

Question #1 of 122

Question ID: 412942

For the last four years, the returns for XYZ Corporation's stock have been 10.4%, 8.1%, 3.2%, and 15.0%. The equivalent compound annual rate is:

- ☐ A) 9.2%.
- ☒ B) 9.1%.
- ☐ C) 8.9%.

Explanation

$$(1.104 \times 1.081 \times 1.032 \times 1.15)^{0.25} - 1 = 9.1\%$$

Question #2 of 122

Question ID: 413016

Which of the following statements concerning a distribution with positive skewness and positive excess kurtosis is *least* accurate?

- ☐ A) The mean will be greater than the mode.
- ☒ B) It has a lower percentage of small deviations from the mean than a normal distribution.
- ☐ C) It has fatter tails than a normal distribution.

Explanation

A distribution with positive excess kurtosis has a higher percentage of small deviations from the mean than normal. So it is more "peaked" than a normal distribution. A distribution with positive skew has a mean > mode.

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Question ID: 412970

When creating intervals around the mean to indicate the dispersion of outcomes, which of the following measures is the *most* useful? The:

- ☐ A) variance.
- ☒ B) standard deviation.
- ☐ C) median.

Explanation

The standard deviation is more useful than the variance because the standard deviation is in the same units as the mean. The median does not help in creating intervals around the mean.

Question #4 of 122

Question ID: 413012

Which of the following statements about skewness and kurtosis is *least* accurate?

- ☐ A) Kurtosis is measured using deviations raised to the fourth power.
- ☐ B) Values of relative skewness in excess of 0.5 in absolute value indicate large levels of skewness.
- ☒ C) Positive values of kurtosis indicate a distribution that has fat tails.

Explanation

Positive values of kurtosis do not indicate a distribution that has fat tails. Positive values of excess kurtosis (kurtosis > 3) indicate fat tails.

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Question ID: 412973

Distribution X has a mean of 10 and a standard deviation of 20. Distribution Y is identical to Distribution X in all respects except that each observation in Distribution Y is three times the value of a corresponding observation in Distribution X. The mean and standard deviation of Distribution Y are *closest* to:

	<u>Mean</u>	<u>Standard deviation</u>
<input type="radio"/> A) 30	20	
<input checked="" type="radio"/> B) 30	60	
<input type="radio"/> C) 10	60	

Explanation

If the observations in Distribution Y are three times the observations in Distribution X, the mean and standard deviation of Distribution Y are three times the mean and standard deviation of Distribution X. The standard deviation of a data set measured in feet, for example, will be 3 times the standard deviation of the data set measured in yards (since 1 yard = 3 feet).

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Question ID: 412910

Which of the following statements regarding the terms population and sample is *least* accurate?

- ☒ A) A sample includes all members of a specified group.
- ☐ B) A descriptive measure of a sample is called a statistic.
- ☐ C) A sample's characteristics are attributed to the population as a whole.

Explanation

A population includes all members of a specified group. A sample is a portion, or subset of the population of interest.

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Question ID: 412975

Annual Returns on ABC Mutual Fund									
1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
11.0%	12.5%	8.0%	9.0%	13.0%	7.0%	15.0%	2.0%	-16.5%	11.0%

If the risk-free rate was 4.0% during the period 1991-2000, what is the Sharpe ratio for ABC Mutual Fund for the period 1991-2000?

☒ A) 0.68.

☒ B) 0.35.

☒ C) 0.52.

Explanation

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
Annual return	11.0%	12.5%	8.0%	9.0%	13.0%	7.0%	15.0%	2.0%	-16.5%	11.0%	Mean = 7.2
X - mean	3.8	5.3	0.8	1.8	5.8	-0.2	7.8	-5.2	-23.7	3.8	
(X - mean) ²	14.44	28.09	0.64	3.24	33.64	0.04	60.84	27.04	561.69	14.44	Sum = 744.10

Variance = $(X - \text{mean})^2 / (n - 1) = 744.10 / 9 = 82.68$

Standard deviation = $(82.68)^{1/2} = 9.1$

Sharpe Ratio = $(\text{mean return} - \text{risk-free rate}) / \text{standard deviation} = (7.2 - 4) / 9.1 = 0.35$

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Question ID: 412954

The following data points are observed returns.

4.2%, 6.8%, 7.0%, 10.9%, 11.6%, 14.4%, 17.0%, 19.0%, 22.5%

What return lies at the 70th percentile (70% of returns lie below this return)?

☒ A) 19.0%.

☒ B) 17.0%.

☒ C) 14.4%.

Explanation

With 9 observations, the location of the 70th percentile is $(9 + 1)(70 / 100) = 7$. The seventh observation in ascending order is 17.0%.

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Question ID: 412955

One year ago, an investor made five separate investments with the invested amounts and returns shown below. What is the arithmetic and geometric mean return on all of the investor's investments respectively?

<i>Investment</i>	<i>Invested Amount</i>	<i>Return (%)</i>
A	10,000	12
B	10,000	14
C	10,000	9
D	20,000	13
E	20,000	7

☐ A) 11.64; 10.97.

☐ B) 11.00; 10.78.

☒ C) 11.00; 10.97.

Explanation

Arithmetic Mean: $12 + 14 + 9 + 13 + 7 = 55$; $55 / 5 = 11$

Geometric Mean: $[(1.12 \times 1.14 \times 1.09 \times 1.13 \times 1.07)^{1/5}] - 1 = 10.97\%$

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Question ID: 412930

Which of the following indicates the frequency of an interval in a frequency distribution histogram?

☐ A) Horizontal logarithmic scale.

☐ B) Width of the corresponding bar.

☒ C) Height of the corresponding bar.

Explanation

In a histogram, intervals are placed on horizontal axis, and frequencies are placed on the vertical axis. The frequency of the particular interval is given by the value on the vertical axis, or the height of the corresponding bar.

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Question ID: 412966

There is a 40% chance that an investment will earn 10%, a 40% chance that the investment will earn 12.5%, and a 20% chance that the investment will earn 30%. What is the mean expected return and the standard deviation of expected returns, respectively?

☐ A) 17.5%; 5.75%.

☒ B) 15.0%; 7.58%.

☐ C) 15.0%; 5.75%.

Explanation

$$\text{Mean} = (0.4)(10) + (0.4)(12.5) + (0.2)(30) = 15\%$$

$$\text{Var} = (0.4)(10 - 15)^2 + (0.4)(12.5 - 15)^2 + (0.2)(30 - 15)^2 = 57.5$$

$$\text{Standard deviation} = \sqrt{57.5} = 7.58$$

Question #12 of 122

Question ID: 412964

The returns for individual assets in a portfolio are shown below:

Assets	Return (%)
A	1.3
B	1.4
C	2.2
D	3.4
E	1.7

What is the population standard deviation of the returns?

☒ A) 0.56%.

☒ B) 1.71%.

☒ C) 0.77%.

Explanation

The population standard deviation equals the square root of the sum of the squares of the position returns less the mean return, divided by the number of entities in the population.

Position	Return (%)	(Return - Mean) ²
A	1.3	0.49
B	1.4	0.36
C	2.2	0.04
D	3.4	1.96
E	1.7	0.09
Mean	10.0/5 = 2.0	Sum = 2.94
Std. Dev. = (2.94/5) ^{0.5} = 0.77%		

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Question ID: 412950

An investor has a \$12,000 portfolio consisting of \$7,000 in stock A with an expected return of 20% and \$5,000 in stock B with an expected return of 10%. What is the investor's expected return on the portfolio?

- ☐ A) 15.0%.
- ☒ B) 15.8%.
- ☐ C) 12.2%.

Explanation

Find the weighted mean where the weights equal the proportion of \$12,000. $(7,000 / 12,000)(0.20) + (5,000 / 12,000)(0.10) = 15.8\%$.

Question #14 of 122

Question ID: 413014

A distribution that is more peaked than normal is:

- ☐ A) platykurtic.
- ☒ B) leptokurtic.
- ☐ C) skewed.

Explanation

A distribution that is more peaked than normal is leptokurtic. A distribution that is flatter than normal is platykurtic.

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Question ID: 412961

Find the respective mean and the mean absolute deviation (MAD) of a series of stock market returns.

Year 1	14%
Year 2	20%
Year 3	24%
Year 4	22%

- ☒ A) 20%; 3%.
- ☐ B) 20%; 12%.
- ☐ C) 22%; 3%.

Explanation

$(14 + 20 + 24 + 22) / 4 = 20$ (mean)

Take the absolute value of the differences and divide by n:

$MAD = [|14 - 20| + |20 - 20| + |24 - 20| + |22 - 20|] / 4 = 3\%$.

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Question ID: 413013

A distribution that has positive excess kurtosis is:

- ☒ A) less peaked than a normal distribution.
- ☐ B) more skewed than a normal distribution.
- ☒ C) more peaked than a normal distribution.

Explanation

A distribution with positive excess kurtosis is one that is more peaked than a normal distribution.

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Question ID: 412965

The weights and returns for individual positions in a portfolio are shown below:

Position	Mkt. Value at 1/1/05(\$MM)	Return for 2005(%)
A	1.3	-2.0
B	1.4	-4.2
C	2.2	+6.4
D	3.9	+2.1
E	1.7	-0.8

What is the return on the portfolio?

- ☒ A) +1.18%.
- ☐ B) +1.50%.
- ☐ C) -1.20%.

Explanation

The return is equal to sum of the products of each position's value and return divided by the beginning portfolio value.

Position	Mkt. Value at 1/1/05(\$MM)	Return for 2005(%)	Position Value × Return (\$MM)
A	1.30	-2.0	-0.0260
B	1.40	-4.2	-0.0588
C	2.20	+6.4	0.1408
D	3.90	+2.1	0.0819
E	1.70	-0.8	-0.0136
Total	10.50		0.1243
0.1243 / 10.5(\$MM) =		+1.1838%	

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Question ID: 412986

If stock X's expected return is 30% and its expected standard deviation is 5%, Stock X's expected coefficient of variation is:

- ✓ A) 0.167.
- x B) 1.20.
- x C) 6.0.

Explanation

The coefficient of variation is the standard deviation divided by the mean: $5 / 30 = 0.167$.

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Question ID: 412960

Given the following annual returns, what is the mean absolute deviation?

2000	2001	2002	2003	2004
15%	2%	5%	-7%	0%

- x A) 3.0%.
- x B) 22.0%.
- ✓ C) 5.6%.

Explanation

The mean absolute deviation is found by taking the mean of the absolute values of deviations from the mean. $(|15 - 3| + |2 - 3| + |5 - 3| + |-7 - 3| + |0 - 3|) / 5 = 5.60\%$

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Question ID: 412953

Consider the following statements about the geometric and arithmetic means as measures of central tendency. Which statement is *least* accurate?

- x A) The difference between the geometric mean and the arithmetic mean increases with an increase in variability between period-to-period observations.
- x B) The geometric mean calculates the rate of return that would have to be earned each year to match the actual, cumulative investment performance.
- ✓ C) The geometric mean may be used to estimate the average return over a one-period time horizon because it is the average of one-period returns.

Explanation

The *arithmetic* mean may be used to estimate the average return over a one-period time horizon because it is the average of one-period returns. Both remaining statements are true.

Question #21 of 122

Question ID: 413019

Which of the following statements concerning skewness is *least* accurate? A distribution with:

- ✓ **A) positive skewness has a long left tail.**
- x **B) a distribution with skew equal to 1 is not symmetrical.**
- x **C) negative skewness has a large number of outliers on its left side.**

Explanation

A distribution with positive skewness has long *right* tails.

Question #22 of 122

Question ID: 413011

If a distribution is positively skewed, then generally:

- x **A) mean < median < mode.**
- ✓ **B) mean > median > mode.**
- x **C) mean > median < mode.**

Explanation

When a distribution is positively skewed the right side tail is longer than normal due to outliers. The mean will exceed the median, and the median will generally exceed the mode because large outliers falling to the far right side of the distribution can dramatically influence the mean.

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Question ID: 412947

The owner of a company has recently decided to raise the salary of one employee, who was already making the highest salary in the company, by 40%. Which of the following value(s) is (are) expected to be affected by this raise?

- ✓ **A) mean only.**
- x **B) mean and median only.**
- x **C) median only.**

Explanation

Mean is affected because it is the sum of all values / number of observations. Median is not affected as it the midpoint between the top half of values and the bottom half of values.

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Question ID: 412967

Given the following annual returns, what is the range?

2000	2001	2002	2003	2004
15%	2%	5%	-7%	0%

- ☐ A) 15.0%.
- ☒ B) 22.0%.
- ☐ C) 3.0%.

Explanation

Range = Highest Value – Lowest Value. $15\% - (-7\%) = 22.0\%$.

Question #25 of 122

Question ID: 412995

Which of the following statements regarding the Sharpe ratio is *most* accurate? The Sharpe ratio measures:

- ☐ A) total return per unit of risk.
- ☒ B) excess return per unit of risk.
- ☐ C) peakedness of a return distribution.

Explanation

The Sharpe ratio measures excess return per unit of risk. Remember that the numerator of the Sharpe ratio is (portfolio return – risk free rate), hence the importance of *excess* return. Note that peakedness of a return distribution is measured by *kurtosis*.

Question #26 of 122

Question ID: 412931

In a frequency distribution histogram, the frequency of an interval is given by the:

- ☐ A) width of the corresponding bar.
- ☐ B) height multiplied by the width of the corresponding bar.
- ☒ C) height of the corresponding bar.

Explanation

In a histogram, intervals are placed on the horizontal axis, and frequencies are placed on the vertical axis. The frequency of a particular interval is given by the value on the vertical axis, or the height of the corresponding bar.

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Question ID: 412948

For the investments shown in the table below, what are the respective mean, median, and mode of the returns?

Investment	Return (%)
A	12
B	14
C	9

D	13
E	7
F	8
G	12

- ☒ A) 10.71%; 9%; 13%.
- ☒ B) 12.00%; 12%; 12%.
- ☒ C) 10.71%; 12%; 12%.

Explanation

The mean is the average return computed by summing the returns and dividing by the number of investments: $75 / 7 = 10.71\%$.

The median is the mid-point or central number of returns arranged from highest to lowest or lowest to highest. In this case: 7, 8, 9, **12**, 12, 13, 14. The median return is 12%.

The mode is the return that occurs most frequently. In this case, 12% is also the mode.

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Question ID: 412951

Trina Romel, mutual fund manager, is taking over a poor-performing fund from a colleague. Romel wants to calculate the return on the portfolio. Over the last five years, the fund's annual percentage returns were: 25, 15, 12, -8, and -14. Determine if the geometric return of the fund will be less than or greater than the arithmetic return and calculate the fund's geometric return:

Geometric Return Geometric compared to
Arithmetic

- ☒ A) 4.96% less than
- ☒ B) 4.96% greater than
- ☒ C) 12.86% greater than

Explanation

The geometric return is calculated as follows:

$$[(1 + 0.25)(1 + 0.15)(1 + 0.12)(1 - 0.08)(1 - 0.14)]^{1/5} - 1,$$

$$\text{or } [1.25 \times 1.15 \times 1.12 \times 0.92 \times 0.86]^{0.2} - 1 = 0.4960, \text{ or } \mathbf{4.96\%}.$$

The geometric return will always be less than or equal to the arithmetic return. In this case the arithmetic return was 6%.

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Question ID: 412905

What is the main difference between descriptive statistics and inferential statistics? Descriptive statistics are:

- ☐ A) used to summarize data while inferential statistics are used to obtain precise information about a large data set.
- ☒ B) used to summarize a large data set while inferential statistics involves procedures used to make forecasts or judgments about a large data set by examining a smaller sample.
- ☐ C) used to make forecasts about the likelihood of upcoming events while inferential statistics are used to summarize any data set.

Explanation

Descriptive statistics are used to summarize a large data set while inferential statistics are based on procedures used to make forecasts or judgments about a large data set by examining a smaller set of data.

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Question ID: 412938

An investor has a \$15,000 portfolio consisting of \$10,000 in stock A with an expected return of 20% and \$5,000 in stock B with an expected return of 10%. What is the investor's expected return on the portfolio?

- ☐ A) 12.2%.
- ☐ B) 7.9%.
- ☒ C) 16.7%.

Explanation

Find the weighted mean where the weights equal the proportion of \$15,000. $[(10,000 / 15,000) \times 0.20] + [(5,000 / 15,000 \times 0.10] = 16.7\%$.

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Question ID: 434189

Annual Returns on ABC Mutual Fund									
Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
11.0%	12.5%	8.0%	9.0%	13.0%	7.0%	15.0%	2.0%	-16.5%	11.0%

What are the arithmetic mean return and the geometric mean return, respectively, for ABC Mutual Fund for the period Year 1 to Year 10?

- ☐ A) 7.2%; 5.6%.
- ☐ B) 8.2%; 6.8%.
- ☒ C) 7.2%; 6.8%.

Explanation

Arithmetic mean = $(11 + 12.5 + 8 + 9 + 13 + 7 + 15 + 2 - 16.5 + 11) / 10 = 7.20$

Geometric mean = $(1.11 \times 1.125 \times 1.08 \times 1.09 \times 1.13 \times 1.07 \times 1.15 \times 1.02 \times 0.835 \times 1.11)^{1/10} - 1 = (1.932)^{0.10} - 1 = 1.068 - 1 = 0.068$ or 6.8%

Question #32 of 122

Question ID: 413000

If a distribution is skewed:

- ✓ **A) the magnitude of positive deviations from the mean is different from the magnitude of negative deviations from the mean.**
- x **B) each side of a return distribution is the mirror image of the other.**
- x **C) it will be more or less peaked reflecting a greater or lesser concentration of returns around the mean.**

Explanation

Skewness is caused by the magnitude of positive deviations from the mean being either larger or smaller than the magnitude of negative deviations from the mean. Each side of a skewed distribution is not a mirror image of the other. Peakedness of a distribution is measured by kurtosis.

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Question ID: 412963

A sample of returns for four randomly selected assets in a portfolio is shown below:

Asset	Return (%)
A	1.3
B	1.4
C	2.2
D	3.4

What is the sample standard deviation of asset returns?

- x **A) 0.88%.**
- ✓ **B) 0.97%.**
- x **C) 1.13%.**

Explanation

The sample standard deviation equals the square root of the sum of the squares of the position returns less the mean return, divided by the number of observations in the sample *minus one*.

Position	Return (%)	(Return - Mean) ²
A	1.3	0.60
B	1.4	0.46

C	2.2	0.02
D	3.4	1.76
Mean	$8.3/4 = 2.075$	Sum = 2.83
Std. Dev. = $[2.83 / (4 - 1)]^{0.5} = 0.97$		

Question #34 of 122

Question ID: 412913

Use the results from the following survey of 500 firms to answer the question.

<i>Number of Employees</i>	<i>Frequency</i>
300 up to 400	40
400 up to 500	62
500 up to 600	78
600 up to 700	101
700 up to 800	131
800 up to 900	88

The frequency of the third class is:

- ☐ A) 180.
- ☒ B) 78.
- ☐ C) 156.

Explanation

The third class is 500 - 600 with a frequency of 78.

Question #35 of 122

Question ID: 412996

Portfolio A earned an annual return of 15% with a standard deviation of 28%. If the mean return on Treasury bills (T-bills) is 4%, the Sharpe ratio for the portfolio is:

- ☐ A) 0.54.
- ☐ B) 1.87.
- ☒ C) 0.39.

Explanation

$$(15 - 4) / 28 = 0.39$$

Question #36 of 122

Question ID: 413006

In a negatively skewed distribution, what is the order (from lowest value to highest) for the distribution's mode, mean, and median values?

- ☐ A) Median, mode, mean.
- ☐ B) Mode, mean, median.
- ☒ C) Mean, median, mode.

Explanation

In a negatively skewed distribution, the mean is less than the median, which is less than the mode.

Question #37 of 122

Question ID: 412906

Which one of the following alternatives *best* describes the primary use of descriptive statistics? Descriptive statistics are used to:

- ☒ A) summarize important characteristics of large data sets.
- ☐ B) obtain data about the characteristics of any data set that can be used to assess the likelihood of the occurrence of future events.
- ☐ C) arrive at estimates regarding a large set of data regarding the statistical characteristics of a smaller sample.

Explanation

Descriptive statistics are used mainly to summarize important characteristics of large data sets.

Question #38 of 122

Question ID: 412922

Use the results from the following survey of 500 firms to answer the question.

<i>Number of Employees</i>	<i>Frequency</i>
300 up to 400	40
400 up to 500	62
500 up to 600	78
600 up to 700	101
700 up to 800	131
800 up to 900	88

The lower boundary of the fifth interval (class) is:

✓ A) 700.

x B) 701.

x C) 800.

Explanation

700 - 800, lower boundary = 700

Question #39 of 122

Question ID: 412907

Which one of the following alternatives *best* describes the primary use of inferential statistics? Inferential statistics are used to:

✓ A) make forecasts, estimates or judgments about a large set of data based on statistical characteristics of a smaller sample.

x B) summarize the important characteristics of a large data set based on statistical characteristics of a smaller sample.

x C) make forecasts based on large data sets.

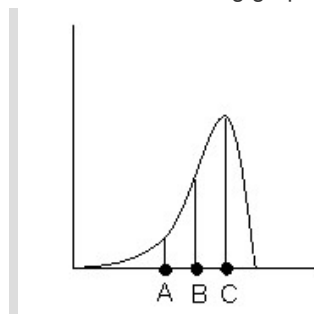
Explanation

Inferential statistics are used mainly to make forecasts, estimates or judgements about a large set of data based on statistical characteristics of a smaller set of data.

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Question ID: 436850

Consider the following graph of a distribution for the prices of various bottles of champagne.



Which of the following statements regarding the distribution is *least* accurate?

x A) The distribution is negatively skewed.

x B) The mean value will be less than the mode.

✓ C) Point A represents the mode.

Explanation

The graph represents a negatively skewed distribution, and thus Point A represents the mean. By definition, mean < median < mode describes a negatively skewed distribution.

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Question ID: 412924

Twenty students take an exam. The percentages of questions they answer correctly are ranked from lowest to highest as follows:

32	49	57	58	61
62	64	66	67	67
68	69	71	72	72
74	76	80	82	83

In a frequency distribution from 30% to 90% that is divided into six equal-sized intervals, the absolute frequency of the sixth interval is:

- ☐ A) 2.
- ☒ B) 3.
- ☐ C) 4.

Explanation

The intervals are $30\% \leq x < 40\%$, $40\% \leq x < 50\%$, $50\% \leq x < 60\%$, $60\% \leq x < 70\%$, $70\% \leq x < 80\%$, and $80\% \leq x \leq 90\%$. There are 3 scores in the range $80\% \leq x \leq 90\%$.

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Question ID: 412934

A portfolio is equally invested in Stock A, with an expected return of 6%, and Stock B, with an expected return of 10%, and a risk-free asset with a return of 5%. The expected return on the portfolio is:

- ☐ A) 8.0%.
- ☐ B) 7.4%.
- ☒ C) 7.0%.

Explanation

$$(0.333)(0.06) + (0.333)(0.10) + 0.333(0.05) = 0.07$$

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Question ID: 412979

Regardless of the shape of a distribution, according to Chebyshev's Inequality, what is the minimum percentage of observations that will lie within +/- two standard deviations of the mean?

- ☒ A) 75%.
- ☐ B) 68%.
- ☐ C) 89%.

Explanation

According to Chebyshev's Inequality, for any distribution, the minimum percentage of observations that lie within k standard deviations of the distribution mean is equal to:

$1 - (1 / k^2)$, with k equal to the number of standard deviations. If $k = 2$, then the percentage of distributions is equal to $1 - (1 / 4) = 75\%$.

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Question ID: 412988

An investor is considering two investments. Stock A has a mean annual return of 16% and a standard deviation of 14%. Stock B has a mean annual return of 20% and a standard deviation of 30%. Calculate the coefficient of variation (CV) of each stock and determine if Stock A has less dispersion or more dispersion relative to B. Stock A's CV is:

- ☐ A) 1.14, and thus has less dispersion relative to the mean than Stock B.
- ☒ B) 0.875, and thus has less dispersion relative to the mean than Stock B.
- ☐ C) 1.14, and thus has more dispersion relative to the mean than Stock B.

Explanation

CV stock A = $0.14 / 0.16 = 0.875$

CV stock B = $0.30 / 0.20 = 1.5$

Stock A has less dispersion relative to the mean than Stock B.

Question #45 of 122

Question ID: 412968

For the past three years, Acme Corp. has generated the following sample returns on equity (ROE): 4%, 10%, and 1%. What is the sample variance of the ROE over the last three years?

- ☒ A) 21.0(%²).
- ☐ B) 4.6%.
- ☐ C) 21.0%.

Explanation

$[(4 - 5)^2 + (10 - 5)^2 + (1 - 5)^2] / (3 - 1) = 21(\%^2)$.

Question #46 of 122

Question ID: 412914

Use the results from the following survey of 500 firms to answer the question.

Number of Employees	Frequency
300 up to 400	40
400 up to 500	62
500 up to 600	78
600 up to 700	101

700 up to 800	131
800 up to 900	88

The number of classes in this frequency table is:

- ✓ A) 6.
- ✗ B) 5.
- ✗ C) 600.

Explanation

300 - 400 = 1, 400 - 500 = 2, 500 - 600 = 3, 600 - 700 = 4, 700 - 800 = 5, 800 - 900 = 6, Total = 6

Question #47 of 122

Question ID: 413017

Which of the following statements about kurtosis is *least* accurate? Kurtosis:

- ✗ A) is used to reflect the probability of extreme outcomes for a return distribution.
- ✗ B) measures the peakedness of a distribution reflecting a greater or lesser concentration of returns around the mean.
- ✓ C) describes the degree to which a distribution is not symmetric about its mean.

Explanation

The degree to which a distribution is not symmetric about its mean is measured by skewness. Excess kurtosis which is measured relative to a normal distribution, indicates the peakedness of a distribution, and also reflects the probability of extreme outcomes.

Question #48 of 122

Question ID: 412937

An investor has a portfolio with 10% cash, 30% bonds, and 60% stock. If last year's return on cash was 2.0%, the return on bonds was 9.5%, and the return on stock was 25%, what was the return on the investor's portfolio?

- ✗ A) 36.50%.
- ✓ B) 18.05%.
- ✗ C) 22.30%.

Explanation

Find the weighted mean of the returns. $(0.10 \times 0.02) + (0.30 \times 0.095) + (0.60 \times 0.25) = 18.05\%$

Question #49 of 122

Question ID: 434188

Which of the following *best* describes a frequency distribution? A frequency distribution is a grouping of:

- ☐ A) measures used to describe a population
- ☒ B) data into non-overlapping intervals
- ☐ C) data into groups, the numerical order of which does not matter

Explanation

A frequency distribution is a presentation of data grouped into non-overlapping intervals to aid the analysis of large data sets.

Question #50 of 122

Question ID: 412999

A higher Sharpe ratio indicates:

- ☐ A) a lower risk per unit of return.
- ☐ B) lower volatility of returns.
- ☒ C) a higher excess return per unit of risk.

Explanation

The Sharpe ratio is excess return (return – R_f) per unit of risk (defined as the standard deviation of returns).

Question #51 of 122

Question ID: 412925

Given the following frequency distribution:

<i>Return</i>	<i>Frequency</i>
-10% up to 0%	5
0% up to 10%	7
10% up to 20%	9
20% up to 30%	6
30% up to 40%	3

What is the relative frequency of the 30% up to 40% return interval?

- ☐ A) 33.3%.
- ☐ B) 3.0%.
- ☒ C) 10.0%.

Explanation

Total number of frequencies = 30.

$3/30 = 10.0\%$

Question #52 of 122

Question ID: 413007

Twenty Level I CFA candidates in a study group took a practice exam and want to determine the distribution of their scores. When they grade their exams they discover that one of them skipped an ethics question and subsequently filled in the rest of his answers in the wrong places, leaving him with a much lower score than the rest of the group. If they include this candidate's score, their distribution will *most likely*:

- ☐ A) have a mode that is less than its median.
- ☐ B) be positively skewed.
- ☒ C) have a mean that is less than its median.

Explanation

With the low outlier included, the distribution will be negatively skewed. For a negatively skewed distribution, the mean is less than the median, which is less than the mode.

Question #53 of 122

Question ID: 412923

Which of the following statements regarding various statistical measures is *least* accurate?

- ☒ A) The coefficient of variation is calculated by dividing the mean by the standard deviation.
- ☐ B) The correlation coefficient is calculated by dividing the covariance of two random variables by the product of their standard deviations.
- ☐ C) Variance equals the sum of the squared deviations from the mean times the probability that each outcome will occur.

Explanation

The coefficient of variation equals the standard deviation divided by the mean.

Question #54 of 122

Question ID: 412952

A stock had the following returns over the last five years: 15%, 2%, 9%, 44%, 23%. What is the respective geometric mean and arithmetic mean for this stock?

- ☐ A) 0.18%; 18.6%.
- ☒ B) 17.76%; 18.6%.
- ☐ C) 17.76%; 23.0%.

Explanation

Geometric mean = $[(1.15)(1.02)(1.09)(1.44)(1.23)]^{1/5} - 1 = 1.17760 = 17.76\%$.

Arithmetic mean = $(15 + 2 + 9 + 44 + 23) / 5 = 18.6\%$.

Question #55 of 122

Question ID: 412997

Johnson Inc. manages a growth portfolio of equity securities that has had a mean monthly return of 1.4% and a standard deviation of returns of 10.8%. Smith Inc. manages a blended equity and fixed income portfolio that has had a mean monthly return of 1.2% and a standard deviation of returns of 6.8%. The mean monthly return on Treasury bills has been 0.3%. Based on the Sharpe ratio, the:

- ☒ **A) performance of the Smith portfolio is preferable to the performance of the Johnson portfolio.**
- ☐ **B) performance of the Johnson portfolio is preferable to the performance of the Smith portfolio.**
- ☐ **C) Johnson and Smith portfolios have exhibited the same risk-adjusted performance.**

Explanation

The Sharpe ratio for the Johnson portfolio is $(1.4 - 0.3)/10.8 = 0.1019$.

The Sharpe ratio for the Smith portfolio is $(1.2 - 0.3)/6.8 = 0.1324$.

The Smith portfolio has the higher Sharpe ratio, or greater excess return per unit of risk.

Question #56 of 122

Question ID: 413018

Which of the following statements concerning kurtosis is *least* accurate?

- ☐ **A) A leptokurtic distribution has fatter tails than a normal distribution.**
- ☒ **B) A leptokurtic distribution has excess kurtosis less than zero.**
- ☐ **C) A distribution that is more peaked than a normal distribution is leptokurtic.**

Explanation

A leptokurtic distribution is more peaked than normal and has fatter tails. However, the excess kurtosis is greater than zero.

Question #57 of 122

Question ID: 485758

The following table provides average return and variance of returns for portfolio managers Bob, Mark, and Rick:

	<u>Bob</u>	<u>Mark</u>	<u>Rick</u>
Average Return (%)	15	13	9
Variance	81	49	36

Which of these managers has the best risk-adjusted return, as measured by the Sharpe Ratio, if the risk-free rate is 4%?

- ☐ **A) Rick.**
- ☒ **B) Mark.**
- ☐ **C) Bob.**

Explanation

This question is solved by calculating the Sharpe Ratio for each of the managers. Then select the manager with the highest ratio. Because the standard deviations are not given, they must be found as the square root of the given variances:

Bob: $81^{1/2} = 9$

Mark: $49^{1/2} = 7$

Rick: $36^{1/2} = 6$

Sharpe Ratio for each manager, with risk-free rate = 4%:

Bob: $(15 - 4) / 9 = 1.222$

Mark: $(13 - 4) / 7 = 1.286$

Rick: $(9 - 4) / 6 = 0.833$

Mark has the highest risk-adjusted return.

Question #58 of 122

Question ID: 412926

Given the following frequency distribution:

<i>Return</i>	<i>Frequency</i>
-10% up to 0%	5
0% up to 10%	7
10% up to 20%	9
20% up to 30%	6
30% up to 40%	3

What is the relative frequency of the 0% to 10% interval?

✓ **A) 23.3%.**

x **B) 40.0%.**

x **C) 33.3%.**

Explanation

Total number of frequencies = 30.

$7/30 = 23.3\%$.

Question #59 of 122

Question ID: 412983

If the historical mean return on an investment is 2.0% and the standard deviation is 8.8%, what is the coefficient of variation (CV)?

x **A) 1.76.**

x **B) 6.80.**

✓ **C) 4.40.**

Explanation

The CV = the standard deviation of returns / mean return or $8.8\% / 2.0\% = 4.4$.

Question #60 of 122

Question ID: 413015

A distribution of returns that has a greater percentage of small deviations from the mean and a greater percentage of large deviations from the mean compared to a normal distribution:

- ✓ **A) has positive excess kurtosis.**
- ✗ **B) is positively skewed.**
- ✗ **C) has negative excess kurtosis.**

Explanation

A distribution that has a greater percentage of small deviations from the mean and a greater percentage of large deviations from the mean will be leptokurtic and will exhibit positive excess kurtosis. The distribution will be taller (more peaked) with fatter tails than a normal distribution.

Question #61 of 122

Question ID: 412920

Which of the following is an example of a parameter?

- ✓ **A) Population variance.**
- ✗ **B) Sample standard deviation.**
- ✗ **C) Sample mean.**

Explanation

A parameter is any descriptive measure of a population characteristic. The population variance describes a population while the sample standard deviation and sample mean are each descriptive measures of samples.

Question #62 of 122

Question ID: 412943

Given the following annual returns, what are the median and mode returns, respectively?

1995	1996	1997	1998	1999
15%	2%	5%	-7%	0%

- ✓ **A) 2.00%; no mode exists.**
- ✗ **B) no median exists; no mode exists.**
- ✗ **C) 2.00%; 3.00%.**

Explanation

Median: Arrange the return values from largest to smallest and take the middle value: (7%), 0%, 2%, 5%, 15%. The middle value is 2.00%. Mode: The mode is defined as the value that most often shows up in a distribution. Because no return value shows up more than once, this distribution has no mode.

Question #63 of 122

Question ID: 434190

Annual Returns on ABC Mutual Fund									
Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
11.0%	12.5%	8.0%	9.0%	13.0%	7.0%	15.0%	2.0%	-16.5%	11.0%

Assuming a mean of 7.2%, what is the sample standard deviation of the returns for ABC Mutual Fund for the period from Year 1 to Year 10?

☒ A) 9.8%.

☒ B) 9.1%.

☒ C) 7.8%.

Explanation

Standard deviation = $[\sum_i (x_i - \bar{X})^2 / (n - 1)]^{1/2} = (744.10 / 9)^{1/2} = 9.1\%$.

Question #64 of 122

Question ID: 412984

The historical return for each of a portfolio's four positions is shown below. Using the population standard deviation, what is the coefficient of variation (CV) for these returns?

Position	Return
A	17.0%
B	12.2%
C	3.9%
D	-8.4%

☒ A) 1.89.

☒ B) 1.56.

☒ C) 3.12.

Explanation

The coefficient of variation is equal to the standard deviation of returns divided by the mean return.

Position	Return	$(R - 6.175\%)^2$
A	17.0%	117.18

B	12.2%	36.30
C	3.9%	5.18
D	-8.4%	212.43
Mean	6.175%	Sum = 371.09
Std. Dev. = $(371.09 / 4)^{0.5} = 9.63$		
CV = $9.63 / 6.175 = 1.56$		

Question #65 of 122

Question ID: 413001

Which of the following statements regarding skewness is *least* accurate?

- ✓ **A) In a skewed distribution, 95% of all values will lie within plus or minus two standard deviations of the mean.**
- ✗ **B) A positively skewed distribution is characterized by many small losses and a few extreme gains.**
- ✗ **C) A distribution that is not symmetrical has skew not equal to zero.**

Explanation

For a normal distribution, the mean will be equal to its median and 95% of all observations will fall within plus or minus two standard deviations of the mean. For a skewed distribution, because it is not symmetrical, this may not be the case. Chebyshev's inequality tells us that at least 75% of observations will lie within plus or minus two standard deviations from the mean.

Question #66 of 122

Question ID: 412982

Following is the population of temperatures (in degrees Celsius) observed during a ten-day period of January taken in San Francisco at the Ferry Building.

Day/°C	1	2	3	4	5	6	7	8	9	10
High	9	11	13	14	13	13	11	14	15	17
Low	3	6	6	7	10	10	9	6	8	4

- The population of high temperatures is normally distributed with a mode of 13°C and a coefficient of variation (CV) of 0.165.
- The population of low temperatures is positively skewed with a mean of 6.9°C and a CV of 0.328.
- A sample of high temperatures taken on odd days (5 data points) has a mean of 12.2°C and a variance of 5.20.
- A sample of low temperatures taken on odd days (5 data points) has a mean of 7.2°C.

Which of the following statements about the temperatures in San Francisco is *least* accurate?

- ✗ **A) For the low temperatures, the mode is less than 6.9°C.**

- ✓ **B)** For the high temperatures, the population variance is greater than the sample variance.
- ✗ **C)** For the low temperatures, the population standard deviation is less than the sample standard deviation.

Explanation

The high temperature population variance is *less* than the sample variance. Calculating the *high temperature population variance* would take quite a bit of time - so look for a shortcut! For the population of high temperatures, we are given the mode and the CV. Here, there are two tricks: remember that the CV = standard deviation / mean and that for a normal distribution, the mean = median = mode. We can manipulate the CV equation as standard deviation = mean × CV, or $13 \times 0.165 = 2.145$. Squaring this result gives a variance of $2.145^2 = 4.60$. Thus, the high temperature population variance is *less* than the sample variance.

Both remaining statements are true. The strategy here is to work from the "easiest" to the most difficult calculations. (Note: all units are °C unless stated otherwise.)

- The question tells us that the *low temperatures* are positively skewed with a mean of 6.9. For a positively skewed distribution, we know that the mean > median > mode. Thus, the mode is less than the mean, or 6.9.
- The population with the *lowest* CV has the least dispersion. Thus, the population of high temperatures (CV of 0.165) is less dispersed than in the population of low temperatures (CV of 0.328).
- Again, calculating the *low temperature population standard deviation* would take quite a bit of time - so look for a shortcut! For the population of high temperatures, we are given the mean and the CV. Here, there is only one trick (we are given the mean): manipulate the CV equation as standard deviation = mean × CV, or $6.9 \times 0.328 = 2.26$. Unfortunately, there is no real shortcut for the low temperature sample standard deviation, which is calculated as follows:
 - Sample mean is given at 7.2.
 - Variance = $[(3 - 7.2)^2 + (6 - 7.2)^2 + (10 - 7.2)^2 + (9 - 7.2)^2 + (8 - 7.2)^2] / (5 - 1) = 7.7$
 - Standard Deviation = $7.7^{1/2} = 2.78$.

Thus, the population standard deviation of 2.26 is less than the sample standard deviation of 2.78.

Question #67 of 122

Question ID: 412929

Which of the following statements about histograms and frequency polygons is *least* accurate?

- ✗ **A)** A histogram and a frequency polygon both plot the absolute frequency on the vertical axis.
- ✗ **B)** A frequency polygon is constructed by plotting the midpoint of each interval on the horizontal axis.
- ✓ **C)** A histogram connects points with a straight line.

Explanation

In constructing a frequency polygon, the midpoint of each interval is plotted on the horizontal axis and the frequency of each interval is plotted on the vertical axis. Points are then connected with straight lines. A histogram is a bar chart of data that has been grouped into a frequency distribution - because it is a bar chart, there are no individual points to connect.

Question #68 of 122

Question ID: 412976

Which of the following statements about statistical concepts is *least* accurate?

- ✓ **A) For a normal distribution, only 95% of the observations lie within ± 3 standard deviations from the mean.**
- x **B) For any distribution, based on Chebyshev's Inequality, 75% of the observations lie within ± 2 standard deviations from the mean.**
- x **C) The coefficient of variation is useful when comparing dispersion of data measured in different units or having large differences in their means.**

Explanation

For a normal distribution, 95% of the observations lie within ± 2 standard deviations of the mean while 99% of the observations lie within plus or minus three standard deviations of the mean. Both remaining statements are true. Note that 75% of observations for any distribution lie within ± 2 standard deviations of the mean using Chebyshev's inequality.

Question #69 of 122

Question ID: 413010

In a positively skewed distribution, the:

- x **A) median equals the mean.**
- x **B) mean is less than the median.**
- ✓ **C) mean is greater than the median.**

Explanation

In a right-skewed distribution, there are large positive outliers. These outliers increase the mean of the distribution but have little effect on the median. Therefore, the mean is greater than the median.

Question #70 of 122

Question ID: 412935

An investor has the following assets:

- \$5,000 in bonds with an expected return of 8%.
- \$10,000 in equities with an expected return of 12%.
- \$5,000 in real estate with an expected return of 10%.

What is the portfolio's expected return?

- ✓ **A) 10.50%.**
- x **B) 10.00%.**
- x **C) 11.00%.**

Explanation

Expected return is the weighted average of the individual expected values. The expected return is: $[(5,000) \times (10.00) + (5,000) \times (8.00) + (10,000) \times (12.00)] / 20,000 = 10.50\%$.

Question #71 of 122

Question ID: 412945

Given the following annual returns, what are the geometric and arithmetic mean returns, respectively?

2002	2003	2004	2005	2006
15%	2%	5%	-7%	0%

☒ A) 2.75%; 5.80%.

☐ B) 1.45%; 3.00%.

☒ C) 2.75%; 3.00%.

Explanation

Geometric Mean: $(1.15 \times 1.02 \times 1.05 \times 0.93 \times 1.0)^{1/5} - 1 = 1.1454^{1/5} - 1 = 2.75\%$

Arithmetic Mean: $(15\% + 2\% + 5\% - 7\% + 0\%) / 5 = 3.00\%$

Question #72 of 122

Question ID: 434192

Claude Bellow, CFA, is an analyst with a real estate focused investment firm. He asks his assistant to gather annual return information on a large office building and on a (REIT) real estate investment trust with diverse holdings. The following tables summarize the information.

Table 1: Annual returns (in %)					
Asset	Year 1	Year 2	Year 3	Year 4	Year 5
REIT	25.0	20.0	5.0	-5.0	13.0
Office Building	15.0	5.0	-5.0	-2.0	13.0

Table 2: Mean and Dispersion Information

Asset	Mean Return*	Variance
REIT	11.6%	114.24
Office Building	5.2%	62.56

* Calculated using the arithmetic mean.

A partner in the firm asks Bellow to calculate the Sharpe ratio for the REIT. If the risk-free rate is 5.0%, the Sharpe ratio is closest to:

☒ A) 0.62.

☐ B) 1.62.

☐ C) 0.06.

Explanation

The Sharpe ratio measures the excess return per unit of risk. The formula is:

$$\text{Sharpe Ratio} = (\bar{r}_p - \bar{r}_f) / \sigma_p$$

where: \bar{r}_p = portfolio return; \bar{r}_f = risk free return; σ = standard deviation

$$\text{Sharpe Ratio}_{\text{REIT}} = (11.6\% - 5.00\%) / 114.24^{1/2} = 0.62.$$

Question #73 of 122

Question ID: 412969

Given the following annual returns, what are the population variance and standard deviation, respectively?

2000	2001	2002	2003	2004
15%	2%	5%	-7%	0%

✓ A) 51.6; 7.2.

x B) 32.4; 5.7.

x C) 64.5; 8.0.

Explanation

The population variance is found by taking the mean of all squared deviations from the mean.

$$[(15 - 3)^2 + (2 - 3)^2 + (5 - 3)^2 + (-7 - 3)^2 + (0 - 3)^2] / 5 = 51.6$$

The population standard deviation is found by taking the square root of the population variance.

$$51.6^{1/2} = 7.2$$

Question #74 of 122

Question ID: 434191

Claude Bellow, CFA, is an analyst with a real estate focused investment firm. He asks his assistant to gather annual return information on a large office building and on a (REIT) real estate investment trust with diverse holdings. The following tables summarize the information.

Table 1: Annual returns (in %)					
Asset	Year 1	Year 2	Year 3	Year 4	Year 5
REIT	25.0	20.0	5.0	-5.0	13.0
Office Building	15.0	5.0	-5.0	-2.0	13.0

Table 2: Mean and Dispersion Information		
Asset	Mean Return*	Variance
REIT	11.6%	114.24

Office Building	5.2%	62.56
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* Calculated using the arithmetic mean.

Which of the following statements about the coefficient of variation of the two assets is *least* accurate?

- ☐ A) The mean of the squared deviations from the arithmetic mean of the office building is less than that of the REIT.
- ☒ B) There is more dispersion relative to the mean in the distribution of the REIT returns when compared to the distribution of the returns for the office building.
- ☐ C) The coefficient of variation of the office building returns is approximately 1.52.

Explanation

There is *less* dispersion relative to the mean in the distribution of the REIT returns ($CV = s / \text{mean} = 114.24^{1/2} / 11.6 = 0.92$) when compared to the distribution of the monthly returns for the Office building ($CV = 62.56^{1/2} / 5.2 = 1.52$). The coefficient of variation measures how much dispersion exists relative to the mean of a distribution and allows for direct comparison of dispersion across different data sets. *Note:* Ignore Table 1! All the information you need is in Table 2.

Both remaining statements are true. The mean of the squared deviations from the arithmetic mean is the definition of the variance, and the variance of the Office Building returns is less than for those of the REIT. Thus, the same relationship holds for the standard deviation.

Question #75 of 122

Question ID: 413005

If a distribution is positively skewed:

- ☐ A) the mode is greater than the median.
- ☒ B) the mean is greater than the median.
- ☐ C) the mode is greater than the mean.

Explanation

For a positively skewed distribution, the mode is less than the median, which is less than the mean (the mean is greatest). Remember that investors are attracted to positive skewness because the mean return is greater than the median return.

Question #76 of 122

Question ID: 412992

A portfolio has a return of 14.2% and a Sharpe's measure of 3.52. If the risk-free rate is 4.7%, what is the standard deviation of returns?

- ☐ A) 2.6%.
- ☒ B) 2.7%.
- ☐ C) 3.9%.

Explanation

Question #77 of 122

Question ID: 412971

Claude Bellow, CFA, is an analyst with a real-estate focused investment firm. Today, one of the partners e-mails Bellow the following table and requests that he "run some numbers." The table below gives five years of annual returns for Marley REIT (real estate investment trust) and a large urban apartment building. Marley REIT invests in commercial properties. (Note: For this question, calculate the mean returns using the *arithmetic mean*.)

Table 1: Annual returns (in %)					
Asset	Year 1	Year 2	Year 3	Year 4	Year 5
Marley REIT	15.0	8.0	13.0	9.0	13.0
Apartment Bldg	10.0	-1.0	8.0	8.0	9.0

One of the office assistants begins to "run some numbers," but is then called away to an important meeting. So far, the assistant calculated the variance of the apartment building returns at 15.76%. (He assumed that the returns given represent the entire population of returns.) Now, Bellow must finish the work.

Bellow should conclude that the standard deviation of the:

- ☒ A) apartment building, if the given returns represent a sample of returns, is 19.70%.
- ☒ B) apartment building, if the given returns represent a sample of returns, is 4.44%.
- ☒ C) REIT, assuming the given returns represent the entire population, is 2.97%.

Explanation

Suggested Strategy: Since you will have approximately 1.5 minutes for each question and this question appears very calculation intensive, it is likely that there is a "trick." Here, start with the apartment building because the labor-intensive part of the calculation has been completed. Remember that the standard deviation is the square root of the variance and that both the formula for the population variance and the formula for the sample variance have the same numerator (the sum of the squared result of the observation less the mean). The denominator of the population variance is the entire data set n , (5 here). The denominator of the sample variance is $n-1$, (or 4 here).

Thus, the population variance = (the sum of the square result of the observation less the mean) / number of observations. Here, $15.76 = x / 5$, $x = 78.80$.

So, the *sample variance* = $78.80 / 4 = 19.70$, and the sample standard deviation = $19.70^{1/2} = 4.44\%$.

Both remaining statements are incorrect. FYI, the calculations for the **REIT** are as follows:

- Mean = $(15 + 8 + 13 + 9 + 13) / 5 = 11.6$
- (The sum of the observation less the mean)² = $[(15-11.6)^2 + (8 - 11.6)^2 + (13 - 11.6)^2 + (9 - 11.6)^2 + (13 - 11.6)^2] = 35.2$
- The population standard deviation = $[(35.2 / 5.0)]^{1/2} = [7.04]^{1/2} = 2.65\%$
- The sample standard deviation = $[(35.2 / 4.0)]^{1/2} = [8.80]^{1/2} = 2.97\%$

Question #78 of 122

Question ID: 412911

Which measure of scale has a true zero point as the origin?

- ☐ A) Nominal scale.
- ☒ B) Ratio scale.
- ☐ C) Ordinal scale.

Explanation

Ratio scales are the strongest level of measurement; they quantify differences in the size of data and have a true zero point as the origin.

Question #79 of 122

Question ID: 412928

Monthly returns for a set of small cap stocks are 1.3%, 0.8%, 0.5%, 3.4%, -3.5%, -1.2%, 1.8%, 2.1%, and 1.5%. An analyst constructs a frequency distribution and a frequency polygon using the following intervals: -4.0% to -2.0%, -2.0% to 0.0%, 0.0% to 2.0%, and 2.0% to 4.0%. Which of the following statements about these data presentations is *least* accurate?

- ☐ A) The absolute frequency of the interval 0.0% to 2.0% is 5.
- ☒ B) The relative frequency of the interval -2.0% to 0.0% equals the relative frequency of the interval 2.0% to 4.0%.
- ☐ C) A frequency polygon plots the midpoint of each interval on the horizontal axis and the absolute frequency of that interval on the vertical axis.

Explanation

When completed, the frequency distribution table should look as follows:

Frequency Distribution of Monthly Small Cap Stock Returns		
Interval	Absolute Frequency	Relative Frequency
-4.0% to -2.0%	1	11.1%
-2.0% to 0.0%	1	11.1%
0.0% to 2.0%	5	55.6%
2.0% to 4.0%	2	22.2%
Total	9	100.0%

The relative frequency of the interval -2.0% to 0.0% *does not* equal the relative frequency of the interval 2.0% to 4.0%.

Question #80 of 122

Question ID: 412936

Which of the following statements about a normal distribution is *least* accurate?

- ☒ A) A normal distribution has excess kurtosis of three.
- ☐ B) Approximately 68% of the observations lie within +/- 1 standard deviation of the mean.
- ☐ C) The mean and variance completely define a normal distribution.

Explanation

Even though normal curves have different sizes, they all have identical shape characteristics. The kurtosis for all normal distributions is three; an excess kurtosis of three would indicate a leptokurtic distribution. Both remaining choices are true.

Question #81 of 122

Question ID: 412941

The respective arithmetic mean and geometric mean returns of the following series of stock market returns are:

Year 1	14%
Year 2	6%
Year 3	-5%
Year 4	20%

☒ A) 8.90%; 8.62%.

☐ B) 8.75%; 8.62%.

☒ C) 8.75%; 8.34%.

Explanation

$$(14 + 6 + (-5) + 20) / 4 = 8.75.$$

$$((1.14 \times 1.06 \times 0.95 \times 1.20)^{0.25} - 1 = 8.34\%.$$

Question #82 of 122

Question ID: 412989

The mean monthly return on (U.S. Treasury bills) T-bills is 0.42% with a standard deviation of 0.25%. What is the coefficient of variation?

☒ A) 60%.

☐ B) 168%.

☐ C) 84%.

Explanation

The coefficient of variation expresses how much dispersion exists relative to the mean of a distribution and is found by $CV = s / \text{mean}$, or $0.25 / 0.42 = 0.595$, or 60%.

Question #83 of 122

Question ID: 434187

Given the following frequency distribution:

Interval	Frequency

10 up to 30	5
30 up to 50	10
50 up to 70	15
70 up to 90	5

Which of the following statements is *least* accurate?

- ☒ A) The absolute frequency of the third interval is 15.
- ☒ B) The relative frequency of the second interval is less than 15%.
- ☒ C) The number of observations is greater than 30.

Explanation

The relative interval frequency is (interval frequency) / (total number) = 28.57%. The number of observations is $5 + 10 + 15 + 5 = 35$.

Question #84 of 122

Question ID: 412991

Given a population of 200, 100, and 300, the coefficient of variation is *closest to*:

- ☒ A) 40%.
- ☒ B) 100%.
- ☒ C) 30%.

Explanation

$$CV = (\sigma / \text{mean})$$

$$\text{mean} = (200 + 100 + 300) / 3 = 200$$

$$\sigma = \sqrt{[(200 - 200)^2 + (100 - 200)^2 + (300 - 200)^2] / 3} = \sqrt{6666.67} = 81.65$$

$$(81.65 / 200) = 40.82\%$$

Question #85 of 122

Question ID: 412985

What is the coefficient of variation for a distribution with a mean of 10 and a variance of 4?

- ☒ A) 25%.
- ☒ B) 20%.
- ☒ C) 40%.

Explanation

Coefficient of variation, CV = standard deviation / mean. The standard deviation is the square root of the variance, or $4^{1/2} = 2$. So, $CV = 2 / 10 = 20\%$.

Question #86 of 122

Question ID: 412919

A summary measure of a characteristic of an entire population is called a:

- ✓ **A) parameter.**
- x **B) census.**
- x **C) statistic.**

Explanation

A parameter measures a characteristic of the underlying population.

Question #87 of 122

Question ID: 412921

Use the results from the following survey of 500 firms to answer the question.

<i>Number of Employees</i>	<i>Frequency</i>
300 up to 400	40
400 up to 500	62
500 up to 600	78
600 up to 700	101
700 up to 800	131
800 up to 900	88

The width of each interval (class) for this frequency table is:

- ✓ **A) 100.**
- x **B) 50.**
- x **C) 101.**

Explanation

Max of interval – Min of interval = 100

Question #88 of 122

Question ID: 412957

What does it mean to say that an observation is at the sixty-fifth percentile?

- x **A) The observation falls within the 65th of 100 intervals.**
- ✓ **B) 65% of all the observations are below that observation.**
- x **C) 65% of all the observations are above that observation.**

Explanation

If the observation falls at the sixty-fifth percentile, 65% of all the observations fall below that observation.

Question #89 of 122

Question ID: 412917

Use the results from the following survey of 500 firms to answer the question.

<i>Number of Employees</i>	<i>Frequency</i>
300 up to 400	40
400 up to 500	62
500 up to 600	78
600 up to 700	101
700 up to 800	131
800 up to 900	88

The cumulative relative frequency of the second interval (400 to 500) is:

- ✓ **A) 20.4%.**
- ✗ **B) 12.4%.**
- ✗ **C) 10.2%.**

Explanation

$62 + 40 = 102$, $102 / 500 = 0.204$ or 20.4%

Question #90 of 122

Question ID: 413009

A distribution with a mean that is less than its median *most likely*:

- ✓ **A) is negatively skewed.**
- ✗ **B) is positively skewed.**
- ✗ **C) has negative excess kurtosis.**

Explanation

A distribution with a mean that is less than its median is a negatively skewed distribution. A negatively skewed distribution is characterized by many small gains and a few extreme losses. Note that kurtosis is a measure of the peakedness of a return distribution.

Question #91 of 122

Question ID: 412933

Which of the following statements about the arithmetic mean is *least* accurate?

- ✓ **A) If the distribution is skewed to the left then the mean will be greater than the median.**
- ✗ **B) The arithmetic mean of a frequency distribution is equal to the sum of the class frequency times the midpoint of the frequency class all divided by the number of observations.**
- ✗ **C) The arithmetic mean is the only measure of central tendency where the sum of the deviations of each observation from the mean is always zero.**

Explanation

If the distribution is skewed to the left, then the mean will be less than the median.

Question #92 of 122

Question ID: 412918

Which of the following statements regarding frequency distributions is *least* accurate? Frequency distributions:

- ✓ **A) organize data into overlapping groups.**
- ✗ **B) summarize data into a relatively small number of intervals.**
- ✗ **C) work with all types of measurement scales.**

Explanation

Data in a frequency distribution must belong to only one group or interval. Intervals are mutually exclusive and non-overlapping.

Question #93 of 122

Question ID: 412944

Which measure of central tendency can be used for both numerical and categorical variables?

- ✗ **A) Mean.**
- ✓ **B) Mode.**
- ✗ **C) Median.**

Explanation

The mode is the only choice that makes sense since you cannot take an average or median of categorical data such as bond ratings (AAA, AA, A, etc.) but the mode is simply the most frequently occurring number or category.

Question #94 of 122

Question ID: 412987

The mean monthly return on a sample of small stocks is 4.56% with a standard deviation of 3.56%. What is the coefficient of variation?

- ✓ A) 78%.
- ✗ B) 84%.
- ✗ C) 128%.

Explanation

The coefficient of variation expresses how much dispersion exists relative to the mean of a distribution and is found by $CV = s / \text{mean}$. $3.56 / 4.56 = 0.781$, or 78%.

Question #95 of 122

Question ID: 412980

In a skewed distribution, what is the minimum proportion of observations between +/- two standard deviations from the mean?

- ✓ A) 75%.
- ✗ B) 84%.
- ✗ C) 95%.

Explanation

For any distribution we can use Chebyshev's Inequality, which states that the proportion of observations within k standard deviations of the mean is at least $1 - (1 / k^2)$.

$$1 - (1 / 2^2) = 0.75, \text{ or } 75\%.$$

Note that for a normal distribution, 95% of observations will fall between +/- 2 standard deviations of the mean.

Question #96 of 122

Question ID: 412981

Assume a sample of beer prices is negatively skewed. Approximately what percentage of the distribution lies within plus or minus 2.40 standard deviations of the mean?

- ✗ A) 58.3%.
- ✓ B) 82.6%.
- ✗ C) 95.5%.

Explanation

Use Chebyshev's Inequality to calculate this answer. Chebyshev's Inequality states that for any set of observations, the proportion of observations that lie within k standard deviations of the mean is *at least* $1 - 1/k^2$. We can use Chebyshev's Inequality to measure the minimum amount of dispersion whether the distribution is normal or skewed. Here, $1 - (1 / 2.4^2) = 1 - 0.17361 = 0.82639$, or **82.6%**.

Question #97 of 122

Question ID: 412927

How is the relative frequency of an interval computed?

- ✗ A) Dividing the sum of the two interval limits by 2.

- ☒ B) Subtracting the lower limit of the interval by the upper limit.
- ☒ C) Dividing the frequency of that interval by the sum of all frequencies.

Explanation

The relative frequency is the percentage of total observations falling within each interval. It is found by taking the frequency of the interval and dividing that number by the sum of all frequencies.

Question #98 of 122

Question ID: 412998

A portfolio of options had a return of 22% with a standard deviation of 20%. If the risk-free rate is 7.5%, what is the Sharpe ratio for the portfolio?

- ☒ A) 0.147.
- ☒ B) 0.568.
- ☒ C) 0.725.

Explanation

Sharpe ratio = $(22\% - 7.50\%) / 20\% = 0.725$.

Question #99 of 122

Question ID: 412993

Portfolio A earned a return of 10.23% and had a standard deviation of returns of 6.22%. If the return over the same period on Treasury bills (T-bills) was 0.52% and the return to Treasury bonds (T-bonds) was 4.56%, what is the Sharpe ratio of the portfolio?

- ☒ A) 1.56.
- ☒ B) 0.56.
- ☒ C) 0.91.

Explanation

Sharpe ratio = $(R_p - R_f) / \sigma_p$, where $(R_p - R_f)$ is the difference between the portfolio return and the risk free rate, and σ_p is the standard deviation of portfolio returns. Thus, the Sharpe ratio is: $(10.23 - 0.52) / 6.22 = 1.56$. Note, the T-bill rate is used for the risk free rate.

Question #100 of 122

Question ID: 412958

What is the seventh decile of the following data points?

81	84	91	97	102	108	110	112	115	121
128	135	138	141	142	147	153	155	159	162

- ☒ A) 141.7.

☒ B) 142.0.

☒ C) 141.0.

Explanation

The formula for determining quantiles is: $L_y = (n + 1)(y) / (100)$. Here, we are looking for the seventh decile (70% of the observations lie below) and the formula is: $(21)(70) / (100) = 14.7$. The seventh decile falls between 141.0 and 142.0, the fourteenth and fifteenth numbers from the left. Since L is not a whole number, we interpolate as: $141.0 + (0.70)(142.0 - 141.0) = 141.7$.

Question #101 of 122

Question ID: 413020

Given rates of return on an index for the past 10 years, the arithmetic mean of these returns is:

☒ A) statistically the best estimator of the next year's rate of return.

☒ B) statistically the best estimator of the compound annual rate of return over multiple periods.

☒ C) the compound annual rate of return that would have resulted in the same change in wealth as the actual rates of return in the past years.

Explanation

The arithmetic mean of past years' returns is statistically a better estimator of the next year's returns than the geometric mean. The geometric mean of past years' returns is the compound annual rate of return that would have resulted in the same change in wealth as the compound individual years' rates of return over the period. For estimating future multi-year returns, the geometric mean of past years' returns is statistically a better estimator than the arithmetic mean.

Question #102 of 122

Question ID: 413021

In the most recent four years, an investment has produced annual returns of 4%, -1%, 6%, and 3%. The *most* appropriate estimate of the next year's return, based on these historical returns, is the:

☒ A) harmonic mean.

☒ B) geometric mean.

☒ C) arithmetic mean.

Explanation

Given a series of historical returns, the arithmetic mean is statistically the best estimator of the next year's return. For estimating a compound return over more than one year, the geometric mean of the historical returns is the most appropriate estimator.

Question #103 of 122

Question ID: 412939

Find the mean, median, and mode, respectively, of the following data:

3, 3, 5, 8, 9, 13, 17

- ☐ A) 3; 8.28; 8.
- ☐ B) 8; 8.28; 3.
- ☒ C) 8.28; 8; 3.

Explanation

Mean = $(3 + 3 + 5 + 8 + 9 + 13 + 17) / 7 = 8.28$; Median = middle of distribution = 8 (middle number); Mode = most frequent = 3.

Question #104 of 122

Question ID: 412978

In a skewed distribution, what is the minimum amount of observations that will fall between ± 1.5 standard deviations from the mean?

- ☐ A) 95%.
- ☒ B) 56%.
- ☐ C) 44%.

Explanation

Because the distribution is skewed, we must use Chebyshev's Inequality, which states that the proportion of observations within k standard deviations of the mean is at least $1 - (1 / k^2)$.

$1 - (1 / 1.5^2) = 0.5555$, or 56%.

Question #105 of 122

Question ID: 412909

Which of the following statements about statistical concepts is *least* accurate?

- ☐ A) A parameter is any descriptive measure of a population characteristic.
- ☒ B) A sample contains all members of a specified group, but a population contains only a subset.
- ☐ C) A frequency distribution is a tabular display of data summarized into a relatively small number of intervals.

Explanation

A population is defined as all members of a specified group, but a sample is a subset of a population.

Question #106 of 122

Question ID: 412912

Fifty mutual funds are ranked according to performance. The five best performing funds are assigned the number 1, while the five worst performing funds are assigned the number 10. This is an example of a(n):

- ☐ A) interval scale.
- ☐ B) nominal scale.
- ☒ C) ordinal scale.

Explanation

The ordinal scale of measurement categorizes and orders data with respect to some characteristic. In this example, the ordinal scale tells us that a fund ranked "1" performed better than a fund ranked "10," but it does not tell us anything about the difference in performance.

Question #107 of 122

Question ID: 413004

In a positively skewed distribution, what is the order (from lowest value to highest) for the distribution's mode, mean, and median values?

- ☐ A) Mean, median, mode.
- ☐ B) Mode, mean, median.
- ☒ C) Mode, median, mean.

Explanation

In a positively skewed distribution, the mode is less than the median, which is less than the mean.

Question #108 of 122

Question ID: 412956

Consider the following set of stock returns: 12%, 23%, 27%, 10%, 7%, 20%, 15%. The third quartile is:

- ☐ A) 20.0%.
- ☒ B) 23%.
- ☐ C) 21.5%.

Explanation

The third quartile is calculated as: $L_y = (7 + 1) (75/100) = 6$. When we order the observations in ascending order: 7%, 10%, 12%, 15%, 20%, 23%, 27%, "23%" is the sixth observation from the left.

Question #109 of 122

Question ID: 412977

According to Chebyshev's Inequality, for any distribution, what is the minimum percentage of observations that lie within three standard deviations of the mean?

- ☐ A) 75%.
- ☐ B) 94%.
- ☒ C) 89%.

Explanation

According to Chebyshev's Inequality, for any distribution, the minimum percentage of observations that lie within k standard deviations of the distribution mean is equal to: $1 - (1 / k^2)$. If $k = 3$, then the percentage of distributions is equal to $1 - (1 / 9) = 89\%$.

Question #110 of 122

Question ID: 412990

The mean and standard deviation of returns for Stock A is represented below.

	<i>Arithmetic Mean</i>	<i>Standard Deviation</i>
Stock A	20%	8%

The coefficient of variation of Stock A is:

- ✓ A) 0.40
- x B) 3.00
- x C) 2.50

Explanation

CV = Standard Deviation / Mean = $(8 / 20) = 0.4$

Question #111 of 122

Question ID: 413002

A distribution with a mode of 10 and a range of 2 to 25 would *most likely* be:

- x A) normally distributed.
- ✓ B) positively skewed.
- x C) negatively skewed.

Explanation

The distance to the left from the mode to the beginning of the range is 8. The distance to the right from the mode to the end of the range is 15. Therefore, the distribution is skewed to the right, which means that it is positively skewed.

Question #112 of 122

Question ID: 412962

Cameron Ryan wants to make an offer on the condominium he is renting. He takes a sample of prices of condominiums in his development that closed in the last five months. Sample prices are as follows (amounts are in thousands of dollars): \$125, \$175, \$150, \$155 and \$135. The sample standard deviation is *closest* to:

- ✓ A) 19.24.
- x B) 38.47.
- x C) 370.00.

Explanation

Calculations are as follows:

1. Sample mean = $(125 + 175 + 150 + 155 + 135) / 5 = 148$
 2. Sample Variance = $[(125 - 148)^2 + (175 - 148)^2 + (150 - 148)^2 + (155 - 148)^2 + (135 - 148)^2] / (5 - 1) = 1,480 / 4 = 370$
 3. Sample Standard Deviation = $370^{1/2} = 19.24\%$.
-

Question #113 of 122

Question ID: 412974

Given the following sample data, find the sample standard deviation of returns for Stock A and for Stock B.

	Stock A	Stock B
Year 1	16%	20%
Year 2	20%	24%
Year 3	12%	10%

Std. Dev. A Std. Dev. B

- ☒ A) 3.3% 5.9%
- ☒ B) 4.0% 7.2%
- ☒ C) 4.0% 5.9%

Explanation

First find the mean of the returns, then take differences from the mean and square them. Add the squared differences and divide by n-1 to find the variance, and take the square root of the variance to find the standard deviation.

For Stock A: $(16 + 20 + 12)/3 = 48/3 = 16\%$ average return.

$$\begin{aligned}(16 - 16)^2 &= 0^2 = 0 \\(20 - 16)^2 &= 4^2 = 16 \\(12 - 16)^2 &= -4^2 = 16 \\0 + 16 + 16 &= 32; 32/(3-1) = 16; 16^{1/2} = 4.0\%\end{aligned}$$

For Stock B: $(20 + 24 + 10)/3 = 54/3 = 18\%$ average return.

$$\begin{aligned}(20 - 18)^2 &= 2^2 = 4 \\(24 - 18)^2 &= 6^2 = 36 \\(10 - 18)^2 &= -8^2 = 64 \\4 + 36 + 64 &= 104; 104 / (3 - 1) = 52; 52^{1/2} = 7.2\%\end{aligned}$$

Question #114 of 122

Question ID: 412949

Michael Philizaire is studying for the Level I CFA examination. During his review of measures of central tendency, he decides to calculate the geometric average of the appreciation/depreciation of his home over the last five years. Using comparable sales and market data he obtains from a local real estate appraiser, Philizaire calculates the year-to-year percentage change in the value of his home as follows: 20, 15, 0, -5, -5. The geometric return is *closest* to:

- ✓ **A) 4.49%.**
- x **B) 0.00%.**
- x **C) 11.60%.**

Explanation

The geometric return is calculated as follows:

$$[(1 + 0.20) \times (1 + 0.15) \times (1 + 0.0) (1 - 0.05) (1 - 0.05)]^{1/5} - 1,$$
$$\text{or } [1.20 \times 1.15 \times 1.0 \times 0.95 \times 0.95]^{0.2} - 1 = 0.449, \text{ or } \mathbf{4.49\%}.$$

Question #115 of 122

Question ID: 412994

The mean monthly return on U.S. Treasury bills (T-bills) is 0.42%. The mean monthly return for an index of small stocks is 4.56%, with a standard deviation of 3.56%. What is the Sharpe measure for the index of small stocks?

- ✓ **A) 1.16%.**
- x **B) 10.60%.**
- x **C) 16.56%.**

Explanation

The Sharpe ratio measures excess return per unit of risk. $(4.56 - 0.42) / 3.56 = 1.16\%$.

Question #116 of 122

Question ID: 412946

An investor has a portfolio with 10% cash, 30% bonds, and 60% stock. Last year, the cash returns was 2.0%, the bonds' return was 9.5%, and the stocks' return was -32.5%. What was the return on the investor's portfolio?

- x **A) -7.00%.**
- ✓ **B) -16.45%.**
- x **C) -33.33%.**

Explanation

Find the weighted mean. $(0.10)(0.02) + (0.30)(0.095) + (0.60)(-0.325) = -16.45\%$.

Question #117 of 122

Question ID: 412908

A summary measure that is computed to describe a population characteristic from a sample is called a:

- ✓ **A) statistic.**
- ✗ **B) parameter.**
- ✗ **C) census.**

Explanation

When sampling from a portion of the population, you compute a statistic to make inferences about the population.

Question #118 of 122

Question ID: 412972

Assume that the following returns are a sample of annual returns for firms in the clothing industry. Given the following sample of returns, what are the sample variance and standard deviation respectively?

<i>Firm 1</i>	<i>Firm 2</i>	<i>Firm 3</i>	<i>Firm 4</i>	<i>Firm 5</i>
15%	2%	5%	(7%)	0%

- ✗ **A) 51.6; 7.2.**
- ✓ **B) 64.5; 8.0.**
- ✗ **C) 32.4; 5.7.**

Explanation

The sample variance is found by taking the sum of all squared deviations from the mean and dividing by $(n - 1)$. $[(15 - 3)^2 + (2 - 3)^2 + (5 - 3)^2 + (-7 - 3)^2 + (0 - 3)^2] / (5 - 1) = 64.5$

The sample standard deviation is found by taking the square root of the sample variance. $\sqrt{64.5} = 8.03$

Question #119 of 122

Question ID: 412940

What is the compound annual growth rate for stock A which has annual returns of 5.60%, 22.67%, and -5.23%?

- ✓ **A) 7.08%.**
- ✗ **B) 8.72%.**
- ✗ **C) 6.00%.**

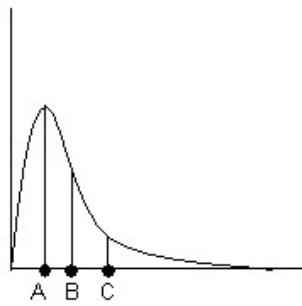
Explanation

Compound annual growth rate is the geometric mean. $(1.056 \times 1.2267 \times 0.9477)^{1/3} - 1 = 7.08\%$

Question #120 of 122

Question ID: 434193

Consider the following graph of a distribution for the prices for various bottles of California-produced wine.



Which of the following statements about this distribution is *least* accurate?

- ☐ A) The distribution is positively skewed.
- ☐ B) The graph could be of the sample \$16, \$12, \$15, \$12, \$17, \$30 (*ignore graph scale*).
- ☒ C) Approximately 68% of observations fall within one standard deviation of the mean.

Explanation

This statement is true for the *normal* distribution. The above distribution is positively skewed. *Note:* for those tempted to use Chebyshev's inequality to determine the percentage of observations falling within one standard deviation of the mean, the formula is valid only for $k > 1$.

The other statements are true. When we order the six prices from least to greatest: \$12, \$12, \$15, \$16, \$17, \$30, we observe that the mode (most frequently occurring price) is \$12, the median (middle observation) is \$15.50 $[(15 + 16)/2]$, and the mean is \$17 (sum of all prices divided by number in the sample). *Time-Saving Note:* Just by ordering the distribution, we can see that it is positively skewed (there are large, positive outliers). By definition, mode < median < mean describes a positively skewed distribution.

Question #121 of 122

Question ID: 412932

Which of the following statements about the median is *least* accurate? It is:

- ☐ A) equal to the 50th percentile.
- ☒ B) more affected by extreme values than the mean.
- ☐ C) equal to the mode in a normal distribution.

Explanation

Median is less influenced by outliers since the median is computed as the "middle" observation. On the other hand, all of the data including outliers are used in computing the mean. Both remaining statements are true regarding the median.

Question #122 of 122

Question ID: 412959

What are the median and the third quintile of the following data points, respectively?

9.2%, 10.1%, 11.5%, 11.9%, 12.2%, 12.8%, 13.1%, 13.6%, 13.9%, 14.2%, 14.8%, 14.9%, 15.4%

- ☐ A) 12.8%; 13.6%.

☒ B) 13.1%; 13.6%.

☐ C) 13.1%; 13.7%.

Explanation

The median is the midpoint of the data points. In this case there are 13 data points and the midpoint is the 7th term.

The formula for determining quantiles is: $L_y = (n + 1)(y) / (100)$. Here, we are looking for the third quintile (60% of the observations lie below) and the formula is: $(14)(60) / (100) = 8.4$. The third quintile falls between 13.6% and 13.9%, the 8th and 9th numbers from the left. Since L is not a whole number, we interpolate as: $0.136 + (0.40)(0.139 - 0.136) = 0.1372$, or 13.7%.