## Question #1 of 200

Question ID: 1572819

If random variable *Y* follows a lognormal distribution then the natural log of *Y* must be:

**A)** normally distributed. ✓

**B)** denoted as $e^X$. ✗

**C)** lognormally distributed. ✗

**Explanation**

For any random variable that is lognormally distributed its natural logarithm (ln) will be normally distributed.

(Module 6.1, LOS 6.a)

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## Question #2 of 200

Question ID: 1572823

Which of the following statements describes a limitation of Monte Carlo simulation?

**A)** Outcomes of a simulation can only be as accurate as the inputs to the model. ✓

**B)** Simulations do not consider possible input values that lie outside historical experience. ✗

**C)** Variables are assumed to be normally distributed but may actually have non-normal distributions. ✗

**Explanation**

Monte Carlo simulations can be set up with inputs that have any distribution and any desired range of possible values. However, a limitation of the technique is that its output can only be as accurate as the assumptions an analyst makes about the range and distribution of the inputs.

(Module 6.1, LOS 6.b)

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## Question #3 of 200

Question ID: 1591299

An analyst calculates a winsorized mean return of 3.2% for an investment fund. This measure *most likely*:

**A)** replaces outliers with less extreme returns. ✓

**B)** equally weights all returns. ✗

**C)** captures the compounded growth rate of the fund. ✗

**Explanation**

The winsorized mean is a technique for dealing with outliers. For example, a 90% winsorized mean replaces the lowest 5% of values with the fifth percentile, and replaces the highest 5% of values with the 95th percentile. The arithmetic mean weights all observations equally. The geometric mean captures the compounded growth rate of the fund.

(Module 3.1, LOS 3.a)

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## Question #4 of 200

Question ID: 1572636

Which of the following return measures is *best* described as purely representing time preference?

**A)** Real risk-free interest rate. ✓

**B)** Total rate of return. ✗

**C)** Nominal risk-free interest rate. ✗

**Explanation**

The real risk-free interest rate represents time preference, or the degree to which consumers prefer consumption in the present to an equal amount of consumption in the future. Other measures of return include time preference, but it also reflect other factors, such as risk or expected inflation.

(Module 1.1, LOS 1.a)

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## Question #5 of 200

Question ID: 1591309

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)** 13.1%; 13.7%. ✓

**B)** 12.8%; 13.6%.

**C)** 13.1%; 13.6%.

**Explanation**

The median is the midpoint of the data points. In this case there are 13 data points and the midpoint is the $7^{th}$ 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 $8^{th}$ and $9^{th}$ 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%.

(Module 3.1, LOS 3.a)

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## Question #6 of 200

Question ID: 1591301

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

**A)** The geometric mean calculates the rate of return that would have to be earned each year to match the actual, cumulative investment performance.

**B)** 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.

**C)** The difference between the geometric mean and the arithmetic mean increases with an increase in variability between period-to-period observations.

**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.

(Module 3.1, LOS 3.a)

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## Question #7 of 200

Question ID: 1572838

An auditor who decides to handpick rather than randomly select transactions to examine for instances of fraud is *most likely* using:

**A)** convenience sampling.

**B)** judgmental sampling. ✓

**C)** cluster sampling. ✗

**Explanation**

Judgmental sampling refers to using expert or professional judgement to select observations from a population.

(Module 7.1, LOS 7.a)

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## Question #8 of 200

Question ID: 1731122

A pure discount instrument with a face value of €1 million matures eight years from today. If its yield to maturity is –1.5%, its price today is *closest* to:

**A)** €0.89 million. ✗

**B)** €0.98 million. ✗

**C)** €1.13 million. ✓

**Explanation**

Given these three answer choices, you can choose the correct answer without performing the calculation. With a negative yield, the price of a single future cash flow must be greater than the amount of the cash flow. In this case, €1,000,000 / $(1 - 0.015)^8$ = €1,128,522.

(Module 2.1, LOS 2.a)

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## Question #9 of 200

Question ID: 1572782

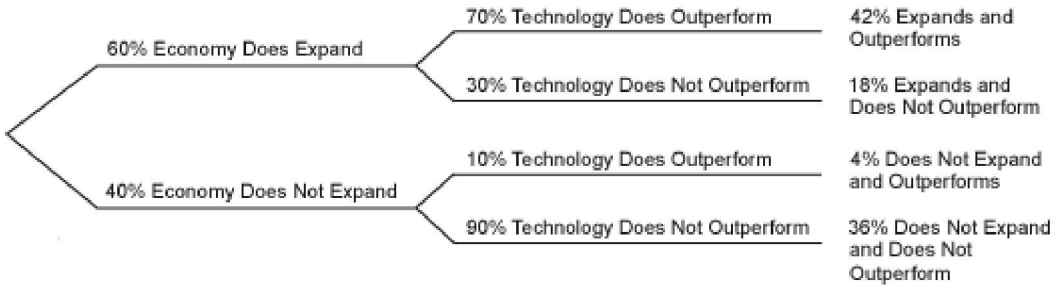
An economist estimates a 60% probability that the economy will expand next year. The technology sector has a 70% probability of outperforming the market if the economy expands and a 10% probability of outperforming the market if the economy does not expand. Given the new information that the technology sector will not outperform the market, the probability that the economy will not expand is *closest* to:

**A)** 54%. ✗

**B)** 33%. ✗

**C)** 67%. ✓

**Explanation**




Using the new information we can use Bayes' formula to update the probability.

P(economy does not expand | tech does not outperform) = P(economy does not expand and tech does not outperform) / P(tech does not outperform).

P(economy does not expand and tech does not outperform) = P(tech does not outperform | economy does not expand) × P(economy does not expand) = 0.90 × 0.40 = 0.36.

P(economy does expand and tech does not outperform) = P(tech does not outperform | economy does expand) × P(economy does expand) = 0.30 × 0.60 = 0.18.

P(economy does not expand) = 1.00 – P(economy does expand) = 1.00 – 0.60 = 0.40.

P(tech does not outperform | economy does not expand) = 1.00 – P(tech does outperform | economy does not expand) = 1.00 – 0.10 = 0.90.

P(tech does not outperform) = P(tech does not outperform and economy does not expand) + P(tech does not outperform and economy does expand) = 0.36 + 0.18 = 0.54.

P(economy does not expand | tech does not outperform) = P(economy does not expand and tech does not outperform) / P(tech does not outperform) = 0.36 / 0.54 = 0.67.

(Module 4.1, LOS 4.c)

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## Question #10 of 200

Question ID: 1572655

For a given stated annual rate of return, compared to the effective rate of return with discrete compounding, the effective rate of return with continuous compounding will be:

**A)** the same. ✗

**B)** lower. ✗

**C)** higher. ✓

**Explanation**

A higher frequency of compounding leads to a higher effective rate of return. The effective rate of return with continuous compounding will, therefore, be greater than any effective rate of return with discrete compounding.

(Module 1.3, LOS 1.d)

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## Question #11 of 200

Question ID: 1591328

If the probability of a Type I error decreases, then the probability of:

**A)** a Type II error increases. ✓

**B)** incorrectly rejecting the null increases. ✗

**C)** incorrectly accepting the null decreases. ✗

**Explanation**

If P(Type I error) decreases, then P(Type II error) increases. A null hypothesis is never accepted. We can only fail to reject the null.

(Module 8.1, LOS 8.a)

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## Question #12 of 200

Question ID: 1572775

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

**A)** 15.0%; 5.75%.

**B)** 15.0%; 7.58%.

**C)** 17.5%; 5.75%.

**Explanation**

Mean = (0.4)(10) + (0.4)(12.5) + (0.2)(30) = 15%

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

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

(Module 4.1, LOS 4.a)

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## Question #13 of 200

Question ID: 1572802

Use the following probability distribution.

| State of the Economy | Probability | Return on Portfolio |
|---|---|---|
| Boom | 0.30 | 15% |
| Bust | 0.70 | 3% |

The expected return for the portfolio is:

**A)** 9.0%.

**B)** 8.1%.

**C)** 6.6%.

**Explanation**

The expected portfolio return is a probability-weighted average:

| State of the Economy | Probability | Return on Portfolio | Probability × Return |
|---|---|---|---|
| Boom | 0.30 | 15% | 0.3 × 15% = 4.5% |
| Bust | 0.70 | 3% | 0.7 × 3% = 2.1% |
| **Expected Return = ∑Probability × Return** | | | **6.6%** |

(Module 5.1, LOS 5.a)

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## Question #14 of 200

Question ID: 1572765

A distribution that is more peaked than a normal distribution is termed:

**A)** skewed.

**B)** leptokurtic.

**C)** platykurtic.

**Explanation**

A distribution that is more peaked than normal is leptokurtic. A leptokurtic distribution has fatter tails compared to a normal distribution. This means there is a greater chance of observing extreme outcomes. Market returns are leptokurtic.

A distribution that is flatter than a normal distribution is termed platykurtic.

(Module 3.2, LOS 3.c)

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## Question #15 of 200

Question ID: 1572640

Stock XYZ is purchased on January 2 at a price of $12 per share. The investor receives a quarterly dividend of $0.60 per share on April 1, and the stock closes on June 30 at $13 per share. The holding period return is *closest* to:

**A)** 8.33%.

**B)** 13.33%.

**C)** 18.33%.

**Explanation**

The holding period return is equal to the change in value from the beginning to the end of the holding period, which will include not only the change in price but also any dividends received over the period. For each share, the price increased by $1, and the dividend received was $0.60. The calculation is equal to:

$$\frac{P_t - P_0 + Div_t}{P_0} = \frac{13 - 12 + 0.60}{12} = 13.33\%$$

Ignoring the dividend produces an 8.33% return, and doubling the dividend produces an 18.33% return. It is important to note that only one dividend was received in the six-month period, and that was on April 1.

(Module 1.1, LOS 1.b)

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## Question #16 of 200

Question ID: 1572681

An investor pays $726.27 for a zero-coupon bond with a face value of $1,000 and maturing in 10 years. Bonds with similar risk profiles and with similar terms yield 3.00%. The yield to maturity for this bond is *closest* to:

**A)** 2.75%.

**B)** 3.25%.

**C)** 3.00%.

**Explanation**

A zero-coupon bond pays no interest, but it is most often purchased at a price heavily discounted from par value. The equation that shows the relationship between the present value (the purchase price), the future value, time, and yield to maturity is shown as follows:

$$\$726.27 = \frac{\$1{,}000}{(1+r)^{10}}$$

$$1 + r = \sqrt[10]{\frac{1{,}000}{726.27}}$$

$$r = 1.0325 - 1 = 0.0325, \text{ or } 3.25$$

This can also be answered using the calculator: N = 10; PV = –726.27; PMT = 0; FV = 1,000. CPT I/Y = 3.25.

2.75% is the yield to maturity if the present value is incorrectly input as $762.27 instead of $726.27. The yield on similar bonds does not reflect the yield on a specific bond.

(Module 2.1, LOS 2.a)

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## Question #17 of 200

Question ID: 1572702

An investor looks at her monthly brokerage statement and notices that the yield to maturity on her 5-year corporate bond with a 4% annual coupon rate has gone from 4.2% last month to 3.8% this month. The statement will reflect a bond price that, over the last month, has:

**A)** remained flat.

**B)** increased.

**C)** decreased.

**Explanation**

Bond prices and yields move in opposite directions, such that if the yield has dropped from 4.2% to 3.8%, it must be a case that the price of the bond has increased. A decrease in price would align with an increase in yield to maturity. If the price had remained flat, the yield would be unchanged.

(Module 2.2, LOS 2.b)

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## Question #18 of 200

Question ID: 1572807

Personal Advisers, Inc., has determined four possible economic scenarios and has projected the portfolio returns for two portfolios for their client under each scenario. Personal's economist has estimated the probability of each scenario as shown in the table below. Given this information, what is the covariance of the returns on Portfolio A and Portfolio B?

| Scenario | Probability | Return on Portfolio A | Return on Portfolio B |
|---|---|---|---|
| A | 15% | 18% | 19% |
| B | 20% | 17% | 18% |
| C | 25% | 11% | 10% |
| D | 40% | 7% | 9% |

**A)** 0.002019.

**B)** 0.001898.

**C)** 0.890223.

**Explanation**

| S | P (S) | Return on Portfolio A | $R_A - E(R_A)$ | Return on Portfolio B | $R_B - E(R_B)$ | $[R_A - E(R_A)] \times [R_B - E(R_B)] \times P(S)$ |
|---|---|---|---|---|---|---|
| A | 15% | 18% | 6.35% | 19% | 6.45% | 0.000614 |
| B | 20% | 17% | 5.35% | 18% | 5.45% | 0.000583 |
| C | 25% | 11% | –0.65% | 10% | –2.55% | 0.000041 |
| D | 40% | 7% | –4.65% | 9% | –3.55% | 0.000660 |
| | | $E(R_A) = 11.65\%$ | | $E(R_B) = 12.55\%$ | | $Cov(R_A,R_B) = 0.001898$ |

(Module 5.1, LOS 5.b)

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## Question #19 of 200

Question ID: 1591273

A loan of $15,000 is to be paid off in monthly payments over 5 years at 12% annual interest. What is the amount of each payment?

**A)** $4,161. ✗

**B)** $1,802. ✗

**C)** $334. ✓

**Explanation**

I = 12 / 12 = 1; N = 5 × 12 = 60; PV = 15,000; CPT → PMT = 333.67.

(Module 2.1, LOS 2.a)

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## Question #20 of 200

Question ID: 1572797

Compute the standard deviation of a two-stock portfolio if stock A (40% weight) has a variance of 0.0015, stock B (60% weight) has a variance of 0.0021, and the correlation coefficient for the two stocks is –0.35?

**A)** 2.64%. ✓

**B)** 1.39%. ✗

**C)** 0.07%. ✗

**Explanation**

The standard deviation of the portfolio is found by:

$$[W_1^2\sigma_1^2 + W_2^2\sigma_2^2 + 2W_1W_2\sigma_1\sigma_2\rho_{1,2}]^{0.5}$$

$$= [(0.40)^2(0.0015) + (0.60)^2(0.0021) + (2)(0.40)(0.60)(0.0387)(0.0458)(-0.35)]^{0.5}$$

$$= 0.0264, \text{ or } 2.64\%.$$

(Module 5.1, LOS 5.a)

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## Question #21 of 200

Question ID: 1572764

A distribution that has positive excess kurtosis is:

**A)** more skewed than a normal distribution. ✗

**B)** more peaked than a normal distribution. ✓

**C)** less peaked than a normal distribution. ✗

**Explanation**

A distribution with positive excess kurtosis is more peaked and has fatter tails than a normal distribution.

(Module 3.2, LOS 3.c)

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## Question #22 of 200

Question ID: 1572829

The goal of resampling and the use of subsamples is to estimate parameters for the:

**A)** various subsamples. ✗

**B)** overall population. ✓

**C)** original sample. ✗

**Explanation**

Samples are often used in a simulation to estimate parameters for a population. Resampling is just taking the original observed sample and repeatedly drawing subsamples to estimate population parameters, such as mean and variance.

(Module 6.1, LOS 6.c)

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## Question #23 of 200

Question ID: 1577767

Over the last four years, an investor's portfolio has the following returns: 5.26%, –2.10%, 3.86%, and 8.18%. The arithmetic mean return is *closest* to:

**A)** 3.76%. ✗

**B)** 3.80%. ✓

**C)** 3.73%. ✗

**Explanation**

The arithmetic mean is equal to the average of the four data points, calculated by summing all four returns and dividing by the number of returns:

$$\frac{(R_1+R_2+R_3+R_4)}{4} = \frac{(0.0526 - 0.0210 + 0.0386 + 0.0818)}{4} = 0.0380, \text{ or } 3.80\%$$

(Module 1.1, LOS 1.b)

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## Question #24 of 200

Question ID: 1572649

Assume an investor makes the following investments:

- Today, she purchases a share of stock in Redwood Alternatives for $50.00.
- After one year, she purchases an additional share for $75.00.
- After one more year, she sells both shares for $100.00 each.

There are no transaction costs or taxes. The investor's required return is 35.0%.

During year one, the stock paid a $5.00 per share dividend. In year two, the stock paid a $7.50 per share dividend.

The time-weighted return is:

**A)** 51.4%. ✓

**B)** 51.7%. ✗

**C)** 23.2%. ✗

**Explanation**

To calculate the *time-weighted* return:

*Step 1: Separate the time periods into holding periods and calculate the return over that period:*

*Holding period 1:* $P_0$ = $50.00

$D_1$ = $5.00

$P_1$ = $75.00 (from information on second stock purchase)

$HPR_1$ = (75 – 50 + 5) / 50 = 0.60, or 60%

*Holding period 2:* $P_1$ = $75.00

$D_2$ = $7.50

$P_2$ = $100.00

$HPR_2$ = (100 – 75 + 7.50) / 75 = 0.433, or 43.3%.

*Step 2: Use the geometric mean to calculate the return over both periods*

Return = $[(1 + HPR_1) \times (1 + HPR_2)]^{1/2} - 1 = [(1.60) \times (1.433)]^{1/2} - 1 = 0.5142$, or **51.4%.**

(Module 1.2, LOS 1.c)

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## Question #25 of 200

Question ID: 1572780

An analyst announces that an increase in the discount rate next quarter will double her earnings forecast for a firm. This is an example of a:

**A)** conditional expectation. ✓

**B)** use of Bayes' formula. ✗

**C)** joint probability. ✗

**Explanation**

This is a conditional expectation. The analyst indicates how an expected value will change given another event.

(Module 4.1, LOS 4.b)

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## Question #26 of 200

Question ID: 1572892

The estimated slope coefficient in a simple linear regression is:

**A)** the predicted value of the dependent variable, given the actual value of the independent variable.

**B)** the change in the independent variable, given a one-unit change in the dependent variable.

**C)** the ratio of the covariance of the regression variables to the variance of the independent variable.

**Explanation**

The estimated slope coefficient in a simple linear regression is $\frac{\text{Cov}_{X,Y}}{\sigma_X^2}$, where Y is the dependent variable and X is the independent variable. The estimated slope coefficient is interpreted as the change in the *dependent* variable, given a one-unit change in the *independent* variable. The predicted value of the dependent variable must consider the estimated intercept term along with the estimated slope coefficient.

(Module 10.1, LOS 10.a)

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## Question #27 of 200

Question ID: 1572846

Which technique for estimating the standard error of the sample mean involves calculating multiple means from the same sample, each with one observation removed from the sample?

**A)** Sample variance.

**B)** Jackknife.

**C)** Bootstrap.

**Explanation**

The jackknife technique involves calculating the standard deviation of the means from samples, each of which is calculated with a different observation removed from the original sample. The bootstrap method involves drawing multiple random samples from a dataset and calculating the standard deviation of those sample means. Standard error based on the standard deviation of a single sample is estimated by dividing the sample standard deviation by the square root of the sample size.

(Module 7.1, LOS 7.c)

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## Question #28 of 200

Question ID: 1572876

If an analyst wants to perform hypothesis testing using a chi-square test, which of the following values is he *most likely* assessing?

**A)** The value of a population variance. ✓

**B)** The value of a population mean. ✗

**C)** Whether two population variances are equal. ✗

**Explanation**

A chi-square test is a hypothesis test used to assess the value of a population variance. The value of a population mean will use either a t-test (for a small sample) or a z-test (for a large sample). An F-test can be used to assess the equality of two population variances.

(Module 8.2, LOS 8.b)

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## Question #29 of 200

Question ID: 1572813

Which of the following portfolios provides the best "safety first" ratio if the minimum acceptable return is 6%?

| Portfolio | Expected Return (%) | Standard Deviation (%) |
|---|---|---|
| 1 | 13 | 5 |
| 2 | 11 | 3 |
| 3 | 9 | 2 |

**A)** 2. ✓

**B)** 3. ✗

**C)** 1. ✗

**Explanation**

Roy's safety-first criterion requires the maximization of the SF Ratio:

SF Ratio = (expected return – threshold return) / standard deviation

| Portfolio | Expected Return (%) | Standard Deviation (%) | SF Ratio |
|---|---|---|---|
| 1 | 13 | 5 | 1.40 |
| 2 | 11 | 3 | 1.67 |
| 3 | 9 | 2 | 1.50 |

Portfolio #2 has the highest safety-first ratio at 1.67.

(Module 5.1, LOS 5.c)

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## Question #30 of 200

Question ID: 1572757

For a positively skewed distribution, the median is greater than:

**A)** the mean, but less than the mode. ✗

**B)** the mode, but less than the mean. ✓

**C)** both the mode and the mean. ✗

**Explanation**

For a positively skewed distribution, the mean is greater than the median, and the median is greater than the mode. Their order reverses for a negatively skewed distribution.

(Module 3.2, LOS 3.c)

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## Question #31 of 200

Question ID: 1591331

A Type I error is made when the researcher:

**A)** fails to reject the null hypothesis when it is actually false. ✗

**B)** rejects the alternative hypothesis when it is actually true. ✗

**C)** rejects the null hypothesis when it is actually true. ✓

**Explanation**

A Type I error is defined as rejecting the null hypothesis when it is actually true. It can be thought of as a false positive.

A Type II error occurs when a researching fails to reject the null hypothesis when it is false. It can be thought of as a false negative.

(Module 8.1, LOS 8.a)

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## Question #32 of 200

Question ID: 1591350

Ron Jacobi, manager with the Toulee Department of Natural Resources, is responsible for setting catch-and-release limits for Lake Norby, a large and popular fishing lake. He takes a sample to determine whether the mean length of Northern Pike in the lake exceeds 18 inches. If the sample t-statistic indicates that the mean length of the fish is significantly greater than 18 inches, when the population mean is actually 17.8 inches, the t-test resulted in:

**A)** a Type I error only. ✓

**B)** a Type II error only. ✗

**C)** both a Type I and a Type II error. ✗

**Explanation**

Rejection of a null hypothesis when it is actually true is a Type I error. Here, $H_o$: $\mu \leq 18$ inches and $H_a$: $\mu > 18$ inches. Type II error is failing to reject a null hypothesis when it is actually false.

Because a Type I error can only occur if the null hypothesis is true, and a Type II error can only occur if the null hypothesis is false, it is logically impossible for a test to result in both types of error at the same time.

(Module 8.2, LOS 8.b)

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## Question #33 of 200

Question ID: 1572644

A dataset contains six values, none of which are equal. The arithmetic mean of the data is 13.25, and the geometric mean of the data is 12.75. The harmonic mean will be:

**A)** between 12.75 and 13.25. ✗

**B)** less than 12.75. ✓

**C)** greater than 13.25. ✗

**Explanation**

For any dataset where the values are not equal, the harmonic mean will be less than the geometric mean (which, in turn, will be less than the arithmetic mean). Here, the arithmetic mean is 13.25, and the geometric mean is 12.75—so the harmonic mean must be less than 12.75. It is worth noting that all three means are equal if every value in the dataset is the same.

(Module 1.1, LOS 1.b)

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## Question #34 of 200

Question ID: 1572779

A conditional expectation involves:

**A)** determining the expected joint probability. ✗

**B)** refining a forecast because of the occurrence of some other event. ✓

**C)** calculating the conditional variance. ✗

**Explanation**

Conditional expected values are contingent upon the occurrence of some other event. The expectation changes as new information is revealed.

(Module 4.1, LOS 4.b)

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## Question #35 of 200

Question ID: 1572879

Lucy James, CFA, is constructing a hypothesis test using a 5% level of significance. If she is interested in increasing the "power of the test," she should consider:

**A)** keeping the significance level the same and increasing the sample size. ✓

**B)** increasing the probability of a Type II error. ✗

**C)** lowering the level of significance. ✗

**Explanation**

A Type I error, which is equivalent to the level of significance, is the probability of incorrectly rejecting a true null hypothesis. A Type II error is the probability of incorrectly not rejecting a false null hypothesis. The "power of the test" is equal to 1 minus the probability of a Type II error and represents the probability of correctly rejecting a false null hypothesis.

To increase the power of the test, James could keep the significance level the same and increase the sample size. Lowering the level of significance will reduce the probability of a Type I error, increase the probability of a Type II error, and decrease the power of the test. Increasing the probability of a Type II error will decrease the power of the test.

(Module 8.2, LOS 8.b)

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## Question #36 of 200

Question ID: 1572763

For a unimodal distribution with negative skewness:

**A)** the median is greater than the mean. ✓

**B)** the mean is greater than the mode. ✗

**C)** the mode is less than the median. ✗

**Explanation**

For a distribution with negative skewness, mean < median < mode.

(Module 3.2, LOS 3.c)

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## Question #37 of 200

Question ID: 1591293

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

**A)** 30.0%. ✗

**B)** 15.8%. ✓

**C)** 15.0%. ✗

**Explanation**

Here we need to multiply the returns by the proportion that each stock represents in the portfolio then sum.

| Stock | Return | Invested | Proportion of Portfolio | Return × Proportion |
|---|---|---|---|---|
| P | 20% | $7,000 | 7/12 | 20% × 7/12 |
| Q | 10% | $5,000 | 5/12 | 10% × 5/12 |
| Total | | **$12,000** | | **15.83%** |

(Module 3.1, LOS 3.a)

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## Question #38 of 200

Question ID: 1591277

Given investors require an annual return of 12.5%, a perpetual bond (i.e., a bond with no maturity/due date) that pays $87.50 a year in interest should be valued at:

**A)** $70. ✗

**B)** $700. ✓

**C)** $1,093. ✗

**Explanation**

87.50 ÷ 0.125 = $700.

(Module 2.1, LOS 2.a)

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## Question #39 of 200

Question ID: 1572820

If a random variable *x* is lognormally distributed then ln *x* is:

**A)** abnormally distributed. ✗

**B)** defined as $e^x$. ✗

**C)** normally distributed. ✓

**Explanation**

For any random variable that is lognormally distributed, its natural logarithm (ln) will be normally distributed.

(Module 6.1, LOS 6.a)

## Question #40 of 200

Question ID: 1572878

Bo Rigley, CFA, is a financial analyst examining large-cap equity returns over a calendar year. His sample size is 252 trading days, and he observes a mean return of 0.07% and a standard deviation of 0.12%. With his null hypothesis that the daily portfolio return is equal to zero and a 10% level of significance, Rigley will:

**A)** not reject the null because the test statistic is less than the critical value. ✗

**B)** reject the null because the test statistic is greater than the critical value. ✓

**C)** not reject the null because the test statistic is greater than the critical value. ✗

**Explanation**

At a 10% level of significance, the critical z-values for a two-tailed test are + or –1.645, so the decision rule is to reject the null if the test statistic < –1.645 or > +1.645.

With a sample size of 252 and a standard deviation of 0.12%, the standard error is equal to:

$$S_{\bar{x}} = \frac{s}{\sqrt{n}} = \frac{0.12\%}{\sqrt{252}} = 0.0075593\%$$

The test statistic is equal to:

$$\frac{0.0007}{0.000075593} = 9.26$$

Because the test statistic of 9.26 > 1.645, Rigley will reject the null that the daily equity return is equal to zero.

(Module 8.2, LOS 8.b)

## Question #41 of 200

Question ID: 1591317

An analyst takes a sample of yearly returns of aggressive growth funds resulting in the following data set: 25, 15, 35, 45, and 55. The mean absolute deviation (MAD) of the data set is closest to:

**A)** 20. ✗

**B)** 12. ✓

**C)** 16. ✗

**Explanation**

Calculate the mean:

$$\frac{25+15+35+45+55}{5} = 35$$

To get the mean absolute deviation, sum the deviations around the mean (ignoring the sign), and divide by the number of observations:

$$\frac{10+20+0+10+20}{5} = 12$$

(Module 3.1, LOS 3.b)

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## Question #42 of 200

Question ID: 1572678

A perpetual bond with a face value of $100,000 pays annual interest of 5%. The bond is quoted at a yield of 7%. The bond's price is *closest* to:

**A)** $71,500. ✓

**B)** $98,100. ✗

**C)** $140,000. ✗

**Explanation**

$$\frac{\$100{,}000(0.05)}{0.07} = \$71{,}428.57.$$

(Module 2.1, LOS 2.a)

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## Question #43 of 200

Question ID: 1572776

There is a 60% chance that the economy will be good next year and a 40% chance that it will be bad. If the economy is good, there is a 70% chance that XYZ Incorporated will have EPS of $5.00 and a 30% chance that their earnings will be $3.50. If the economy is bad, there is an 80% chance that XYZ Incorporated will have EPS of $1.50 and a 20% chance that their earnings will be $1.00. What is the firm's expected EPS?

**A)** $2.75. ✗

**B)** $5.95. ✗

**C)** $3.29. ✓

**Explanation**

| State of the Economy (Unconditional Probability) | Conditional Probability | Joint Probability | EPS | Joint Probability × EPS |
|---|---|---|---|---|
| GOOD 60% | 70% | 60% × 70% = 42% | $5.00 | 42% × $5.00 = $2.10 |
| | 30% | 60% × 30% = 18% | $3.50 | 18% × $3.50 = $0.63 |
| BAD 40% | 80% | 40% × 80% = 32% | $1.50 | 32% × $1.50 = $0.48 |
| | 20% | 40% × 20% = 8% | $1.00 | 8% × $1.00 = $0.08 |
| **Expected EPS = ∑ Joint Probability × EPS** | | | | **$3.29** |

(Module 4.1, LOS 4.a)

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## Question #44 of 200

Question ID: 1572642

Based on the advice of his financial advisor regarding dollar cost averaging, a client invests $2,000 each month into a blue-chip stock. The stock price on the date of purchase each month over a four-month stretch was $12, $14, $11, and $9. Using the harmonic mean, the average cost per share of the stock is *closest* to:

**A)** $11.50.

**B)** $11.75.

**C)** $11.20.

**Explanation**

The formula to calculate the harmonic mean is equal to:

$$\overline{X_H} = \frac{4}{\frac{1}{12}+\frac{1}{14}+\frac{1}{11}+\frac{1}{9}} = 11.2113$$

Note that the arithmetic mean stock price is $11.50, and because the harmonic mean will always be less than the arithmetic mean for any dataset with unequal values, $11.75 would never be possible.

(Module 1.1, LOS 1.b)

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## Question #45 of 200

Question ID: 1572637

An investor buys a stock on March 24 for $63.25. The stock pays quarterly dividends of $0.54 on May 1 and August 1. On September 27, the investor sells the stock for $62.80. The investor's holding period return is *closest* to:

**A)** 2.5%.

**B)** 1.0%.

**C)** 2.0%.

**Explanation**

$\frac{62.80+0.54+0.54}{63.25} - 1 = 0.01 = 1\%$. Because we are asked for the HPR, the beginning and ending dates are irrelevant. If we had been asked to annualize the return, we would need to know the length of the holding period.

(Module 1.1, LOS 1.b)

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## Question #46 of 200

Question ID: 1572773

Tully Advisers, Inc., has determined four possible economic scenarios and has projected the portfolio returns for two portfolios for their client under each scenario. Tully's economist has estimated the probability of each scenario as shown in the table below. Given this information, what is the expected return on Portfolio A?

| Scenario | Probability | Return on Portfolio A | Return on Portfolio B |
|---|---|---|---|
| A | 15% | 17% | 19% |
| B | 20% | 14% | 18% |
| C | 25% | 12% | 10% |
| D | 40% | 8% | 9% |

**A)** 11.55%.

**B)** 12.75%.

**C)** 12.55%.

**Explanation**

The expected return on Portfolio A is a probability-weighted average of 17%, 14%, 12%, and 8%.

Expected return = (0.15)(0.17) + (0.20)(0.14) + (0.25)(0.12) + (0.40)(0.08) = 0.1155 or 11.55%.

| Scenario | Probability | Return on Portfolio A | Portfolio × Weight |
|---|---|---|---|
| A | 15% | 17% | 15 × 17% |
| B | 20% | 14% | 20% × 14% |
| C | 25% | 12% | 25% × 12% |
| D | 40% | 8% | 40% × 8% |
| Probability Weighted Average Return<br>**∑ Probability × Weight** | | | **11.55%** |

(Module 4.1, LOS 4.a)

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## Question #47 of 200

Question ID: 1572889

For a test of independence based on contingency table data, the test statistic is calculated as the:

**A)** sum of differences between each table cell's actual value and its expected value, if the two characteristics are independent. ✗

**B)** mean absolute deviation of all table cells' actual values and their expected values, if the two characteristics are independent. ✗

**C)** sum of squared differences between each table cell's actual value and its expected value, if the two characteristics are independent. ✓

**Explanation**

The chi-square statistic for a test of independence based on contingency table data is the sum of squared differences between each table cell's actual value and its expected value, if the two characteristics are independent.

(Module 9.1, LOS 9.b)

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## Question #48 of 200

Question ID: 1591307

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

**A)** 65% of all the observations are above that observation. ✗

**B)** The observation falls within the 65th of 100 intervals.

**C)** 65% of all the observations are below that observation.

**Explanation**

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

(Module 3.1, LOS 3.a)

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## Question #49 of 200

Question ID: 1572897

Consider the following analysis of variance (ANOVA) table:

| Source | Sum of squares | Degrees of freedom | Mean sum of squares |
|---|---|---|---|
| Regression | 550 | 1 | 550.000 |
| Error | 750 | 38 | 19.737 |
| Total | 1,300 | 39 | |

The *F*-statistic for the test of the fit of the model is *closest* to:

**A)** 27.87.

**B)** 0.42.

**C)** 0.97.

**Explanation**

F = sum of squares regression / mean squared error = 550 / 19.737 = 27.867.

(Module 10.2, LOS 10.d)

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## Question #50 of 200

Question ID: 1572845

If the true mean of a population is 16.62, according to the central limit theorem, the mean of the distribution of sample means, for all possible sample sizes n will be:

**A)** 16.62.

**B)** 16.62 / √n.

**C)** indeterminate for sample with n < 30.

**Explanation**

According to the central limit theorem, the mean of the distribution of sample means will be equal to the population mean. n > 30 is only required for distributions of sample means to approach normal distribution.

(Module 7.1, LOS 7.b)

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## Question #51 of 200

Question ID: 1572907

Under which of these conditions is a machine learning model said to be underfit?

**A)** The model identifies spurious relationships. ✗

**B)** The input data are not labeled. ✗

**C)** The model treats true parameters as noise. ✓

**Explanation**

Underfitting describes a machine learning model that is not complex enough to describe the data it is meant to analyze. An underfit model treats true parameters as noise and fails to identify the actual patterns and relationships. A model that is overfit (too complex) will tend to identify spurious relationships in the data. Labeling of input data is related to the use of supervised or unsupervised machine learning techniques.

(Module 11.1, LOS 11.b)

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## Question #52 of 200

Question ID: 1591278

An investment product promises to pay a lump sum of $25,458 at the end of 9 years. If an investor feels this investment should produce a rate of return of 14%, compounded annually, the present value is *closest* to:

**A)** $7,618.00. ✗

**B)** $9,426.00. ✗

**C)** $7,829.00. ✓

**Explanation**

$25,458 / 1.14^9 = 7,828.54$

Alternatively, N = 9; I/Y = 14; FV = -25,458; PMT = 0; CPT → PV = $7,828.54.

(Module 2.1, LOS 2.a)

## Question #53 of 200

Question ID: 1572875

A data analyst compares the P/E ratios for two companies over a period of 20 years and calculates a two-tailed *F*-statistic that exceeds the critical *F*-statistic value. As a result of her findings, she will:

**A)** reject the null hypothesis that the P/E ratio variances between the two companies are significantly different. ✗

**B)** not reject the null hypothesis that the P/E ratio variances between the two companies are significantly different. ✗

**C)** reject the null hypothesis that the P/E ratio variances between the two companies are not significantly different. ✓

**Explanation**

The F-test is used to assess the equality of two population variances. Here, the comparison is between two companies' P/E ratios over a period of 20 years. The null hypothesis for the two-tailed test is that the variances are not significantly different, while the alternative hypothesis is that they are significantly different.

Because the calculated *F*-statistic is higher than the critical *F*-statistic value, the null hypothesis will be rejected.

(Module 8.2, LOS 8.b)

## Question #54 of 200

Question ID: 1591311

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%.

(Module 3.1, LOS 3.b)

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## Question #55 of 200

Question ID: 1591342

The power of the test is:

**A)** equal to the level of confidence.

**B)** the probability of rejecting a false null hypothesis.

**C)** the probability of rejecting a true null hypothesis.

**Explanation**

This is the definition of the power of the test: the probability of correctly rejecting the null hypothesis (rejecting the null hypothesis when it is false).

(Module 8.1, LOS 8.a)

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## Question #56 of 200

Question ID: 1572755

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

**A)** normally distributed.

**B)** positively skewed.

**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.

(Module 3.2, LOS 3.c)

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## Question #57 of 200

Question ID: 1572818

Expected returns and standard deviations of returns for three portfolios are shown in the following table:

| Portfolio | Expected Return | Standard Deviation |
|---|---|---|
| 1 | 9% | 5% |
| 2 | 8% | 4% |
| 3 | 7% | 3% |

Assuming the risk-free rate is 3%, an investor who wants to minimize the probability of returns less than 5% should choose:

**A)** Portfolio 1. ✓

**B)** Portfolio 3. ✗

**C)** Portfolio 2. ✗

**Explanation**

The probability of returns less than 5% can be minimized by selecting the portfolio with the greatest safety-first ratio using a threshold return of 5%:

Portfolio 1 = (9 – 5) / 5 = 4/5 = 0.80

Portfolio 2 = (8 – 5) / 4 = 3/4 = 0.75

Portfolio 3 = (7 – 5) / 3 = 2/3 = 0.67

(Module 5.1, LOS 5.c)

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## Question #58 of 200

Question ID: 1759955

Which of the following statements regarding the central limit theorem (CLT) is *least* accurate? The CLT:

**A)** states that for a population with mean μ and variance $\sigma^2$, the sampling distribution of the sample means for any sample of size n will be approximately normally distributed. ✓

**B)** holds for any population distribution with mean μ and a finite variance $\sigma^2$, assuming a large sample size. ✗

**C)** gives the variance of the distribution of sample means as $\sigma^2$ / n, where $\sigma^2$ is the population variance and n is the sample size. ✗

**Explanation**

This question is asking you to select the inaccurate statement. The CLT states that for a population with mean μ and a finite variance $\sigma^2$, the sampling distribution of the sample means becomes approximately normally distributed *as the sample size becomes large*. The other statements are accurate.

(Module 7.1, LOS 7.b)

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## Question #59 of 200

Question ID: 1572783

The probability of A is 0.4. The probability of $A^C$ is 0.6. The probability of (B | A) is 0.5, and the probability of (B | $A^C$) is 0.2. Using Bayes' formula, what is the probability of (A | B)?

**A)** 0.375.

**B)** 0.125.

**C)** 0.625.

**Explanation**

Using the total probability rule, we can compute the

$$P(B): P(B) = [P(B \mid A) \times P(A)] + [P(B \mid A^C) \times P(A^C)]$$

$$P(B) = [0.5 \times 0.4] + [0.2 \times 0.6] = 0.32$$

Using Bayes' formula, we can solve for

$$P(A \mid B): P(A \mid B) = [\, P(B \mid A) \div P(B) \,] \times P(A) = [0.5 \div 0.32] \times 0.4 = 0.625$$

(Module 4.1, LOS 4.c)

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## Question #60 of 200

Question ID: 1591303

An analyst compiles the returns on Fund Q over the last four years:

| Year | Return |
|---|---|
| 1 | 4% |
| 2 | 3% |
| 3 | 2% |
| 4 | 30% |

Which of the following will result in the *lowest* measure of the mean return?

**A)** The geometric mean.

**B)** The arithmetic mean.

**C)** The harmonic mean.

**Explanation**

$$\text{Harmonic mean} = \frac{4}{\frac{1}{1.04}+\frac{1}{1.03}+\frac{1}{1.02}+\frac{1}{1.30}} - 1 = 0.0864 = 8.64\%$$

$$\text{Geometric mean} = \left[(1.04)\,(1.03)\,(1.02)\,(1.30)\right]^{\frac{1}{4}} - 1 = 0.0917 = 9.17\%$$

$$\text{Arithmetic mean} = \frac{4\%+3\%+2\%+30\%}{4} = 9.75\%$$

(Module 3.1, LOS 3.a)

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## Question #61 of 200

Question ID: 1572877

A financial analyst is constructing a hypothesis test to assess whether the mean daily return on a portfolio of blue-chip stocks is statistically different from zero. The sample size is 128 trading days, the mean return is 0.14%, and the standard deviation is 0.18%. With the null hypothesis that the daily portfolio return is equal to zero, which of the following changes in variables will independently make it more likely that the null is rejected?

**A)** A move of the mean return down to 0.11%.

**B)** An increase in the standard deviation of the returns to 0.23%.

**C)** An increase in the sample size to 140.

**Explanation**

Even though numbers are provided, no calculations are needed. An increase in the sample size will produce a lower standard error, and a lower standard error will equate to a higher test statistic. Note that all numbers provided are positive, such that the critical value will be a positive number. The higher the test statistic is relative to the critical value, the more likely it is that the null hypothesis is rejected.

A decrease in the mean return will lower the test statistic, while an increase in the standard deviation will increase the standard error (which will decrease the test statistic).

(Module 8.2, LOS 8.b)

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## Question #62 of 200

Question ID: 1591302

The following annualized monthly return measures have been calculated for an investment based on its performance over the last 72 months.

| | |
|---|---|
| Arithmetic mean | 6.8% |
| Geometric mean | 6.0% |
| 90% Winsorized mean | 5.5% |

If for one month in the period the return was extremely high, which measure *best* reflects the central tendency of the investment's returns?

**A)** Winsorized mean.

**B)** Geometric mean.

**C)** Arithmetic mean.

**Explanation**

A winsorized mean is a technique for removing the distorting effects of outliers by replacing them with less extreme values. The arithmetic and geometric means are based on all observations and therefore include the impact of outliers.

(Module 3.1, LOS 3.a)

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## Question #63 of 200

Question ID: 1572698

Assuming a constant rate of growth in dividends, we can estimate an equity share's:

**A)** growth rate as the sum of its dividend yield and its required rate of return.

**B)** dividend yield as the sum of its required rate of return and its growth rate.

**C)** required rate of return as the sum of its dividend yield and growth rate.

**Explanation**

Starting with the Gordon growth model, we can solve for the estimated required rate of return, constant growth rate, or dividend yield as follows:

$$k_e = \frac{D_1}{V_0} + g_c$$

$$g_c = k_e - \frac{D_1}{V_0}$$

$$\frac{D_1}{V_0} = k_e - g_c$$

(Module 2.2, LOS 2.b)

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## Question #64 of 200

Question ID: 1572770

A portfolio's monthly returns follow a distribution with a kurtosis measure of 4.2. Relative to a portfolio with normally distributed returns, this portfolio has a:

**A)** higher probability of extreme upside returns and higher chance of extreme downside returns.

**B)** lower probability of extreme upside returns and higher chance of extreme downside returns.

**C)** higher probability of extreme upside returns and lower chance of extreme downside returns.

**Explanation**

A leptokurtic distribution (a distribution with kurtosis measure greater than 3) is more peaked in the middle (data more clustered around the mean) and has fatter tails at the extremes (greater probability of outliers).

(Module 3.2, LOS 3.c)

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## Question #65 of 200

Question ID: 1572771

The correlation between two variables is –0.74. The *most appropriate* way to interpret this correlation is that:

**A)** the two variables have a negative linear association.

**B)** there is unlikely to be a strong linear relationship between the two variables.

**C)** if one of the variables increases, there is a 74% probability that the other variable will decrease.

**Explanation**

A correlation coefficient of –0.74 suggests a relatively strong negative linear association between the two variables. We cannot interpret the correlation coefficient directly as a measure of the probability that the two variables will change in opposite directions.

(Module 3.2, LOS 3.d)

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## Question #66 of 200

Question ID: 1572898

Consider the following analysis of variance (ANOVA) table:

| Source | Sum of squares | Degrees of freedom | Mean sum of squares |
|---|---|---|---|
| Regression | 556 | 1 | 556 |
| Error | 679 | 50 | 13.5 |
| Total | 1,235 | 51 | |

The $R^2$ for this regression is *closest* to:

**A)** 0.55.

**B)** 0.45.

**C)** 0.82.

**Explanation**

$R^2$ = sum of squares regression / sum of squares total = 556 / 1,235 = 0.45.

(Module 10.2, LOS 10.d)

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## Question #67 of 200

Question ID: 1572902

To account for logarithmic variables, functional forms of simple linear regressions are available if:

**A)** either the dependent or independent variable is logarithmic, but not both.

**B)** the independent variable is logarithmic, but not if the dependent variable is logarithmic.

**C)** either or both of the dependent and independent variables are logarithmic.

**Explanation**

A log-lin model is appropriate if the dependent variable is logarithmic, while the independent variable is linear. A lin-log model is appropriate if the independent variable is logarithmic, while the dependent variable is linear. A log-log model is appropriate if both the independent and dependent variables are logarithmic.

(Module 10.3, LOS 10.f)

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## Question #68 of 200

Question ID: 1572760

If a distribution is positively skewed, then generally:

**A)** mean > median > mode.

**B)** mean < median < mode.

**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.

(Module 3.2, LOS 3.c)

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## Question #69 of 200

Question ID: 1572759

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 mean that is less than its median.

**B)** be positively skewed.

**C)** have a mode 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.

(Module 3.2, LOS 3.c)

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## Question #70 of 200

Question ID: 1572812

The mean and standard deviation of returns for three portfolios are listed below in percentage terms.

Portfolio X: Mean 5%, standard deviation 3%.

Portfolio Y: Mean 14%, standard deviation 20%.

Portfolio Z: Mean 19%, standard deviation 28%.

Using Roy's safety-first criteria and a threshold of 4%, select the optimal portfolio.

**A)** Portfolio Y. ✗

**B)** Portfolio X. ✗

**C)** Portfolio Z. ✓

**Explanation**

Portfolio Z has the largest value for the SFRatio: (19 – 4) / 28 = 0.5357.

For Portfolio X, the SFRatio is (5 – 4) / 3 = 0.3333.

For Portfolio Y, the SFRatio is (14 – 4) / 20 = 0.5000.

(Module 5.1, LOS 5.c)

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## Question #71 of 200

Question ID: 1572659

Over a period of one year, an investor's portfolio has declined in value from 127,350 to 108,427. What is the continuously compounded rate of return?

**A)** -14.86%. ✗

**B)** -13.84%. ✗

**C)** -16.09%. ✓

**Explanation**

The continuously compounded rate of return = $\ln(S_1 / S_0) = \ln(108{,}427 / 127{,}350) = -16.09\%$.

(Module 1.3, LOS 1.d)

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## Question #72 of 200

Question ID: 1572768

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

**A)** describes the degree to which a distribution is not symmetric about its mean. ✓

**B)** is used to reflect the probability of extreme outcomes for a return distribution. ✗

**C)** measures the peakedness of a distribution reflecting a greater or lesser concentration of returns around the 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.

(Module 3.2, LOS 3.c)

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## Question #73 of 200

Question ID: 1572827

In bootstrap resampling, a single observation from a full dataset:

**A)** may appear either in exactly one sample or in no samples. ✗

**B)** must appear in one and only one sample. ✗

**C)** may appear in multiple samples. ✓

**Explanation**

Bootstrap resampling involves drawing repeated samples of a given size from a full dataset, replacing the sampled observations each time so that they might be redrawn in another sample.

(Module 6.1, LOS 6.c)

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## Question #74 of 200

Question ID: 1591346

A survey is taken to determine whether the average starting salaries of CFA charterholders is equal to or greater than $57,000 per year. Assuming a normal distribution, what is the test statistic given a sample of 115 newly acquired CFA charterholders with a mean starting salary of $65,000 and a standard deviation of $4,500?

**A)** 19.06.

**B)** -19.06.

**C)** 1.78.

**Explanation**

With a large sample size (115) the z-statistic is used. The z-statistic is calculated by subtracting the hypothesized parameter from the parameter that has been estimated and dividing the difference by the standard error of the sample statistic. Here, the test statistic = (sample mean – hypothesized mean) / (population standard deviation / (sample size)$^{1/2}$ = (X − μ) / (σ / n$^{1/2}$) = (65,000 – 57,000) / (4,500 / 115$^{1/2}$) = (8,000) / (4,500 / 10.72) = 19.06.

(Module 8.2, LOS 8.b)

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## Question #75 of 200

Question ID: 1666659

Tina O'Fahey, CFA, believes a stock's price in the next quarter depends on two factors: the direction of the overall market and whether the company's next earnings report is good or poor. The possible outcomes and some probabilities are illustrated in the tree diagram shown below:


Based on this tree diagram, the expected value of the stock if the market decreases is *closest* to:

**A)** $62.50.

**B)** $57.00.

**C)** $26.00.

**Explanation**

The expected value if the overall market decreases is 0.4($60) + (1 – 0.4)($55) = $57.

(Module 4.1, LOS 4.b)

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## Question #76 of 200

Question ID: 1572777

A two-sided but very thick coin is expected to land on its edge twice out of every 100 flips. And the probability of face up (heads) and the probability of face down (tails) are equal. When the coin is flipped, the prize is $1 for heads, $2 for tails, and $50 when the coin lands on its edge. What is the expected value of the prize on a single coin toss?

**A)** $2.47.

**B)** $1.50.

**C)** $17.67.

**Explanation**

We need to calculate of probability weighted average payoff.

Since the probability of the coin landing on its edge is 0.02, the probability of each of the other two events is 0.49. The expected payoff is: (0.02 × $50) + (0.49 × $1) + (0.49 × $2) = $2.47.

| Outcome | Probability | Payoff | Probability × Payoff |
|---|---|---|---|
| Edge | 2 / 100 = 2% | $50 | 2% × $50 |
| Heads | 49% | $1 | 49% × $1 |
| Tails | 49% | $2 | 49% × $2 |
| **Expected Payoff = ∑ Probability × Payoff** | | | **$2.47** |

(Module 4.1, LOS 4.a)

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## Question #77 of 200

Question ID: 1572668

If an investor bought a stock for $32 and sold it nine months later for $37.50 after receiving $2 in dividends, what was the holding period return on this investment?

**A)** 23.44%.

**B)** 32.42%.

**C)** 17.19%.

**Explanation**

HPR = [ending value – beginning value] / beginning value

HPR = [(2 + 37.50) – 32] / 32 = 0.2344.

(Module 1.3, LOS 1.e)

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## Question #78 of 200

Question ID: 1591312

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)** 370.00. ✗

**B)** 19.24. ✓

**C)** 38.47. ✗

**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 = $370^{1/2} = 19.24\%$.

(Module 3.1, LOS 3.b)

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## Question #79 of 200

Question ID: 1572900

To determine a confidence interval around the predicted value from a simple linear regression, the appropriate degrees of freedom are:

**A)** n – 2. ✓

**B)** n – 1. ✗

**C)** n. ✗

**Explanation**

The degrees of freedom are n – 2 for a confidence interval around a predicted value.

(Module 10.3, LOS 10.e)

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## Question #80 of 200

Question ID: 1591351

For a two-tailed test of hypothesis involving a z-distributed test statistic and a 5% level of significance, a calculated z-statistic of 1.5 indicates that:

**A)** the null hypothesis is rejected. ✗

**B)** the null hypothesis cannot be rejected. ✓

**C)** the test is inconclusive. ✗

**Explanation**

For a two-tailed test at a 5% level of significance the calculated z-statistic would have to be greater than the critical z value of 1.96 for the null hypothesis to be rejected.

(Module 8.2, LOS 8.b)

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## Question #81 of 200

Question ID: 1591290

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)** median only. ✗

**B)** both mean and median. ✗

**C)** mean 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.

(Module 3.1, LOS 3.a)

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## Question #82 of 200

Question ID: 1572700

An investor spends $365,000 purchasing zero-coupon bonds with a total face value of $500,000 and maturing in 10 years. For the annualized rate of return to be above 3.20%, the bond's price will have to be:

**A)** lower than $365,000. ✓

**B)** higher than $365,000. ✗

**C)** equivalent to $365,000. ✗

**Explanation**

With a future value of $500,000, a present value of $365,000, and a maturity of 10 years, the annualized rate of return is calculated as shown:

$$\frac{\$500{,}000}{(1+r)^{10}} = \$365{,}000$$

$$(1+r)^{10} = \frac{\$500{,}000}{\$365{,}000} = 1.36986$$

$$r = 1.36986^{1/10} - 1 = 0.0320$$

On the calculator, N = 10; PV = –365,000; PMT = 0; FV = 500,000; CPT I/Y = 3.2.

Because the annualized return is 3.20% and the question asks about what the bond's price must be to be above 3.20%, the price of the bond must be below the purchase price of $365,000. The relationship between the price and rate of return is inverse; for the rate of return to be above 3.20%, the price must fall.

(Module 2.2, LOS 2.b)

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## Question #83 of 200

Question ID: 1591316

| 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)** 9.1%.

**B)** 9.8%.

**C)** 7.8%.

**Explanation**

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

(Module 3.1, LOS 3.b)

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## Question #84 of 200

Question ID: 1572808

Joe Mayer, CFA, projects that XYZ Company's return on equity varies with the state of the economy in the following way:

| State of Economy | Probability of Occurrence | Company Returns |
|---|---|---|
| Good | .20 | 20% |
| Normal | .50 | 15% |
| Poor | .30 | 10% |

The standard deviation of XYZ's expected return on equity is *closest* to:

**A)** 1.5%.

**B)** 12.3%.

**C)** 3.5%.

**Explanation**

In order to calculate the standard deviation of the company returns, first calculate the expected return, then the variance, and the standard deviation is the square root of the variance.

The expected value of the company return is the probability weighted average of the possible outcomes: (0.20)(0.20) + (0.50)(0.15) + (0.30)(0.10) = 0.145.

The variance is the sum of the probability of each outcome multiplied by the squared deviation of each outcome from the expected return: $(0.2)(0.20 - 0.145)^2 + (0.5)(0.15 - 0.145)^2 + (0.3)(0.1-0.145)^2 = 0.000605 + 0.0000125 + 0.0006075 = 0.001225$.

The standard deviation is the square root of 0.001225 = 0.035 or 3.5%.;

(Module 5.1, LOS 5.b)

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## Question #85 of 200

Question ID: 1591333

Which of the following statements regarding hypothesis testing is *least* accurate?

**A)** A type II error is the acceptance of a hypothesis that is actually false.

**B)** The significance level is the risk of making a type I error.

**C)** A type I error is acceptance of a hypothesis that is actually false.

**Explanation**

A type I error is the rejection of a hypothesis that is actually true.

(Module 8.1, LOS 8.a)

## Question #86 of 200

Question ID: 1709675

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)** 9.1%. ✓

**B)** 9.2%. ✗

**C)** 8.9%. ✗

**Explanation**

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

(Module 1.2, LOS 1.c)

## Question #87 of 200

Question ID: 1572643

An analyst evaluates a dataset with eight values. From the dataset, she calculates the geometric mean to be 8.50. If the arithmetic mean is equal to 8.90, the harmonic mean is *closest* to:

**A)** 8.12. ✓

**B)** 8.63. ✗

**C)** 9.30. ✗

**Explanation**

The relationship between the arithmetic, harmonic, and geometric mean is equal to:

arithmetic mean × harmonic mean = $(\text{geometric mean})^2$

8.90 × harmonic mean = $(\text{geometric mean})^2 = (8.50)^2$

$$\text{harmonic mean} = \frac{(8.50)^2}{8.90} = 8.12$$

*Note: This could also be answered without performing calculations, knowing that harmonic < geometric < arithmetic, where values are not equal.*

(Module 1.1, LOS 1.b)

## Question #88 of 200

Question ID: 1572804

The following table shows the weightings and expected returns for a portfolio of three stocks:

| Stock | Weight | $E(R_X)$ |
|---|---|---|
| V | 0.40 | 12% |
| M | 0.35 | 8% |
| S | 0.25 | 5% |

What is the expected return of this portfolio?

**A)** 8.85%.

**B)** 8.33%.

**C)** 9.05%.

**Explanation**

The expected return is simply a weighted average return.

Multiplying the weight of each asset by its expected return, then summing, produces: E(RP) = 0.40(12) + 0.35(8) + 0.25(5) = 8.85%.

| State of the Economy | Weight | $E(R_X)$ | Probability × Return |
|---|---|---|---|
| V | 0.40 | 12% | 0.4 × 12% |
| M | 0.35 | 8% | 0.35 × 8% |
| S | 0.25 | 5% | 0.25 × 5% |
| **Expected Return = ∑ Weight × $E(R_X)$** | | | **8.85%** |

(Module 5.1, LOS 5.a)

## Question #89 of 200

Question ID: 1591282

Given the following cash flow stream:

| End of Year | Annual Cash Flow |
|---|---|
| 1 | $4,000 |
| 2 | $2,000 |
| 3 | -0- |
| 4 | -$1,000 |

Using a 10% discount rate, the present value of this cash flow stream is:

**A)** $3,415.00.

**B)** $3,636.00.

**C)** $4,606.00.

**Explanation**

PV(1): N = 1; I/Y = 10; FV = -4,000; PMT = 0; CPT → PV = 3,636

PV(2): N = 2; I/Y = 10; FV = -2,000; PMT = 0; CPT → PV = 1,653

PV(3): 0

PV(4): N = 4; I/Y = 10; FV = 1,000; PMT = 0; CPT → PV = -683

Total PV = 3,636 + 1,653 + 0 – 683 = 4,606

(Module 2.2, LOS 2.c)

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## Question #90 of 200

Question ID: 1572796

For assets A and B we know the following: $E(R_A) = 0.10$, $E(R_B) = 0.20$, $Var(R_A) = 0.25$, $Var(R_B) = 0.36$ and the correlation of the returns is 0.6. What is the expected return of a portfolio that is equally invested in the two assets?

**A)** 0.3050.

**B)** 0.1500.

**C)** 0.2275.

**Explanation**

The expected return of a portfolio composed of n-assets is the weighted average of the expected returns of the assets in the portfolio: $((w_1) \times (E(R_1)) + ((w_2) \times (E(R_2)) = (0.5 \times 0.1) + (0.5 \times 0.2) = 0.15$.

(Module 5.1, LOS 5.a)

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## Question #91 of 200

Question ID: 1591272

An annuity will pay eight annual payments of $100, with the first payment to be received one year from now. If the interest rate is 12% per year, what is the present value of this annuity?

**A)** $1,229.97. ✗

**B)** $496.76. ✓

**C)** $556.38. ✗

**Explanation**

N = 8; I/Y = 12%; PMT = -$100; FV = 0; CPT → PV = $496.76.

(Module 2.1, LOS 2.a)

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## Question #92 of 200

Question ID: 1572697

A bond pays annual coupon interest of £60 and returns its face value of £1,000 in seven years. The bond's price today is £1,045. Its yield to maturity is *closest* to:

**A)** 6.0%. ✗

**B)** 5.2%. ✓

**C)** 6.8%. ✗

**Explanation**

N = 7; PMT = 60; FV = 1,000; PV = –1,045; CPT I/Y = 5.2162.

(Module 2.2, LOS 2.b)

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## Question #93 of 200

Question ID: 1572670

An investor sold a 30-year bond at a price of $850 after he purchased it at $800 a year ago. He received $50 of interest at the time of the sale. The annualized holding period return is:

**A)** 6.25%.

**B)** 15.0%.

**C)** 12.5%.

**Explanation**

The holding period return (HPR) is calculated as follows:

$$HPR = (P_t - P_{t-1} + D_t) / P_t$$

where:

$P_t$ = price per share at the end of time period t

$D_t$ = cash distributions received during time period t.

**Here,** HPR = (850 – 800 + 50) / 800 = 0.1250, or **12.50%.**

(Module 1.3, LOS 1.e)

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## Question #94 of 200

Question ID: 1591300

Over the last five years, an investment fund's monthly returns were relatively stable apart from last year, where two extremely high returns were recorded. If the arithmetic mean for the fund's monthly returns over the period is 6.7%, a trimmed or winsorized mean return is *most likely* to be:

**A)** higher than the arithmetic mean.

**B)** equal to the arithmetic mean.

**C)** lower than the arithmetic mean.

**Explanation**

A trimmed mean discards a percentage of the highest and lowest observations, while a winsorized mean replaces a percentage of the highest and lowest observations with less extreme values. In this case the arithmetic mean would be influenced by the two highly positive returns, while a trimmed or winsorized mean would adjust for them and would likely be lower than the arithmetic mean.

(Module 3.1, LOS 3.a)

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## Question #95 of 200

Question ID: 1591275

Wortel Industries has preferred stock outstanding that paying an annual dividend of $3.75 per share. If an investor wants to earn a rate of return of 8.5%, how much should he be willing to pay for a share of Wortel preferred stock?

**A)** $42.10.

**B)** $44.12.

**C)** $31.88.

**Explanation**

To calculate the price, we need to discount the future dividend stream at the investor's required return.

The stream of dividends is a perpetuity (a fixed dividend each year forever).

Given the PV of a perpetuity = cash flow / discount rate

Then price = $3.75 / 0.085 = $44.12

(Module 2.1, LOS 2.a)

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## Question #96 of 200

Question ID: 1591349

A survey is taken to determine whether the average starting salaries of CFA charterholders is equal to or greater than $59,000 per year. What is the test statistic given a sample of 135 newly acquired CFA charterholders with a mean starting salary of $64,000 and a standard deviation of $5,500?

**A)** 10.56.

**B)** -10.56.

**C)** 0.91.

**Explanation**

With a large sample size (135) the *z*-statistic is used. The *z*-statistic is calculated by subtracting the hypothesized parameter from the parameter that has been estimated and dividing the difference by the standard error of the sample statistic. Here, the test statistic = (sample mean – hypothesized mean) / (population standard deviation / (sample size)$^{1/2}$) = $(X - \mu) / (\sigma / n^{1/2})$ = (64,000 – 59,000) / (5,500 / $135^{1/2}$) = (5,000) / (5,500 / 11.62) = 10.56.

(Module 8.2, LOS 8.b)

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## Question #97 of 200

Question ID: 1572709

An investor is choosing between two possible investments. Both have identical future cash flows in all situations, but the investor notices a slight discrepancy in price between the two. What action will this investor take based on the no-arbitrage principle?

**A)** Do nothing, as there cannot be a price divergence based on the rule. ✗

**B)** Act quickly by buying the lower-priced investment, as the prices will quickly converge. ✓

**C)** Wait for the prices to further diverge, then sell the higher-priced investment. ✗

**Explanation**

The no-arbitrage principle (law of one price) states that the price for an investment will be the same if two sets of future cash flows are identical under all conditions. Although there should not be a discrepancy in theory, there may be one for a short time period. If there is a slight price discrepancy between these investments, it will not last long, so the investor should act quickly and buy the lower-priced investment. The prices would not further diverge.

(Module 2.2, LOS 2.c)

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## Question #98 of 200

Question ID: 1572890

A simple linear regression is a model of the relationship between:

**A)** one dependent variable and one independent variable. ✓

**B)** one dependent variable and one or more independent variables. ✗

**C)** one or more dependent variables and one or more independent variables. ✗

**Explanation**

A simple linear regression is a model of the relationship between one dependent variable and one independent variable. A multiple regression is a model of the relationship between one dependent variable and more than one independent variable.

(Module 10.1, LOS 10.a)

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## Question #99 of 200

Question ID: 1572821

Which of the following statements regarding the distribution of returns used for asset pricing models is *most* accurate?

**A)** Normal distribution returns are used for asset pricing models because they will only allow the asset price to fall to zero. ✗

**B)** Lognormal distribution returns are used for asset pricing models because they will not result in an asset return of less than -100%. ✓

**C)** Lognormal distribution returns are used because this will allow for negative returns on the assets. ✗

**Explanation**

Lognormal distribution returns are used for asset pricing models because this will not result in asset returns of less than 100% because the lowest the asset price can decrease to is zero which is the lowest value on the lognormal distribution. The normal distribution allows for asset prices less than zero which could result in a return of less than -100% which is impossible.

(Module 6.1, LOS 6.a)

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## Question #100 of 200

Question ID: 1572790

If given the standard deviations of the returns of two assets and the correlation between the two assets, which of the following would an analyst *least likely* be able to derive from these?

**A)** Strength of the linear relationship between the two. ✗

**B)** Covariance between the returns. ✗

**C)** Expected returns. ✓

**Explanation**

The correlations and standard deviations cannot give a measure of central tendency, such as the expected value.

(Module 5.1, LOS 5.a)

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## Question #101 of 200

Question ID: 1572893

Which of the following is *least likely* an assumption of linear regression?

**A)** The variance of the error terms each period remains the same. ✗

**B)** The error terms from a regression are positively correlated. ✓

**C)** Values of the independent variable are not correlated with the error term. ✗

**Explanation**

One assumption of linear regression is that the error terms are independently distributed. In this case, the correlations between error terms are expected to be zero. Constant variance of the error terms and no correlation between the independent variable and the error term are assumptions of linear regression.

(Module 10.1, LOS 10.b)

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## Question #102 of 200

Question ID: 1572906

Artificial intelligence is *best* described as:

**A)** networks of smart devices and buildings. ✗

**B)** the field of study concerned with extracting information from data. ✗

**C)** computer systems that emulate human thinking. ✓

**Explanation**

Artificial intelligence refers to computer systems that emulate the functioning of the human mind. Networks of smart devices and buildings are referred to as the Internet of Things. Data science is the field of study concerned with extracting information from data.

(Module 11.1, LOS 11.b)

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## Question #103 of 200

Question ID: 1572799

Given the following probability distribution, find the standard deviation of expected returns.

| Event | $P(R_A)$ | $R_A$ |
|---|---|---|
| Recession | 0.10 | -5% |
| Below Average | 0.30 | -2% |
| Normal | 0.50 | 10% |
| Boom | 0.10 | 31% |

**A)** 10.04%. ✓

**B)** 7.00%.

**C)** 12.45%.

**Explanation**

Find the weighted average return (0.10)(–5) + (0.30)(–2) + (0.50)(10) + (0.10)(31) = 7%.

Next, take differences, square them, multiply by the probability of the event and add them up. That is the variance. Take the square root of the variance for Std. Dev. $(0.1)(-5 - 7)^2 + (0.3)(-2 - 7)^2 + (0.5)(10 - 7)^2 + (0.1)(31 - 7)^2 = 100.8$ = variance.

$100.8^{0.5} = 10.04\%$.

(Module 5.1, LOS 5.a)

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## Question #104 of 200

Question ID: 1572800

Tully Advisers, Inc., has determined four possible economic scenarios and has projected the portfolio returns for two portfolios for their client under each scenario. Tully's economist has estimated the probability of each scenario, as shown in the table below. Given this information, what is the standard deviation of returns on portfolio A?

| Scenario | Probability | Return on Portfolio A | Return on Portfolio B |
|---|---|---|---|
| A | 15% | 18% | 19% |
| B | 20% | 17% | 18% |
| C | 25% | 11% | 10% |
| D | 40% | 7% | 9% |

**A)** 1.140%.

**B)** 5.992%.

**C)** 4.53%.

**Explanation**

$E(R_A) = 11.65\%$

$\sigma^2 = 0.0020506 = 0.15(0.18 - 0.1165)^2 + 0.2(0.17 - 0.1165)^2 + 0.25(0.11 - 0.1165)^2 + 0.4(0.07 - 0.1165)^2$

$\sigma = 0.0452836$

(Module 5.1, LOS 5.a)

## Question #105 of 200

Question ID: 1572680

A 15-year zero-coupon German government bond has an annualized yield of –1.5%.

Assuming annual compounding, the price of the bond per €100 of principal is *closest* to:

**A)** €115. ✗

**B)** €125. ✓

**C)** €105. ✗

**Explanation**

N = 15; I/Y = –1.5; FV = 100; PMT = 0; CPT PV = –125.45.

(Module 2.1, LOS 2.a)

## Question #106 of 200

Question ID: 1591336

Which of the following statements about hypothesis testing is *least* accurate?

**A)** The significance level is the probability of making a Type I error. ✗

**B)** A Type II error is the probability of failing to reject a null hypothesis that is not true. ✗

**C)** A Type I error is the probability of rejecting the null hypothesis when the null hypothesis is false. ✓

**Explanation**

A Type I error is the probability of rejecting the null hypothesis when the null hypothesis is true.

(Module 8.1, LOS 8.a)

## Question #107 of 200

Question ID: 1591337

Which of the following statements about hypothesis testing is *most* accurate? A Type I error is the probability of:

**A)** failing to reject a false hypothesis. ✗

**B)** rejecting a true null hypothesis.

**C)** rejecting a true alternative hypothesis.

**Explanation**

The Type I error is the error of rejecting the null hypothesis when, in fact, the null is true.

(Module 8.1, LOS 8.a)

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## Question #108 of 200

Question ID: 1572665

An investor begins with a $100,000 portfolio. At the end of the first period, it generates $5,000 of income, which he does not reinvest. At the end of the second period, he contributes $25,000 to the portfolio. At the end of the third period, the portfolio is valued at $123,000. The portfolio's money-weighted return per period is *closest to*:

**A)** 1.20%.

**B)** 0.94%.

**C)** –0.50%.

**Explanation**

Using the financial calculator, the initial investment ($CF_0$) is –100,000. The income is +5,000 ($CF_1$), and the contribution is –25,000 (CF2). Finally, the ending value is +123,000 ($CF_3$) available to the investor. Compute IRR = 0.94

(Module 1.3, LOS 1.e)

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## Question #109 of 200

Question ID: 1572663

The *most appropriate* measure of the increase in the purchasing power of a portfolio's value over a given span of time is a(n):

**A)** holding period return.

**B)** after-tax return.

**C)** real return.

**Explanation**

A real return is adjusted for the effects of inflation and is used to measure the increase in purchasing power over time.

(Module 1.3, LOS 1.e)

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## Question #110 of 200

Question ID: 1572654

A stock that pays no dividend is currently priced at €42.00. One year ago the stock was €44.23. The continuously compounded rate of return is *closest to*:

**A)** –5.17%. ✓

**B)** +5.17%. ✗

**C)** –5.04%. ✗

**Explanation**

$$\ln\left(\frac{S_1}{S_0}\right) = \ln\left(\frac{42.00}{44.23}\right) = \ln(0.9496) = -0.0517 = -5.17\%$$

(Module 1.3, LOS 1.d)

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## Question #111 of 200

Question ID: 1572887

In a test of independence based on contingency table data, degrees of freedom are the:

**A)** product of the number of rows minus one and the number of columns, minus one. ✓

**B)** sum of the number of rows and the number of columns, minus two. ✗

**C)** sum of the number of rows and the number of columns. ✗

**Explanation**

Degrees of freedom for a test for independence are [(r – 1) (c – 1)], where r and c are the number of rows and the number of columns in the contingency table.

(Module 9.1, LOS 9.b)

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## Question #112 of 200

Question ID: 1572684

An equity investor has a required return of 7% and purchases preferred stock with a $50 per share par value and an annual dividend of $3.20. The value of the preferred stock is *closest* to:

**A)** $50. ✗

**B)** $43. ✗

**C)** $46. ✓

**Explanation**

The value of preferred stock, based on the assumption that the annual dividend will be paid in perpetuity, is equal to:

The correct answer is 45.71, which is closest to $46 per share.

$$\frac{D_P}{k_P} = \frac{3.20}{0.07} = 45.71$$

(Module 2.1, LOS 2.a)

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## Question #113 of 200

Question ID: 1572710

An investor is deciding whether to buy a 1-year bond two years in a row or lock in the rate on a 2-year bond today. The 1-year spot interest rate is 5.25%, and the 2-year spot interest rate is 6.50%. Which of the following statements is *most accurate* regarding implied forward rates and the investor's options?

**A)** The investor is better off locking in the 2-year rate at 6.50%. ✗

**B)** The forward rate will be between 5.25% and 6.50%. ✗

**C)** The expected rate on a 1-year bond one year from today is equal to 7.76%. ✓

**Explanation**

Implied forward rates can be derived based on observable spot rates in the fixed income market. The result is that the implied 1-year forward rate one year in the future can be derived based on this formula:

$$\frac{(1+S_2)^2}{(1+S_1)} = (1 + 1y1y)$$

$$\frac{(1.065)^2}{(1.0525)} - 1 = 0.0776$$

The forward rate (1y1y) is equal to 7.76%.

The forward rate will be higher than both spot rates, which means it cannot be between 5.25% and 6.50%. The investor should be indifferent between the 2-year bond paying 6.50% and 1-year bonds at 5.25% and 7.76%.

(Module 2.2, LOS 2.c)

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## Question #114 of 200

Question ID: 1572909

A data analyst uses fintech to evaluate the number of times the words *buy* or *sell* appear in a company's quarterly filings in a given fiscal year. This is *most likely* an example of which form of fintech?

**A)** Text analytics. ✓

**B)** Natural language processing. ✗

**C)** Algorithmic trading. ✗

**Explanation**

Text analytics, which relates to the analysis of unstructured data in text or voice forms, can be used to analyze the frequency in which a word or words appear in documents. The number of times the words *buy* and *sell* appear can be evaluated using text analytics. Algorithmic trading is computerized securities trading based on preset trading rules. Natural language processing uses computers and artificial intelligence (AI) to interpret human language.

(Module 11.1, LOS 11.c)

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## Question #115 of 200

Question ID: 1572683

A bond with a 10-year maturity has a face value of $10,000 and pays annual interest of $600. The bond is issued at a price of $9,500. The bond's yield to maturity will be:

**A)** less than 6%.

**B)** equal to 6%.

**C)** greater than 6%.

**Explanation**

No calculations are needed to answer this question. This bond was issued at a price of $9,500, which is below face value of $10,000. The bond is considered a discount bond, and this results from a situation where the bond's coupon rate is below the yield to maturity. With annual interest of $600 on a face value of $10,000, the coupon rate is equal to 6% (600 / 10,000). The yield to maturity must be greater than 6% for the bond to be issued at a discounted price.

(Module 2.1, LOS 2.a)

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## Question #116 of 200

Question ID: 1572707

Assume that one- and two-year risk-free rates are 1.80% and 2.50%, respectively. Using the cash flow additivity principle, the one-year reinvestment rate, one year from now is *closest* to:

**A)** 3.5%.

**B)** 2.8%.

**C)** 3.2%.

**Explanation**

$$F_{1,1} = \frac{(1+r_2)^2}{(1+r_1)^1} - 1 = \frac{1.025^2}{1.018^1} - 1 = 3.2\%$$

(Module 2.2, LOS 2.c)

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## Question #117 of 200

Question ID: 1591284

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)** 12.17%.

**B)** 11.77%.

**C)** 18.05%.

**Explanation**

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

| Asset | Weight | Return | Weight × Return |
|---|---|---|---|
| Cash | 10% | 2% | 10% × 2% = 0.2% |
| Bonds | 30% | 9.5% | 30% × 9.5% = 2.85% |
| Stock | 60% | 25% | 60% × 25% = 15% |
| Weighted Average Return **∑ Weight × Probability** | | | **18.05%** |

(Module 3.1, LOS 3.a)

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## Question #118 of 200

Question ID: 1572886

A test of the hypothesis that two categorical variables are independent is *most likely* to employ:

**A)** population parameters.

**B)** contingency tables.

**C)** *t*-statistics.

**Explanation**

A hypothesis test whether of two categorical variables (e.g., company sector and bond rating) are independent can be performed by constructing a contingency table and calculating a chi-squared statistic.

(Module 9.1, LOS 9.b)

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## Question #119 of 200

Question ID: 1572778

Use the following data to calculate the standard deviation of the return:

- 50% chance of a 12% return
- 30% chance of a 10% return
- 20% chance of a 15% return

**A)** 1.7%. ✓

**B)** 2.5%. ✗

**C)** 3.0%. ✗

**Explanation**

The standard deviation is the positive square root of the variance. The variance is the expected value of the squared deviations around the expected value, weighted by the probability of each observation. The expected value is: (0.5) × (0.12) + (0.3) × (0.1) + (0.2) × (0.15) = 0.12. The variance is: (0.5) × $(0.12 - 0.12)^2$ + (0.3) × $(0.1 - 0.12)^2$ + (0.2) × $(0.15 - 0.12)^2$ = 0.0003. The standard deviation is the square root of 0.0003 = 0.017 or 1.7%.

(Module 4.1, LOS 4.a)

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## Question #120 of 200

Question ID: 1572891

In a simple regression model, the least squares criterion is to minimize the sum of squared differences between:

**A)** the estimated and actual slope coefficient. ✗

**B)** the predicted and actual values of the dependent variable. ✓

**C)** the intercept term and the residual term. ✗

**Explanation**

The least squares criterion defines the best-fitting linear relationship as the one that minimizes the sum of squared errors, the squared vertical distances between the predicted and actual values of the dependent variable.

(Module 10.1, LOS 10.a)

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## Question #121 of 200

Question ID: 1572901

When there is a linear relationship between an independent variable and the relative change in the dependent variable, the *most appropriate* model for a simple regression is:

**A)** the log-log model. ✗

**B)** the log-lin model. ✓

**C)** the lin-log model. ✗

**Explanation**

A regression of the form ln Y = $b_0$ + $b_1$X is appropriate when the relative change in the dependent variable is a linear function of the independent variable.

(Module 10.3, LOS 10.f)

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## Question #122 of 200

Question ID: 1591318

If the historical mean return on an investment is 2.0%, the standard deviation is 8.8%, and the risk free rate is 0.5%, what is the coefficient of variation (CV)?

**A)** 0.23. ✗

**B)** 0.17. ✗

**C)** 4.40. ✓

**Explanation**

The CV = the standard deviation of returns / mean return

= 8.8% / 2.0% = 4.4.

The CV is a measure of risk per unit of mean return. When ranking portfolios based on the CV, a lower value is preferred to higher.

(Module 3.1, LOS 3.b)

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## Question #123 of 200

Question ID: 1591286

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. $(1.056 \times 1.2267 \times 0.9477)^{1/3} - 1 = 7.08\%$

(Module 3.1, LOS 3.a)

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## Question #124 of 200

Question ID: 1572701

A 5-year, 8% coupon bond with a par value of $1,000 pays interest annually. The price is $942.50, and the yield to maturity is 9.50%. If the price of the bond moves to $963.75, the yield to maturity will be closest to:

**A)** 8.93%.

**B)** 10.07%.

**C)** 8.55%.

**Explanation**

Because the price of the bond increases, the yield to maturity will fall from its current level. The current level is 9.50%, which means the yield cannot be 10.07%. The calculation for the yield can be derived using a financial calculator:

$$\begin{aligned} \text{PV} &= -963.75 \\ \text{FV} &= 1{,}000.00 \\ \text{N} &= 5 \text{ years} \\ \text{PMT} &= 80 \ \ (8\% \text{ of par}) \\ \text{Solve for I/Y} &= 8.93. \end{aligned}$$

(Module 2.2, LOS 2.b)

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## Question #125 of 200

Question ID: 1572834

Thomas Merton, a car industry analyst, wants to investigate a relationship between the types of ads used in advertising campaigns and sales to customers in certain age groups. In order to make sure he includes manufacturers of all sizes, Merton divides the industry into four size groups and draws random samples from each group. What sampling method is Merton using?

**A)** Simple random sampling.

**B)** Cross-sectional sampling.

**C)** Stratified random sampling.

**Explanation**

In stratified random sampling, we first divide the population into subgroups based on some relevant characteristic(s) and then make random draws from each group.

(Module 7.1, LOS 7.a)

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## Question #126 of 200

Question ID: 1591352

Kyra Mosby, M.D., has a patient who is complaining of severe abdominal pain. Based on an examination and the results from laboratory tests, Mosby states the following diagnosis hypothesis: $H_O$: Appendicitis, $H_A$: Not Appendicitis. Dr. Mosby removes the patient's appendix and the patient still complains of pain. Subsequent tests show that the gall bladder was causing the problem. By taking out the patient's appendix, Dr. Mosby:

**A)** is correct. ✗

**B)** made a Type I error. ✗

**C)** made a Type II error. ✓

**Explanation**

This statement is an example of a Type II error, which occurs when you fail to reject a hypothesis when it is actually false.

The other statements are incorrect. A Type I error is the rejection of a hypothesis when it is actually true.

(Module 8.2, LOS 8.b)

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## Question #127 of 200

Question ID: 1572825

Bill Phillips is developing a Monte Carlo simulation to value a complex and thinly traded security. Phillips wants to model one input variable to have negative skewness and a second input variable to have positive excess kurtosis. In a Monte Carlo simulation, Phillips can appropriately use:

**A)** both of these variables. ✓

**B)** neither of these variables. ✗

**C)** only one of these variables. ✗

**Explanation**

One of the advantages of Monte Carlo simulation is that an analyst can specify any distribution for inputs.

(Module 6.1, LOS 6.b)

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## Question #128 of 200

Question ID: 1591345

A researcher is testing whether the average age of employees in a large firm is statistically different from 35 years (either above or below). A sample is drawn of 250 employees and the researcher determines that the appropriate critical value for the test statistic is 1.96. The value of the computed test statistic is 4.35. Given this information, which of the following statements is *least* accurate? The test:

**A)** has a significance level of 95%. ✓

**B)** indicates that the researcher will reject the null hypothesis. ✗

**C)** indicates that the researcher is 95% confident that the average employee age is different than 35 years. ✗

**Explanation**

This test has a *significance level of 5%.* The relationship between confidence and significance is: significance level = 1 – confidence level. We know that the significance level is 5% because the sample size is large and the critical value of the test statistic is 1.96 (2.5% of probability is in both the upper and lower tails).

(Module 8.2, LOS 8.b)

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## Question #129 of 200

Question ID: 1572651

An investor makes the following investments:

- She purchases a share of stock for $50.00.
- After one year, she purchases an additional share for $75.00.
- After one more year, she sells both shares for $100.00 each.
- There are no transaction costs or taxes.

During year one, the stock paid a $5.00 per share dividend. In year 2, the stock paid a $7.50 per share dividend. The investor's required return is 35%. Her money-weighted return is *closest to*:

**A)** -7.5%. ✗

**B)** 48.9%. ✓

**C)** 16.1%. ✗

**Explanation**

To determine the money weighted rate of return, use your calculator's cash flow and IRR functions. The cash flows are as follows:

CF0: initial cash outflow for purchase = $50

CF1: dividend inflow of $5 - cash outflow for additional purchase of $75 = net cash outflow of -$70

CF2: dividend inflow (2 × $7.50 = $15) + cash inflow from sale (2 × $100 = $200) = net cash inflow of $215

Enter the cash flows and compute IRR:

CF0 = -50; CF1 = -70; CF2 = +215; CPT IRR = 48.8607

(Module 1.2, LOS 1.c)

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## Question #130 of 200

Question ID: 1572758

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

**A)** Mode, mean, median. ✗

**B)** Mean, median, mode. ✓

**C)** Median, mode, mean. ✗

**Explanation**

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

(Module 3.2, LOS 3.c)

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## Question #131 of 200

Question ID: 1591338

Which of the following statements about hypothesis testing is *least* accurate?

**A)** A Type II error is failing to reject a false null hypothesis. ✗

**B)** If the alternative hypothesis is $H_a$: $\mu > \mu_0$, a two-tailed test is appropriate. ✓

**C)** The null hypothesis is a statement about the value of a population parameter. ✗

**Explanation**

The hypotheses are always stated in terms of a population parameter. Type I and Type II are the two types of errors you can make – reject a null hypothesis that is true or fail to reject a null hypothesis that is false. The alternative may be one-sided (in which case a > or < sign is used) or two-sided (in which case a ≠ is used).

(Module 8.1, LOS 8.a)

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## Question #132 of 200

Question ID: 1572785

John purchased 60% of the stocks in a portfolio, while Andrew purchased the other 40%. Half of John's stock-picks are considered good, while a fourth of Andrew's are considered to be good. If a randomly chosen stock is a good one, what is the probability John selected it?

**A)** 0.40.

**B)** 0.30.

**C)** 0.75.

**Explanation**

Using the information of the stock being good, the probability is updated to a conditional probability:

P(*John | good*) = P(*good and John*) / P(*good*).

P(*good and John*) = P(*good | John*) × P(*John*) = 0.5 × 0.6 = 0.3.

P(*good and Andrew*) = 0.25 × 0.40 = 0.10.

P(*good*) = P(*good and John*) + P (*good and Andrew*) = 0.40.

P(*John | good*) = P(*good and John*) / P(*good*) = 0.3 / 0.4 = 0.75.

(Module 4.1, LOS 4.c)

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## Question #133 of 200

Question ID: 1572639

Assuming at least some variations in a set of data, the:

**A)** geometric mean is greater than the arithmetic mean, which is greater than the harmonic mean.

**B)** arithmetic mean is greater than geometric mean, which is greater than the harmonic mean.

**C)** harmonic mean is greater than the geometric mean, which is greater than the arithmetic mean.

**Explanation**

As long as there is variability in the data, the arithmetic mean is greater than geometric mean, which is greater than the harmonic mean.

(Module 1.1, LOS 1.b)

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## Question #134 of 200

Question ID: 1591334

A Type II error:

**A)** fails to reject a true null hypothesis.

**B)** fails to reject a false null hypothesis.

**C)** rejects a true null hypothesis.

**Explanation**

A Type II error is defined as accepting the null hypothesis when it is actually false. The chance of making a Type II error is called beta risk.

(Module 8.1, LOS 8.a)

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## Question #135 of 200

Question ID: 1591319

Returns for a portfolio over the last four years are shown below. Treating these returns as a sample, what is their coefficient of variation (CV)?

| Year | Return |
|---|---|
| 1 | 17.0% |
| 2 | 12.2% |
| 3 | 3.9% |
| 4 | –8.4% |

**A)** 1.80.

**B)** 0.55.

**C)** 1.56.

**Explanation**

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

Mean return = (17.0% + 12.2% + 3.9% – 8.4%) / 4 = 6.175%

| Year | Return | $(R - 6.175\%)^2$ |
|---|---|---|
| 1 | 17.0% | 117.18 |
| 2 | 12.2% | 36.30 |
| 3 | 3.9% | 5.18 |
| 4 | –8.4% | 212.43 |
| | | Sum = 371.09 |

Sample standard deviation = $[371.09 / (4 - 1)]^{0.5}$ = 11.12%

Coefficient of variation = 11.12% / 6.175% = 1.80

(Module 3.1, LOS 3.b)

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## Question #136 of 200

Question ID: 1572645

Time-weighted returns are used by the investment management industry because they:

**A)** take all cash inflows and outflows into account using the internal rate of return.

**B)** result in higher returns versus the money-weighted return calculation.

**C)** are not affected by the timing of cash flows.

**Explanation**

Time-weighted returns are not affected by the timing of cash flows. Money-weighted returns, by contrast, will be higher when funds are added at a favorable investment period or will be lower when funds are added during an unfavorable period. Thus, time-weighted returns offer a better performance measure because they are not affected by the timing of flows into and out of the account.

(Module 1.2, LOS 1.c)

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## Question #137 of 200

Question ID: 1591291

For the investments shown in the table below:

| Investment | Return (%) |
|---|---|
| A | 12 |
| B | 14 |
| C | 9 |
| D | 13 |
| E | 7 |
| F | 8 |
| G | 12 |

Which of the following statements is *most accurate*?

**A)** The median is equal to the mode. ✓

**B)** The mean is equal to the median. ✗

**C)** The mean is equal to the mode. ✗

**Explanation**

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. The mean is 75 / 7 = 10.71%.

(Module 3.1, LOS 3.a)

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## Question #138 of 200

Question ID: 1591268

Which one of the following statements *best* describes the components of the required interest rate on a security?

**A)** The real risk-free rate, the expected inflation rate, the default risk premium, a liquidity premium and a premium to reflect the risk associated with the maturity of the security. ✓

**B)** The nominal risk-free rate, the expected inflation rate, the default risk premium, a liquidity premium and a premium to reflect the risk associated with the maturity of the security. ✗

**C)** The real risk-free rate, the default risk premium, a liquidity premium and a premium to reflect the risk associated with the maturity of the security. ✗

**Explanation**

The required interest rate on a security is made up of the nominal rate which is in turn made up of the real risk-free rate plus the expected inflation rate. It should also contain a liquidity premium as well as a premium related to the maturity of the security.

(Module 1.1, LOS 1.a)

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## Question #139 of 200

Question ID: 1572888

A test of independence based on contingency table data uses a(n):

**A)** *t*-statistic. ✗

**B)** *F*-statistic. ✗

**C)** chi-square statistic. ✓

**Explanation**

A test for independence based on contingency table data uses a chi-square statistic.

(Module 9.1, LOS 9.b)

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## Question #140 of 200

Question ID: 1572685

To determine whether the current price of a common stock is aligned with its intrinsic value, an analyst wants to use the Gordon growth model. To appropriately apply the model, the analyst will need to estimate:

**A)** a growth rate that is above the required return. ✗

**B)** the dividend to be received next year. ✓

**C)** a fluctuating growth rate assigned to dividends. ✗

**Explanation**

The Gordon growth model, also known as the constant growth dividend discount model (DDM), takes the next period's dividend and divides it by the difference between the required return and the growth rate. The growth rate is assumed to be constant, and it must be below the required return—or else the denominator of the calculation will be negative, making it invalid.

(Module 2.1, LOS 2.a)

## Question #141 of 200

Question ID: 1572789

The covariance of the returns on investments X and Y is 18.17. The standard deviation of returns on X is 7%, and the standard deviation of returns on Y is 4%. What is the value of the correlation coefficient for returns on investments X and Y?

**A)** +0.85.

**B)** +0.65.

**C)** +0.32.

**Explanation**

The correlation coefficient = Cov (X,Y) / [(Std Dev. X)(Std. Dev. Y)] = 18.17 / 28 = 0.65

(Module 5.1, LOS 5.a)

## Question #142 of 200

Question ID: 1572792

An investor has two stocks, Stock R and Stock S in her portfolio. Given the following information on the two stocks, the portfolio's standard deviation is *closest* to:

- $\sigma_R$ = 34%
- $\sigma_S$ = 16%
- $r_{R,S}$ = 0.67
- $W_R$ = 80%
- $W_S$ = 20%

**A)** 8.7%.

**B)** 7.8%.

**C)** 29.4%.

**Explanation**

The formula for the standard deviation of a 2-stock portfolio is:

$$s = [W_A^2 s_A^2 + W_B^2 s_B^2 + 2W_A W_B s_A s_B r_{A,B}]^{1/2}$$

$$s = [(0.8^2 \times 0.34^2) + (0.2^2 \times 0.16^2) + (2 \times 0.8 \times 0.2 \times 0.34 \times 0.16 \times 0.67)]^{1/2} = [0.073984 + 0.001024 + 0.0116634]^{1/2} = 0.0866714^{1/2} = 0.2944$$, or approximately **29.4%.**

(Module 5.1, LOS 5.a)

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## Question #143 of 200

Question ID: 1572844

Suppose the mean debt/equity ratio of the population of all banks in the United States is 20 and the population variance is 25. A banking industry analyst uses a computer program to select a random sample of 50 banks from this population and compute the sample mean. The program repeats this exercise 1000 times and computes the sample mean each time. According to the central limit theorem, the sampling distribution of the 1000 sample means will be approximately normal if the population of bank debt/equity ratios has:

**A)** a Student's *t*-distribution, because the sample size is greater than 30. ✗

**B)** a normal distribution, because the sample is random. ✗

**C)** any probability distribution. ✓

**Explanation**

The central limit theorem tells us that for a population with a mean μ and a finite variance $\sigma^2$, the sampling distribution of the sample means of all possible samples of size *n* will be approximately normally distributed with a mean equal to μ and a variance equal to $\sigma^2/n$, *no matter the distribution of the population*, assuming a large sample size.

(Module 7.1, LOS 7.b)

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## Question #144 of 200

Question ID: 1572669

A stock is currently worth $75. If the stock was purchased one year ago for $60, and the stock paid a $1.50 dividend during the year, what is the holding period return?

**A)** 22.0%. ✗

**B)** 24.0%. ✗

**C)** 27.5%. ✓

**Explanation**

HPR = [ending value – beginning value] / beginning value

= (75 + 1.50 – 60) / 60 = 27.5%.

(Module 1.3, LOS 1.e)

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## Question #145 of 200

Question ID: 1591280

A share of George Co. preferred stock is selling for $65. It pays a dividend of $4.50 per year and has a perpetual life. The rate of return it is offering its investors is *closest* to:

**A)** 6.9%. ✓

**B)** 14.4%. ✗

**C)** 4.5%. ✗

**Explanation**

4.5 / 65 = 0.0692, or 6.92%.

(Module 2.1, LOS 2.a)

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## Question #146 of 200

Question ID: 1572806

Given the following probability distribution, find the covariance of the expected returns for stocks A and B.

| Event | $P(R_i)$ | $R_A$ | $R_B$ |
|---|---|---|---|
| Recession | 0.10 | -5% | 4% |
| Below Average | 0.30 | -2% | 8% |
| Normal | 0.50 | 10% | 10% |
| Boom | 0.10 | 31% | 12% |

**A)** 17.4. ✓

**B)** 10.9 ✗

**C)** 3.2. ✗

**Explanation**

Find the weighted average return for each stock.

Stock A: (0.10)(-5) + (0.30)(-2) + (0.50)(10) + (0.10)(31) = 7%.

Stock B: (0.10)(4) + (0.30)(8) + (0.50)(10) + (0.10)(12) = 9%.

Next, multiply the differences of the two stocks by each other, multiply by the probability of the event occurring, and sum. This is the covariance between the returns of the two stocks.

$$[(-5 - 7) \times (4 - 9)]\,(0.1) + [(-2 - 7) \times (8 - 9)](0.3) + [(10 - 7) \times (10 - 9)](0.5) + [(31 - 7) \times (12 - 9)](0.1) = 6.0 + 2.7 + 1.5 + 7.2 = 17.4$$

(Module 5.1, LOS 5.b)

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## Question #147 of 200

Question ID: 1684500

The following information is available concerning expected return and standard deviation of Pluto and Neptune Corporations:

| | Expected Return | Standard Deviation |
|---|---|---|
| Pluto Corporation | 11% | 0.22 |
| Neptune Corporation | 9% | 0.13 |

If the correlation between Pluto and Neptune is 0.25, determine the expected return and standard deviation of a portfolio that consists of 65% Pluto Corporation stock and 35% Neptune Corporation stock.

**A)** 10.3% expected return and 2.58% standard deviation.

**B)** 10.0% expected return and 16.05% standard deviation.

**C)** 10.3% expected return and 16.05% standard deviation.

**Explanation**

$$ER_{Port} = (W_{Pluto})(ER_{Pluto}) + (W_{Neptune})(ER_{Neptune})$$

$$= (0.65)(0.11) + (0.35)(0.09) = 10.3\%$$

$$\sigma_p = [(w_1)^2(\sigma_1)^2 + (w_2)^2(\sigma_2)^2 + 2w_1w_2\sigma_1\sigma_2\,\rho_{1,2}]^{1/2}$$

$$= [(0.65)^2(22)^2 + (0.35)^2(13)^2 + 2(0.65)(0.35)(22)(13)(0.25)]^{1/2}$$

$$= [(0.4225)(484) + (0.1225)(169) + 2(0.65)(0.35)(22)(13)(0.25)]^{1/2}$$

$$= (257.725)^{1/2} = 16.0538\%$$

(Module 5.1, LOS 5.a)

## Question #148 of 200

Question ID: 1572822

A lognormal distribution is *least likely* to be:

**A)** used to model stock prices. ✗

**B)** bounded below by zero. ✗

**C)** negatively skewed. ✓

**Explanation**

A lognormal distribution is positively skewed and is bounded below by zero.

If stock returns are continuously compounded, then prices follow a lognormal distribution under certain conditions.

(Module 6.1, LOS 6.a)

## Question #149 of 200

Question ID: 1572809

The joint probability function for returns on an equity index (RI) and returns on a stock (RS)is given in the following table:

| | **Returns on Index ($R_I$)** | | |
|---|---|---|---|
| **Return on stock ($R_S$)** | **$R_I = 0.16$** | **$R_I = 0.02$** | **$R_I = -0.10$** |
| $R_S = 0.24$ | 0.25 | 0.00 | 0.00 |
| $R_S = 0.03$ | 0.00 | 0.45 | 0.00 |
| $R_S = -0.15$ | 0.00 | 0.00 | 0.30 |

Covariance between stock returns and index returns is *closest* to:

**A)** 0.019. ✗

**B)** 0.014. ✓

**C)** 0.029. ✗

**Explanation**

E(I) = (0.25 × 0.16) + (0.45 × 0.02) + (0.30 × –0.10) = 0.0190.

E(S) = (0.25 × 0.24) + (0.45 × 0.03) + (0.30 × –0.15) = 0.0285.

Covariance = [0.25 × (0.16 – 0.0190) × (0.24 – 0.0285)] + [0.45 × (0.02 – 0.0190) × (0.03 – 0.0285)] + [0.30 × (–0.10 – 0.0190) × (–0.15 – 0.0285)] = 0.0138.

(Module 5.1, LOS 5.b)

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## Question #150 of 200

Question ID: 1572837

To estimate the average time Level I CFA candidates spend preparing for the exam, an employee of ABC Investments decides to randomly survey candidates who work at ABC's offices, although he is unsure how well they represent the candidate population. This is *most likely* an example of:

**A)** convenience sampling. ✓

**B)** judgmental sampling. ✗

**C)** stratified sampling. ✗

**Explanation**

Convenience sampling refers to sampling an element of a population based on ease of access.

(Module 7.1, LOS 7.a)

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## Question #151 of 200

Question ID: 1591341

An analyst decides to select 10 stocks for her portfolio by placing the ticker symbols for all the stocks traded on the New York Stock Exchange in a large bowl. She randomly selects 20 stocks and will put every other one chosen into her 10-stock portfolio. The analyst used:

**A)** stratified random sampling. ✗

**B)** dual random sampling. ✗

**C)** simple random sampling. ✓

**Explanation**

In simple random sampling, each item in the population has an equal chance of being selected. The analyst's method meets this criterion.

(Module 8.1, LOS 8.a)

## Question #152 of 200

Question ID: 1572772

The correlation coefficient between the return on an investment and the rate of economic growth is –0.065. An analyst should *most likely* interpret this correlation coefficient as indicating that returns on this investment are:

**A)** unrelated to economic growth. ✗

**B)** not related linearly to economic growth. ✓

**C)** negatively related to economic growth. ✗

**Explanation**

A correlation coefficient near zero indicates that two variables exhibit no linear relationship. This does not necessarily mean that the variables are unrelated because they might exhibit a nonlinear relationship.

(Module 3.2, LOS 3.d)

## Question #153 of 200

Question ID: 1572847

An advantage of the bootstrap method of estimating the standard error of sample means, compared to estimating it based on a sample variance, is that the bootstrap method:

**A)** only requires one sample to be taken. ✗

**B)** is less computationally demanding. ✗

**C)** can be applied to complex statistics. ✓

**Explanation**

Calculating the standard error of sample means based on a single sample variance is most appropriate when the sample is unbiased and the population is approximately normally distributed. When these conditions do not hold, the bootstrap method may be more appropriate. This method is more computationally demanding in that it requires the analyst to calculate the means of multiple samples from the full dataset.

(Module 7.1, LOS 7.c)

## Question #154 of 200

Question ID: 1572814

Which of the following portfolios provides the optimal "safety first" return if the minimum acceptable return is 9%?

| Portfolio | Expected Return (%) | Standard Deviation (%) |
|---|---|---|
| 1 | 13 | 5 |
| 2 | 11 | 3 |
| 3 | 9 | 2 |

**A)** 2.

**B)** 1.

**C)** 3.

**Explanation**

Roy's safety-first criterion requires the maximization of the SF Ratio:

SF Ratio = (expected return – threshold return) / standard deviation

| Portfolio | Expected Return (%) | Standard Deviation (%) | SF Ratio |
|---|---|---|---|
| 1 | 13 | 5 | 0.80 |
| 2 | 11 | 3 | 0.67 |
| 3 | 9 | 2 | 0.00 |

Portfolio #1 has the highest safety-first ratio at 0.80.

(Module 5.1, LOS 5.c)

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## Question #155 of 200

Question ID: 1572706

An investor with USD1,000,000 is undecided between two mutually exclusive opportunities with the following cash flows:

| | Time 0 | Time 1 | Time 2 | Time 3 |
|---|---|---|---|---|
| Opportunity 1 | –1,000,000 | 500,000 | 500,000 | 500,000 |
| Opportunity 2 | –1,000,000 | 400,000 | 500,000 | 600,000 |

The investor's required return is 11% per year. Which opportunity should the investor choose?

**A)** The investor should be indifferent between the two opportunities.

**B)** The investor should choose Opportunity 1.

**C)** The investor should choose Opportunity 2.

**Explanation**

Although this problem may be solved by calculating the individual NPVs of each opportunity (Opportunity 1: 221.86 and Opportunity 2: 204.89), another approach would be to use the cash flow additivity principle as follows:

| | Time 1 | Time 2 | Time 3 |
|---|---|---|---|
| Opportunity 1 | 500,000 | 500,000 | 500,000 |
| Opportunity 2 | 400,000 | 500,000 | 600,000 |
| Cash flow difference | +100,000 | 0 | –100,000 |

Because the present value of the cash flow difference arising at Time 1 (in favor of Opportunity 1) must exceed the present value of the negative cash flow difference arising at Time 3 (in favor of Opportunity 2) at any positive discount rate, Opportunity 1 is preferred.

(Module 2.2, LOS 2.c)

## Question #156 of 200

Question ID: 1591330

If a two-tailed hypothesis test has a 5% probability of rejecting the null hypothesis when the null is true, it is *most likely* that the:

**A)** probability of a Type I error is 2.5%. ✗

**B)** significance level of the test is 5%. ✓

**C)** power of the test is 95%. ✗

**Explanation**

Rejecting the null hypothesis when it is true is a Type I error. The probability of a Type I error is the significance level of the test. The power of a test is one minus the probability of a Type II error, which cannot be calculated from the information given.

(Module 8.1, LOS 8.a)

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## Question #157 of 200

Question ID: 1572816

Three portfolios with normally distributed returns are available to an investor who wants to minimize the probability that the portfolio return will be less than 5%. The risk and return characteristics of these portfolios are shown in the following table:

| Portfolio | Expected return | Standard deviation |
|---|---|---|
| Epps | 6% | 4% |
| Flake | 7% | 9% |
| Grant | 10% | 15% |

Based on Roy's safety-first criterion, which portfolio should the investor select?

**A)** Grant. ✓

**B)** Epps. ✗

**C)** Flake. ✗

**Explanation**

Roy's safety-first ratios for the three portfolios:

Epps = (6 - 5) / 4 = 0.25

Flake = ( 7 - 5) / 9 = 0.222

Grant = (10 - 5) / 15 = 0.33

The portfolio with the largest safety-first ratio has the lowest probability of a return less than 5%. The investor should select the Grant portfolio.

(Module 5.1, LOS 5.c)

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## Question #158 of 200

Question ID: 1572911

Which of the following statements *most accurately* describes a data processing method?

**A)** Search focuses on how data will be recorded and archived.

**B)** Curation focuses on data quality and accuracy through data cleaning.

**C)** Capture focuses on how data moves from the underlying source to the analytical tool.

**Explanation**

*Curation* refers to ensuring the quality and accuracy of data. *Capture* refers to collecting and transforming data in preparation for analysis. *Search* refers to the ways data will be queried.

(Module 11.1, LOS 11.c)

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## Question #159 of 200

Question ID: 1572677

A bond pays annual coupon interest of £40 and returns its face value of £1,000 in five years.

The bond's yield to maturity is 4.5%. Its price today is *closest* to:

**A)** £946.

**B)** £957.

**C)** £978.

**Explanation**

N = 5; I/Y = 4.5; PMT = 40; FV = 1,000; CPT PV = –978.05.

(Module 2.1, LOS 2.a)

## Question #160 of 200

Question ID: 1572696

A pure discount instrument with a face value of ¥500 million matures nine years from today and has a current price of ¥350 million. The instrument's annualized yield is *closest* to:

**A)** 3.3%.

**B)** 4.0%.

**C)** 4.7%.

**Explanation**

$$(1 + r)^9 = \frac{500}{350}$$

$$r = \left(\frac{500}{350}\right)^{\frac{1}{9}} - 1 = 4.04\%.$$

(Module 2.2, LOS 2.b)

## Question #161 of 200

Question ID: 1572828

When resampling is done, the subsamples that are repeatedly drawn from the original observed samples will:

**A)** remain the same size.

**B)** progressively get larger.

**C)** progressively get smaller.

**Explanation**

With resampling, the starting point is the original sample, and subsamples are repeatedly drawn from it. Each subsample will have the same number of observations.

(Module 6.1, LOS 6.c)

## Question #162 of 200

Question ID: 1572824

Monte Carlo simulation is necessary to:

**A)** compute continuously compounded returns.

**B)** approximate solutions to complex problems.

**C)** reduce sampling error.

**Explanation**

This is the purpose of this type of simulation. The point is to construct distributions using complex combinations of hypothesized parameters.

(Module 6.1, LOS 6.b)

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## Question #163 of 200

Question ID: 1572774

An investor is considering purchasing ACQ. There is a 30% probability that ACQ will be acquired in the next two months. If ACQ is acquired, there is a 40% probability of earning a 30% return on the investment and a 60% probability of earning 25%. If ACQ is not acquired, the expected return is 12%. What is the expected return on this investment?

**A)** 12.3%.

**B)** 18.3%.

**C)** 16.5%.

**Explanation**

E(r) = (0.70 × 0.12) + (0.30 × 0.40 × 0.30) + (0.30 × 0.60 × 0.25) = 0.165.

(Module 4.1, LOS 4.a)

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## Question #164 of 200

Question ID: 1572767

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.

(Module 3.2, LOS 3.c)

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## Question #165 of 200

Question ID: 1572840

The central limit theorem concerns the sampling distribution of the:

**A)** population mean.

**B)** sample standard deviation.

**C)** sample mean.

**Explanation**

The central limit theorem tells us that for a population with a mean m and a finite variance $\sigma^2$, the sampling distribution of the *sample means* of all possible samples of size n will approach a normal distribution with a mean equal to μ and a variance equal to $\sigma^2$ / n as *n* gets large.

(Module 7.1, LOS 7.b)

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## Question #166 of 200

Question ID: 1572682

A financial advisor recommends to her client that he buy a 6-year, $1,000 face value bond that pays annual interest of 5%. The yield to maturity is 4.5%, and the client intends to hold the bond as an investment until it matures. The value of the bond today is *closest* to:

**A)** $975.

**B)** $1,025.

**C)** $1,000.

**Explanation**

With a fixed-coupon, annual-pay bond, the annual interest payment and the principal payment are discounted at the yield to maturity. The calculator solution is to solve for present value while setting the number of periods (N) to 6, the annual payment (PMT) to 50 (which is 1,000 × 5%), the future value (FV) to 1,000, and the yield (I/Y) to 4.5%:

$$\frac{50}{1.045} + \frac{50}{1.045^2} + \ldots + \frac{1{,}050}{1.045^6} = 1{,}025.79$$

This can also be answered using the calculator: N = 6; I/Y = 4.5; PMT = 50; FV = 1,000. CPT PV = –1,025.79.

It is also worth noting that because the yield to maturity (4.5%) is below the coupon rate (5%), the bond's current price must be above the par value of $1,000. $975 would only be possible if the yield was above the coupon rate.

(Module 2.1, LOS 2.a)

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## Question #167 of 200

Question ID: 1572672

A 10% coupon bond was purchased for $1,000. One year later the bond was sold for $915 to yield 11%. The investor's holding period yield on this bond is *closest* to:

**A)** 18.5%. ✗

**B)** 1.5%. ✓

**C)** 9.0%. ✗

**Explanation**

HPY = [(interest + ending value) / beginning value] – 1

= [(100 + 915) / 1,000] – 1

= 1.015 – 1 = 1.5%

(Module 1.3, LOS 1.e)

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## Question #168 of 200

Question ID: 1572826

One of the major limitations of Monte Carlo simulation is that it:

**A)** cannot provide the insight that analytic methods can. ✓

**B)** does not lend itself to performing “what if” scenarios. ✗

**C)** requires that variables be modeled using the normal distribution. ✗

**Explanation**

The major limitations of Monte Carlo simulation are that it is fairly complex and will provide answers that are no better than the assumptions used and that it cannot provide the insights that analytic methods can. Monte Carlo simulation is useful for performing "what if" scenarios. One of the first steps in Monte Carlo simulation is to specify the probably distribution along with the distribution parameters. The distribution specified does not have to be normal. (Module 6.1, LOS 6.b)

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## Question #169 of 200

Question ID: 1572708

An investor purchases a stock on January 1. The annual dividend payments for a stock investment for the next four years, beginning on December 31, are $50, $75, $100, and $125. Based on the cash flow additivity principle, the present value of this series of cash flows will be equivalent to the present value of a $50 annuity and the present value of what series of cash flows?

**A)** $75, $50, $25, and $0. ✗

**B)** $0, $25, $50, and $75. ✓

**C)** $0, $0, $125, and $125. ✗

**Explanation**

The cash flow additivity principle states that the PV of any stream of cash flows is equal to the sum of the PVs of all of the cash flows. The cash flows are $50, $75, $100, and $125. So, if one stream of cash flows is equal to $50 each year, subtract $50 from each original cash flow to get the second stream of cash flows.

The PV of 50, 75, 100, and 125 = PV of 50, 50, 50, and 50 + PV of 0, 25, 50, and 75.

The order matters, as the PV will be different (and higher) if the higher cash flows come before the lower ones.

(Module 2.2, LOS 2.c)

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## Question #170 of 200

Question ID: 1572675

A pure discount instrument with a face value of ¥100 million matures 12 years from today. If its yield to maturity is 3%, its price today is *closest* to:

**A)** ¥72 million. ✗

**B)** ¥71 million. ✗

**C)** ¥70 million.

**Explanation**

¥100,000,000(1.03)$^{-12}$ = ¥70,137,988.

(Module 2.1, LOS 2.a)

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## Question #171 of 200

Question ID: 1572830

Which of the following statements is *most accurate* regarding the dataset and samples used in bootstrap resampling?

**A)** The full dataset is used, and the samples are all the same size.

**B)** A partial dataset is used, and the samples are all the same size.

**C)** A partial dataset is used, and the samples are different sizes.

**Explanation**

With bootstrap resampling, the samples pulled from the full dataset are all the same size. Partial datasets are not used.

(Module 6.1, LOS 6.c)

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## Question #172 of 200

Question ID: 1591276

An investor purchases a 10-year, $1,000 par value bond that pays annual coupons of $100. If the market rate of interest is 12%, what is the current market value of the bond?

**A)** $1,124.

**B)** $887.

**C)** $950.

**Explanation**

Note that bond problems are just mixed annuity problems. You can solve bond problems directly with your financial calculator using all five of the main TVM keys at once. For bond-types of problems the bond's price (PV) will be negative, while the coupon payment (PMT) and par value (FV) will be positive. N = 10; I/Y = 12; FV = 1,000; PMT = 100; CPT → PV = –886.99.

(Module 2.1, LOS 2.a)

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## Question #173 of 200

Question ID: 1572815

The mean and standard deviation of returns on three portfolios are listed below in percentage terms:

- Portfolio X: Mean 5%, standard deviation 3%.
- Portfolio Y: Mean 14%, standard deviation 20%.
- Portfolio Z: Mean 19%, standard deviation 28%.

Using Roy's safety first criteria and a threshold of 3%, which of these is the optimal portfolio?

**A)** Portfolio Z. ✗

**B)** Portfolio Y. ✗

**C)** Portfolio X. ✓

**Explanation**

According to the safety-first criterion, the optimal portfolio is the one that has the largest value for the SFRatio (mean – threshold) / standard deviation.

For Portfolio X, (5 – 3) / 3 = 0.67.

For Portfolio Y, (14 – 3) / 20 = 0.55.

For Portfolio Z, (19 – 3) / 28 = 0.57.

(Module 5.1, LOS 5.c)

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## Question #174 of 200

Question ID: 1572679

A stock is expected to pay a dividend next year of $2.40. An analyst expects the dividend to grow at a constant annual rate of 4% and believes investors' required rate of return on the stock is 7%. The analyst will estimate a value for this stock that is *closest* to:

**A)** $85.60. ✗

**B)** $80.00. ✓

**C)** $83.20. ✗

**Explanation**

Applying the Gordon growth model, $\frac{\$2.40}{0.07-0.04} = \$80.$

(Module 2.1, LOS 2.a)

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## Question #175 of 200

Question ID: 1572703

An analyst is using the constant growth dividend discount model (DDM) to evaluate XYZ stock. The stock is currently trading at $20 per share and recently paid an annual dividend of $1.50. Assuming a constant growth rate of 4.5%, the implied required rate of return on the stock is *closest* to:

**A)** 12.00%.

**B)** 12.34%.

**C)** 11.68%.

**Explanation**

The Gordon growth model, also known as the DDM, takes the next period's dividend and divides it by the difference between the required return and the growth rate. The formula can be algebraically manipulated to isolate the required rate of return. The calculation to determine the required rate of return is shown:

$$k_e = \frac{D_1}{V_0} + g_c = \frac{1.50(1.045)}{20} + 0.045 = 0.1234, \text{ or } 12.34$$

The 11.68% answer option is the output if the current dividend is discounted by the growth rate rather than increased by the growth rate to get to the next period's dividend.

The 12.00% answer option is the output if the current dividend is used in the calculation without adjusting for the growth rate.

(Module 2.2, LOS 2.b)

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## Question #176 of 200

Question ID: 1591322

The mean monthly return on a sample of small stocks is 4.56% with a standard deviation of 3.56%. If the risk-free rate is 1%, what is the coefficient of variation?

**A)** 0.78.

**B)** 1.28.

**C)** 1.00.

**Explanation**

The coefficient of variation expresses how much dispersion exists relative to the mean of a distribution. It is a measure of risk per unit of mean return.

CV = *s / mean*. 3.56 / 4.56 = 0.781, or 78%.

(Module 3.1, LOS 3.b)

## Question #177 of 200

Question ID: 1591344

An analyst calculates that the mean of a sample of 200 observations is 5. The analyst wants to determine whether the calculated mean, which has a standard error of the sample statistic of 1, is significantly different from 7 at the 5% level of significance. Which of the following statements is *least* accurate?:

**A)** The alternative hypothesis would be $H_a$: mean > 7. ✓

**B)** The mean observation is significantly different from 7, because the calculated Z-statistic is less than the critical Z-statistic. ✗

**C)** The null hypothesis would be: $H_0$: mean = 7. ✗

**Explanation**

The way the question is worded, this is a two tailed test. The alternative hypothesis is not $H_a$: M > 7 because in a two-tailed test the alternative is =, while < and > indicate one-tailed tests. A test statistic is calculated by subtracting the hypothesized parameter from the parameter that has been estimated and dividing the difference by the standard error of the sample statistic. Here, the test statistic = (sample mean – hypothesized mean) / (standard error of the sample statistic) = (5 - 7) / (1) = -2. The calculated Z is -2, while the critical value is -1.96. The calculated test statistic of -2 falls to the left of the critical Z-statistic of -1.96, and is in the rejection region. Thus, the null hypothesis is rejected and the conclusion is that the sample mean of 5 is significantly different than 7. What the negative sign shows is that the mean is less than 7; a positive sign would indicate that the mean is more than 7. The way the null hypothesis is written, it makes no difference whether the mean is more or less than 7, just that it is not 7.

(Module 8.2, LOS 8.b)

## Question #178 of 200

Question ID: 1591292

Michael Philizaire decides to calculate the geometric average of the appreciation/deprecation 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)** 0.00%. ✗

**B)** 11.60%. ✗

**C)** 4.49%. ✓

**Explanation**

The geometric return is calculated as follows:

$$[(1 + 0.20) \times (1 + 0.15) \times (1 + 0.0)\ (1 - 0.05)\ (1 - 0.05)]^{1/5} - 1,$$

$$\text{or } [1.20 \times 1.15 \times 1.0 \times 0.95 \times 0.95]^{0.2} - 1 = 0.449, \text{ or } \mathbf{4.49\%}.$$

(Module 3.1, LOS 3.a)

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## Question #179 of 200

Question ID: 1572899

Given the relationship: Y = 2.83 + 1.5X

What is the predicted value of the dependent variable when the value of the independent variable equals 2?

**A)** 5.83. ✓

**B)** 2.83. ✗

**C)** –0.55. ✗

**Explanation**

Y = 2.83 + (1.5)(2) = 2.83 + 3 = 5.83.

(Module 10.3, LOS 10.e)

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## Question #180 of 200

Question ID: 1572711

Assuming the 1-year riskless interest rates on the U.S. dollar and British pound are 3.5% and 4.0% respectively, the forward exchange rate between the two currencies will be different than the spot rate by approximately:

**A)** 0.50%. ✓

**B)** 7.50%. ✗

**C)** 3.75%. ✗

**Explanation**

The percentage difference between forward and spot exchange rates is approximately equal to the difference between the interest rates in the two countries. Although there is a more refined calculation, the difference between the forward and spot rates will be approximately equal to 4.0% – 3.5% = 0.50%.

3.75% is just the average of the two rates, and 7.50% adds them together instead of taking the difference.

(Module 2.2, LOS 2.c)

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## Question #181 of 200

Question ID: 1572638

The product of the arithmetic mean and the harmonic mean is the:

**A)** square root of the geometric mean. ✗

**B)** geometric mean. ✗

**C)** square of the geometric mean. ✓

**Explanation**

The mathematical relationship among arithmetic, geometric, and harmonic means is as follows: arithmetic mean × harmonic mean = (geometric mean)$^2$.

(Module 1.1, LOS 1.b)

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## Question #182 of 200

Question ID: 1572664

A security portfolio earns a gross return of 7.0% and a net return of 6.5%. The difference of 0.5% *most likely* results from:

**A)** fees. ✓

**B)** inflation. ✗

**C)** taxes. ✗

**Explanation**

The net return on a portfolio is its gross return minus management and administrative fees. A return adjusted for taxes is called an after-tax return. A return adjusted for inflation is called a real return.

(Module 1.3, LOS 1.e)

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## Question #183 of 200

Question ID: 1572699

Abeta's stock is trading at $47. Abeta just paid a dividend of $1.50, and markets assume a constant growth rate in dividends of 4%. Abeta's required return on equity is *closest* to:

**A)** 7.3%.

**B)** 8.1%.

**C)** 6.5%.

**Explanation**

To calculate the implied cost of equity, we rearrange the constant growth formula as follows:

$$\mathrm{r} = \frac{D_0 \times (1+g)}{P_0} + \mathrm{g} = \frac{1.50 \times 1.04}{47.00} + 0.04 = 7.32\%$$

(Module 2.2, LOS 2.b)

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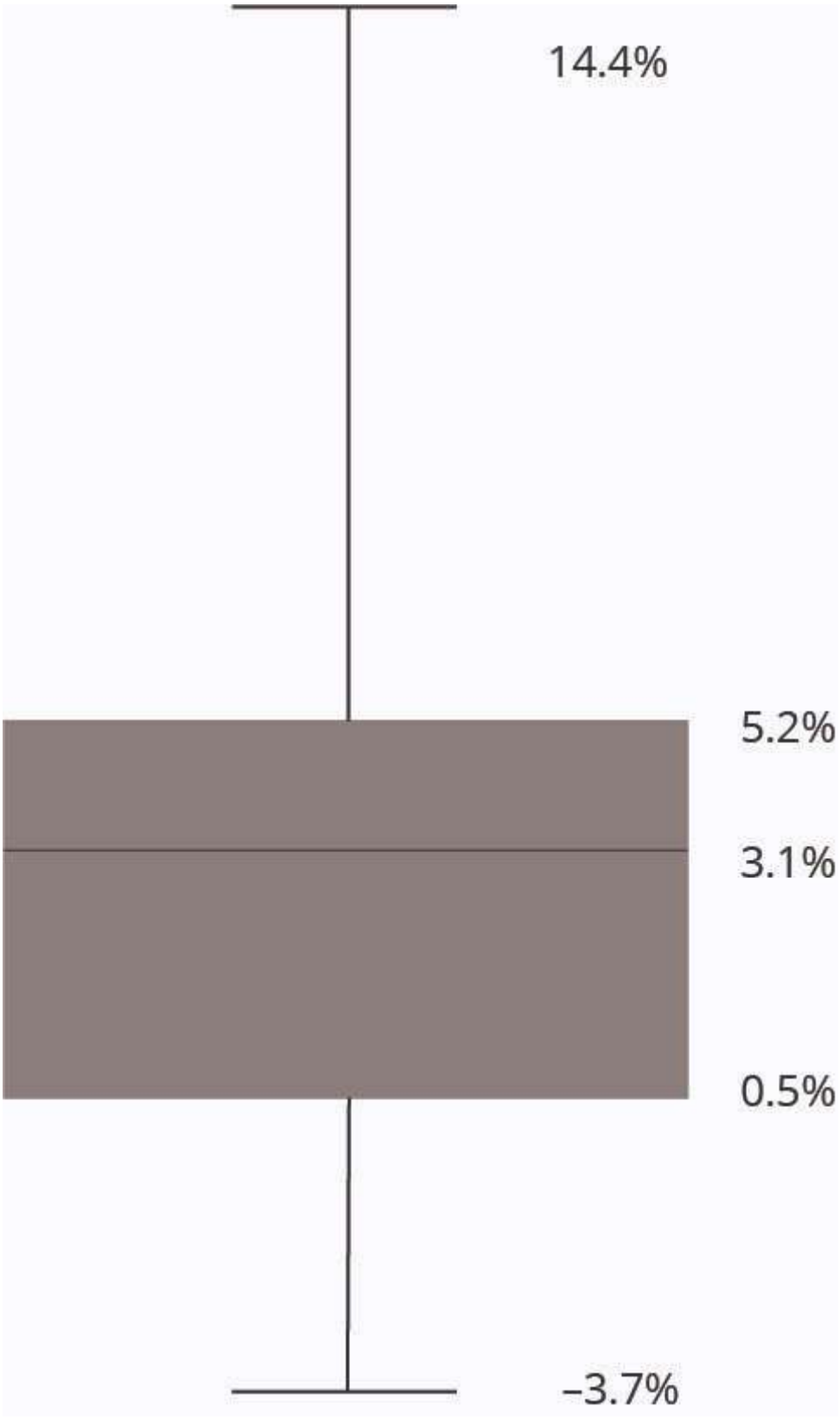
## Question #184 of 200

Question ID: 1591304

Given the following box-and-whisker plot:




The interquartile range is:

**A)** 0.5% to 3.1%.

**B)** 3.1% to 5.2%.

**C)** 0.5% to 5.2%.

**Explanation**

The interquartile range is from the first quartile (25th percentile) to the third quartile (75th percentile) and is represented as the box in a box-and-whisker plot. The horizontal line within the box represents the median (50th percentile).

(Module 3.1, LOS 3.a)

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## Question #185 of 200

Question ID: 1572832

An equity analyst needs to select a representative sample of manufacturing stocks. Starting with the population of all publicly traded manufacturing stocks, she classifies each stock into one of the 20 industry groups that form the Index of Industrial Production for the manufacturing industry. She then selects four stocks from each industry. The sampling method the analyst is using is *best* characterized as:

**A)** systematic sampling. ✗

**B)** stratified random sampling. ✓

**C)** random sampling. ✗

**Explanation**

In stratified random sampling, a researcher classifies a population into smaller groups based on one or more characteristics, takes a simple random sample from each subgroup, and pools the results.

A random sample is one where each member of the population has an equal chance of being selected.

Systematic sampling is where every *n*th member of the population is selected, also known as nonrandom sampling.

(Module 7.1, LOS 7.a)

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## Question #186 of 200

Question ID: 1572894

A simple linear regression is said to exhibit heteroskedasticity if its residual term:

**A)** does not have a constant variance. ✓

**B)** is nonnormally distributed. ✗

**C)** is not independently distributed. ✗

**Explanation**

Heteroskedasticity is the condition in which the variance of the residual term of a regression is not constant across all observations.

(Module 10.1, LOS 10.b)

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## Question #187 of 200

Question ID: 1572905

Which of the following uses of data is *most accurately* described as curation?

**A)** An investor creates a word cloud from financial analysts' recent research reports about a company. ✗

**B)** An analyst adjusts daily stock index data from two countries for their different market holidays. ✓

**C)** A data technician accesses an offsite archive to retrieve data that has been stored there. ✗

**Explanation**

Curation is ensuring the quality of data—for example, by adjusting for bad or missing data. Word clouds are a visualization technique. Moving data from a storage medium to where they are needed is referred to as transfer.

(Module 11.1, LOS 11.b)

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## Question #188 of 200

Question ID: 1572658

If a stock decreases from $90 to $80, the continuously compounded rate of return for the period is:

**A)** -0.1178. ✓

**B)** -0.1250. ✗

**C)** -0.1000. ✗

**Explanation**

This is given by the natural logarithm of the new price divided by the old price; ln(80 / 90) = -0.1178.

(Module 1.3, LOS 1.d)

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## Question #189 of 200

Question ID: 1572648

On January 1, Jonathan Wood invests $50,000. At the end of March, his investment is worth $51,000. On April 1, Wood deposits $10,000 into his account, and by the end of June, his account is worth $60,000. Wood withdraws $30,000 on July 1 and makes no additional deposits or withdrawals the rest of the year. By the end of the year, his account is worth $33,000. The time-weighted return for the year is *closest to*:

**A)** 5.5%. ✗

**B)** 10.4%. ✓

**C)** 7.0%. ✗

**Explanation**

January – March return = 51,000 / 50,000 − 1 = 2.00%

April – June return = 60,000 / (51,000 + 10,000) − 1 = –1.64%

July – December return = 33,000 / (60,000 − 30,000) − 1 = 10.00%

Time-weighted return = [(1 + 0.02)(1 − 0.0164)(1 + 0.10)] − 1 = 0.1036 or 10.36%

(Module 1.2, LOS 1.c)

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## Question #190 of 200

Question ID: 1572895

The coefficient of determination for a linear regression is *best* described as the:

**A)** percentage of the variation in the independent variable explained by the variation of the dependent variable. ✗

**B)** covariance of the independent and dependent variables. ✗

**C)** percentage of the variation in the dependent variable explained by the variation of the independent variable. ✓

**Explanation**

The coefficient of determination for a linear regression describes the percentage of the variation in the dependent variable explained by the variation of the independent variable.

(Module 10.2, LOS 10.c)

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## Question #191 of 200

Question ID: 1591308

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)** 141.0.

**B)** 141.7.

**C)** 142.0.

**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.

(Module 3.1, LOS 3.a)

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## Question #192 of 200

Question ID: 1572896

A simple linear regression is performed to quantify the relationship between the return on the common stocks of medium-sized companies (mid-caps) and the return on the S&P 500 index, using the monthly return on mid-cap stocks as the dependent variable and the monthly return on the S&P 500 as the independent variable. The results of the regression are shown below:

| | Coefficient | Standard Error of Coefficient | *t*-Value |
|---|---|---|---|
| Intercept | 1.71 | 2.950 | 0.58 |
| S&P 500 | 1.52 | 0.130 | 11.69 |
| Coefficient of determination = 0.599 | | | |

The strength of the relationship, as measured by the correlation coefficient, between the return on mid-cap stocks and the return on the S&P 500 for the period under study was:

**A)** 0.774.

**B)** 0.130.

**C)** 0.599.

**Explanation**

We are given the coefficient of determination of 0.599 ($R^2$) and are asked to find the correlation coefficient (r), which is the square root of the coefficient of determination for a simple regression:

$$\sqrt{0.599} = 0.774$$

(Module 10.2, LOS 10.c)

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## Question #193 of 200

Question ID: 1572880

Which of the following statements about parametric and nonparametric tests is *least* accurate?

**A)** The test of the mean of the differences is used when performing a paired comparison. ✗

**B)** Nonparametric tests rely on population parameters. ✓

**C)** The test of the difference in means is used when you are comparing means from two independent samples. ✗

**Explanation**

Nonparametric tests are not concerned with parameters; they make minimal assumptions about the population from which a sample comes. It is important to distinguish between the test of the difference in the means and the test of the mean of the differences. Also, it is important to understand that parametric tests rely on distributional assumptions, whereas nonparametric tests are not as strict regarding distributional properties.

(Module 8.2, LOS 8.c)

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## Question #194 of 200

Question ID: 1591332

A Type I error:

**A)** fails to reject a false null hypothesis. ✗

**B)** rejects a false null hypothesis. ✗

**C)** rejects a true null hypothesis. ✓

**Explanation**

A Type I Error is defined as rejecting the null hypothesis when it is actually true. The probability of committing a Type I error is the significance level or alpha risk.

(Module 8.1, LOS 8.a)

## Question #195 of 200

Question ID: 1591305

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)** 14.4%. ✗

**C)** 17.0%. ✓

**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%.

(Module 3.1, LOS 3.a)

## Question #196 of 200

Question ID: 1591298

A 5% trimmed mean ignores the:

**A)** highest and lowest 5% of observations. ✗

**B)** highest and lowest 2.5% of observations. ✓

**C)** lowest 5% of observations. ✗

**Explanation**

A 5% trimmed means discards the highest 2.5% and lowest 2.5% of observations and is the arithmetic average of the remaining 95% of observations.

(Module 3.1, LOS 3.a)

## Question #197 of 200

Question ID: 1591353

For a hypothesis test regarding a population parameter, an analyst has determined that the probability of failing to reject a false null hypothesis is 18%, and the probability of rejecting a true null hypothesis is 5%. The power of the test is:

**A)** 0.95.

**B)** 0.18.

**C)** 0.82.

**Explanation**

The power of the test is 1 – the probability of failing to reject a false null (Type II error); 1 – 0.18 = 0.82.

(Module 8.2, LOS 8.b)

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## Question #198 of 200

Question ID: 1572910

A large investment company uses an enterprise risk management framework to assess the various risks in its organization. Some of the tools it uses to assess its risks include scenario analysis and simulations, which typically involve:

**A)** large amounts of quantitative and qualitative data.

**B)** small amounts of quantitative and qualitative data.

**C)** large amounts of quantitative data and small amounts of qualitative data.

**Explanation**

The techniques (e.g., simulations and scenario analysis) used to assess and manage risk will require large amounts of quantitative and qualitative data. This is particularly true for a large investment company.

(Module 11.1, LOS 11.c)

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## Question #199 of 200

Question ID: 1591287

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.

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

(Module 3.1, LOS 3.a)

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## Question #200 of 200

Question ID: 1572704

Using a constant growth dividend discount model (DDM), an analyst assumes a required return on equity of 9.75%. The current stock price is $30 per share, and the next period's dividend is $2.40 per share. The constant growth rate implied in the model is *closest* to:

**A)** 1.89%.

**B)** 1.83%.

**C)** 1.75%.

**Explanation**

The Gordon growth model, also known as the DDM, takes the next period's dividend and divides it by the difference between the required return and the growth rate. The formula can be algebraically manipulated to isolate the implied growth rate. The calculation to determine the growth rate is shown:

$$g_c = k_e - \frac{D_1}{V_0} = 0.0975 - \frac{2.40}{30} = 0.0975 - 0.08 = 0.0175, \text{ or } 1.75$$

The 1.83% answer option takes the correct answer of 1.75% and adds the dividend yield of 8%: 1.75% + 0.08% = 1.83%. The 1.89% answer option takes the correct answer of 1.75% and grows it by multiplying it by the dividend yield of 8%: 1.75% × (1.08) = 1.89%.

(Module 2.2, LOS 2.b)