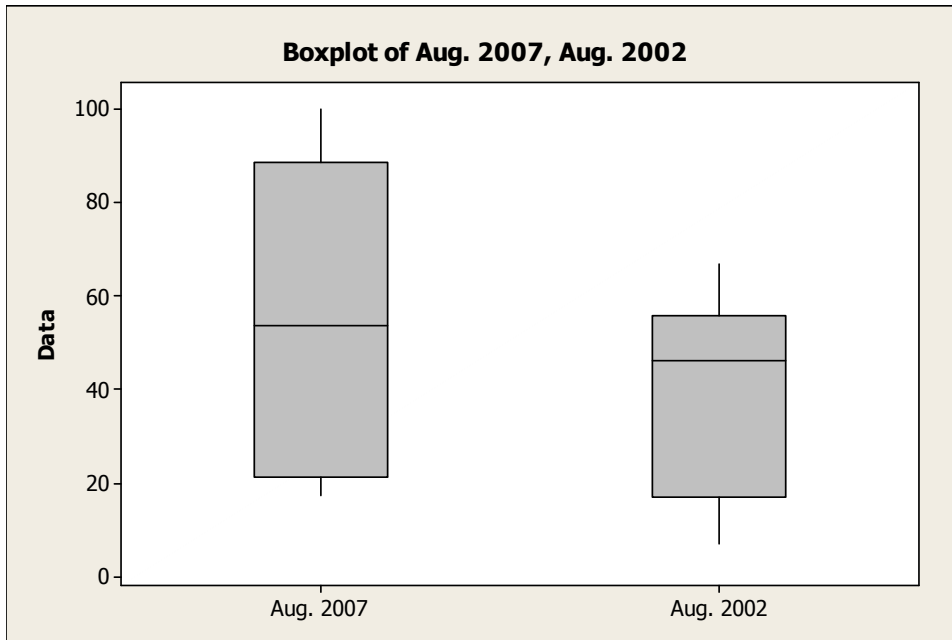
9. Data were collected on the hourly wage (\$) for two types of marketing managers: (1) advertising / promotion managers and (2) sales managers. The results were used to create the following histograms. Which of the following statements is true?



- A. The distribution of hourly wages for sales managers is unimodal and skewed right.
- B. The distribution of hourly wages for advertising/promotion managers is unimodal and skewed left.
- C. The distribution of hourly wages for sales managers is unimodal and skewed left.
- D. It appears that sales managers earn a lower hourly wage compared to advertising/promotion managers.
- E. Both C and D.

3.7.1 Find summary statistics; create displays; describe distributions; determine appropriate measures.

10. The following boxplots show the closing share prices for a sample of technology companies on the first trading days in August 2007 and in August 2002. Which of the following statement is true?



- A. The median closing share price is higher in August 2007 compared to August 2002.
- B. Closing prices are more variable in August 2007 compared to August 2002.
- C. The distribution of closing prices in August 2007 appears more symmetric than the distribution of closing prices in August 2002.
- D. Both A and B.
- E. All of the above.

***Chapter 3: Displaying and Describing Quantitative Data – Quiz D – Key***

1. A
2. B
3. E
4. D
5. B
6. A
7. C
8. B
9. C
10. E