Question #1 of 96

Question ID: 1456450

For a continuous uniform distribution that can take on values only between 2 and 10, the probability of an outcome:

A) equal to 4 is 11.1%.

B) less than 3 is 12.5%.

C) greater than 5 is 27.5%.

Explanation

The probability of an outcome less than 3 is (3 – 2) / (10 – 2) = 12.5%. For a continuous distribution, the probability of any single outcome is zero.

(Module 4.1, LOS 4.d)

Question #2 of 96

Question ID: 1456430

Which of the following statements about probability distributions is *least* accurate?

A) A probability distribution includes a listing of all the possible outcomes of an experiment.

B) In a binomial distribution each observation has only two possible outcomes that are mutually exclusive.

C) A probability distribution is, by definition, normally distributed.

Explanation

Probabilities must be zero or positive, but a probability distribution is not necessarily normally distributed. Binomial distributions are either successes or failures.

(Module 4.1, LOS 4.a)

Question #3 of 96

Question ID: 1456493

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) 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	0.80
2	11	3	0.67
3	9	2	0.00

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

(Module 4.2, LOS 4.k)

Question #4 of 96

Question ID: 1456515

A random variable with which of the following probability distributions will have the greatest probability of an outcome more than two standard deviations from the mean?

A) Student's *t*-distribution with 18 degrees of freedom.

B) Student's *t*-distribution with 15 degrees of freedom.

C) Standard normal distribution.

Explanation

For degrees of freedom less than about 120, Student's *t*-distribution has fatter tails and larger probabilities of extreme outcomes compared to the standard normal distribution. For Student's *t*-distribution, the lower the degrees of freedom, the fatter the tails and the greater the probability of extreme outcomes.

(Module 4.3, LOS 4.n)

Question #5 of 96

Question ID: 1456453

A casual laborer has a 70% probability of finding work on each day that she reports to the day labor marketplace. What is the probability that she will work three days out of five?

A) 0.3087.

B) 0.3192.

C) 0.6045.

Explanation

> P(3) = 5! / [(5 – 3)! × 3!] × (0.7^3) × (0.3^2) = 0.3087 = 5 →2nd→ nCr → 3 × 0.343 × 0.09

(Module 4.1, LOS 4.e)

Question #6 of 96

Question ID: 1456465

Multivariate distributions can describe:

A) discrete random variables only.

B) continuous random variables only.

C) either discrete or continuous random variables.

Explanation

Multivariate distributions can describe discrete or continuous random variables.

(Module 4.2, LOS 4.g)

Question #7 of 96

Question ID: 1456520

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 4.3, LOS 4.p)

Question #8 of 96

Question ID: 1456477

A stock portfolio has had a historical average annual return of 12% and a standard deviation of 20%. The returns are normally distributed. The range –27.2 to 51.2% describes a:

A) 68% confidence interval.

B) 99% confidence interval.

C) 95% confidence interval.

Explanation

The upper limit of the range, 51.2%, is (51.2 – 12) = 39.2 / 20 = 1.96 standard deviations above the mean of 12. The lower limit of the range is (12 – (-27.2)) = 39.2 / 20 = 1.96 standard deviations below the mean of 12. A 95% confidence level is defined by a range 1.96 standard deviations above and below the mean.

(Module 4.2, LOS 4.h)

Question #9 of 96

Question ID: 1456510

With 60 observations, what is the appropriate number of degrees of freedom to use when carrying out a statistical test on the mean of a population?

A) 59.

B) 60.

C) 61.

Explanation

When performing a statistical test on the mean of a population based on a sample of size n, the number of degrees of freedom is n – 1 since once the mean is estimated from a sample there are only n – 1 observations that are free to vary. In this case the appropriate number of degrees of freedom to use is 60 – 1 = 59.

(Module 4.3, LOS 4.n)

Question #10 of 96

Question ID: 1456438

A random variable X is continuous and bounded between zero and five, X:(0 ≤ X ≤ 5). The cumulative distribution function (cdf) for X is F(x) = x / 5. Calculate P(2 ≤ X ≤ 4).

A) 1.00.

B) 0.50.

C) 0.40.

Explanation

For a continuous distribution, P(a ≤ X ≤b) = F(b) – F(a). Here, F(4) = 0.8 and F(2) = 0.4. Note also that this is a uniform distribution over 0 ≤ x ≤ 5 so Prob(2 < x < 4) = (4 – 2) / 5 = 40%.

(Module 4.1, LOS 4.b)

Question #11 of 96

Question ID: 1456481

A grant writer for a local school district is trying to justify an application for funding an after-school program for low-income families. Census information for the school district shows an average household income of $26,200 with a standard deviation of $8,960. Assuming that the household income is normally distributed, what is the percentage of households in the school district with incomes of less than $12,000?

A) 15.87%.

B) 5.71%.

C) 9.92%.

Explanation

Z = ($12,000 – $26,200) / $8,960 = –1.58.

From the table of areas under the standard normal curve, 5.71% of observations are more than 1.58 standard deviations below the mean.

(Module 4.2, LOS 4.i)

Question #12 of 96

Question ID: 1456506

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

A) -0.1000.

B) -0.1250.

C) -0.1178.

Explanation

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

(Module 4.3, LOS 4.m)

Question #13 of 96

Question ID: 1456480

The probability that a normally distributed random variable will be more than two standard deviations above its mean is:

A) 0.4772.

B) 0.0228.

C) 0.9772.

Explanation

1 – F(2) = 1 – 0.9772 = 0.0228.

(Module 4.2, LOS 4.h)

Question #14 of 96

Question ID: 1456408

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

A) lognormally distributed.

B) normally distributed.

C) denoted as e^X.

Explanation

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

(Module 4.3, LOS 4.l)

Question #15 of 96

Question ID: 1456458

In a normal distribution, the:

A) median equals the mode.

B) skew is positive.

C) kurtosis is 4.

Explanation

A normal distribution has a zero skew (which implies a symmetrical distribution). When skew is zero, the mean, median, and mode are all equal.

Kurtosis of a normal distribution is 3.

(Module 4.2, LOS 4.f)

Question #16 of 96

Question ID: 1456451

For a certain class of junk bonds, the probability of default in a given year is 0.2. Whether one bond defaults is independent of whether another bond defaults. For a portfolio of five of these junk bonds, what is the probability that zero or one bond of the five defaults in the year ahead?

A) 0.7373.

B) 0.0819.

C) 0.4096.

Explanation

The outcome follows a binomial distribution where n = 5 and p = 0.2. In this case p(0) = 0.8^5 = 0.3277 and p(1) = 5 × 0.8^4 × 0.2 = 0.4096, so P(X=0 or X=1) = 0.3277 + 0.4096.

(Module 4.1, LOS 4.e)

Question #17 of 96

Question ID: 1456497

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 2.

B) Portfolio 1.

C) Portfolio 3.

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 4.2, LOS 4.k)

Question #18 of 96

Question ID: 1456460

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

A) Approximately 34% of the observations fall within plus or minus one standard deviation of the mean.

B) Kurtosis is equal to 3.

C) The distribution is completely described by its mean and variance.

Explanation

Approximately 68% of the observations fall within one standard deviation of the mean. Approximately 34% of the observations fall within the mean plus one standard deviation (or the mean minus one standard deviation).

(Module 4.2, LOS 4.f)

Question #19 of 96

Question ID: 1456489

A food retailer has determined that the mean household income of her customers is \$47,500 with a standard deviation of \$12,500. She is trying to justify carrying a line of luxury food items that would appeal to households with incomes greater than \$60,000. Based on her information and assuming that household incomes are normally distributed, what percentage of households in her customer base has incomes of \$60,000 or more?

A) 15.87%.

B) 2.50%.

C) 5.00%.

Explanation

$$Z = (\$60{,}000 - \$47{,}500) / \$12{,}500 = 1.0$$

From the table of areas under the normal curve, 84.13% of observations lie to the left of +1 standard deviation of the mean. So, 100% – 84.13% = 15.87% with incomes of \$60,000 or more.

(Module 4.2, LOS 4.j)

Question #20 of 96

Question ID: 1456508

A stock increased in value last year. Which will be greater, its continuously compounded or its holding period return?

A) Its continuously compounded return.

B) Its holding period return.

C) Neither, they will be equal.

Explanation

When a stock increases in value, the holding period return is always greater than the continuously compounded return that would be required to generate that holding period return. For example, if a stock increases from $1 to $1.10 in a year, the holding period return is 10%. The continuously compounded rate needed to increase a stock's value by 10% is Ln(1.10) = 9.53%.

(Module 4.3, LOS 4.m)

Question #21 of 96

Question ID: 1456490

An investment has an expected return of 10% with a standard deviation of 5%. If the returns are normally distributed, the probability of losing money is *closest* to:

A) 16.0%.

B) 5.0%.

C) 2.5%.

Explanation

Using the standard normal probability distribution, $\mathrm{z} = \frac{\text{observation} - \text{mean}}{\text{standard deviation}} = \frac{0-10}{5} = -2.0$, the chance of getting zero or less return (losing money) is 1 − 0.9772 = 0.0228% or 2.28%. An alternative explanation: the expected return is 10%. To lose money means the return must fall below zero. Zero is about two standard deviations to the left of the mean. 50% of the time, a return will be below the mean, and 2.5% of the observations are below two standard deviations down. About 97.5% of the time, the return will be above zero. Thus, only about a 2.5% chance exists of having a value below zero. (Module 4.2, LOS 4.j)

Question #22 of 96

Question ID: 1456486

Standard Normal Distribution

$P(Z \leq z) = N(z)$ for $z \geq 0$

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319

Given a normally distributed population with a mean income of $40,000 and standard deviation of $7,500, what percentage of the population makes between $30,000 and $35,000?

A) 15.96.

B) 13.34.

C) 41.67.

Explanation

The *z*-score for $30,000 = ($30,000 – $40,000) / $7,500 or –1.33. From the *z*-table given, 1.33 standard deviations above the mean is associated with a probability of 0.9082. The probability of an outcome more than 1.33 standard deviations below the mean is 1 – 0.9082, which equals 0.0918.

The *z*-score for $35,000 = ($35,000 – $40,000) / $7,500 or –0.67. The probability of an outcome more than 0.67 standard deviations below the mean is 1 – 0.7486, which equals 0.2514.

The probability of an outcome between 0.67 and 1.33 standard deviations below the mean is 0.2514 – 0.0918 = 0.1596, or 15.96%.

(Module 4.2, LOS 4.j)

Question #23 of 96

Question ID: 1456434

A random variable that has a countable number of possible values is *best* described as a:

A) discrete random variable. ✓

B) probability distribution. ✗

C) continuous random variable. ✗

Explanation

A discrete variable is one that has a finite number of possible outcomes and can be counted, like the number of rainy days in a week.

A continuous variable, on the other hand, is one that has an infinite number of possibilities and must be measured, for example, quantity of rain in a week.

(Module 4.1, LOS 4.a)

Question #24 of 96

Question ID: 1456452

Which of the following is NOT an assumption of the binomial distribution?

A) Random variable X is discrete. ✗

B) The expected value is a whole number. ✓

C) The trials are independent. ✗

Explanation

The expected value is $n \times p$. A simple example shows us that the expected value does not have to be a whole number: $n = 5$, $p = 0.5$, $n \times p = 2.5$. The other conditions are necessary for the binomial distribution.

(Module 4.1, LOS 4.e)

Question #25 of 96

Question ID: 1456467

In a multivariate normal distribution, a correlation tells the:

A) overall relationship between all the variables. ✗

B) relationship between the means and variances of the variables. ✗

C) strength of the linear relationship between two of the variables.

Explanation

This is true by definition. The correlation only applies to two variables at a time.

(Module 4.2, LOS 4.g)

Question #26 of 96

Question ID: 1456435

Which of the following is *least likely* to be an example of a discrete random variable?

A) The number of days of sunshine in the month of May 2006 in a particular city.

B) The rate of return on a real estate investment.

C) Quoted stock prices on the NASDAQ.

Explanation

The rate of return on a real estate investment, or any other investment, is an example of a continuous random variable because the possible outcomes of rates of return are infinite (e.g., 10.0%, 10.01%, 10.001%, etc.). Both of the other choices are measurable (countable).

(Module 4.1, LOS 4.a)

Question #27 of 96

Question ID: 1456468

A multivariate distribution is *best* defined as describing the behavior of:

A) a random variable with more than two possible outcomes.

B) two or more independent random variables.

C) two or more dependent random variables.

Explanation

A multivariate distribution describes the relationships between two or more random variables, when the behavior of each random variable is dependent on the others in some way.

(Module 4.2, LOS 4.g)

Question #28 of 96

Question ID: 1456512

Which one of the following statements about the t-distribution is *most* accurate?

A) The t-distribution is positively skewed.

B) The t-distribution has thinner tails compared to the normal distribution.

C) The t-distribution approaches the standard normal distribution as the degrees of freedom increase.

Explanation

As the number of degrees of freedom grows, the t-distribution approaches the shape of the standard normal distribution.

Compared to the normal distribution, the t-distribution has fatter tails.

The t-distribution is symmetric about the mean and so it has skewness of zero.

(Module 4.3, LOS 4.n)

Question #29 of 96

Question ID: 1456431

Which of the following statements about probability distributions is *least* accurate?

A) The skewness of a normal distribution is zero.

B) A binomial probability distribution is an example of a continuous probability distribution.

C) A discrete random variable is a variable that can assume only certain clearly separated values resulting from a count of some set of items.

Explanation

The binomial probability distribution is an example of a *discrete* probability distribution. There are only two possible outcomes of each trial and the outcomes are mutually exclusive. For example, in a coin toss the outcome is either heads or tails.

The other responses are both correct definitions.

(Module 4.1, LOS 4.a)

Question #30 of 96

Question ID: 1456483

Cumulative Z-Table

z	0.04	0.05
1.8	0.9671	0.9678
1.9	0.9738	0.9744
2.0	0.9793	0.9798
2.1	0.9838	0.9842

The owner of a bowling alley determined that the average weight for a bowling ball is 12 pounds with a standard deviation of 1.5 pounds. A ball denoted "heavy" should be one of the top 2% based on weight. Assuming the weights of bowling balls are normally distributed, at what weight (in pounds) should the "heavy" designation be used?

A) 14.00 pounds.

B) 14.22 pounds.

C) 15.08 pounds.

Explanation

The first step is to determine the *z*-score that corresponds to the top 2%. Since we are only concerned with the top 2%, we only consider the right hand of the normal distribution. Looking on the cumulative table for 0.9800 (or close to it) we find a *z*-score of 2.05. To answer the question, we need to use the normal distribution given: 98 percentile = sample mean + (*z*-score)(standard deviation) = 12 + 2.05(1.5) = 15.08.

(Module 4.2, LOS 4.i)

Question #31 of 96

Question ID: 1456514

Segment of the table of critical values for Student's t-distribution:

Level of Significance for a One-Tailed Test		
df	**0.050**	**0.025**
Level of Significance for a Two-Tailed Test		
df	**0.10**	**0.05**
28	1.701	2.048
29	1.699	2.045
30	1.697	2.042
40	1.684	2.021

For a *t*-distributed test statistic with 30 degrees of freedom, a one-tailed test specifying the parameter greater than some value and a 95% confidence level, the critical value is:

A) 1.684.

B) 1.697.

C) 2.042.

Explanation

This is the critical value for a one-tailed probability of 5% and 30 degrees of freedom.

(Module 4.3, LOS 4.n)

Question #32 of 96

Question ID: 1456454

Assume 30% of the CFA candidates have a degree in economics. A random sample of three CFA candidates is selected. What is the probability that none of them has a degree in economics?

A) 0.027.

B) 0.343.

C) 0.900.

Explanation

The probability of 0 successes in 3 trials is: [3! / (0!3!)] $(0.3)^0$ $(0.7)^3$ = 0.343

(Module 4.1, LOS 4.e)

Question #33 of 96

Question ID: 1456447

Consider a random variable X that follows a continuous uniform distribution: 7 ≤ X ≤ 20. Which of the following statements is *least* accurate?

A) F(12 ≤ X ≤ 16) = 0.307.

B) F(21) = 0.00.

C) F(10) = 0.23.

Explanation

F(21) = 1.00. For a cumulative distribution function, the expression F(x) refers to the probability of an outcome less than or equal to x. In this distribution all the possible outcomes are between 7 and 20. Therefore the probability of an outcome less than or equal to 21 is 100%.

The other choices are true.

- F(10) = (10 – 7) / (20 – 7) = 3 / 13 = 0.23
- F(12 ≤ X ≤ 16) = F(16) – F(12) = [(16 – 7) / (20 – 7)] – [(12 – 7) / (20 – 7)] = 0.692 – 0.385 = 0.307

(Module 4.1, LOS 4.d)

Question #34 of 96

Question ID: 1456476

A stock portfolio's returns are normally distributed. It has had a mean annual return of 25% with a standard deviation of 40%. The probability of a return between -41% and 91% is *closest to*:

A) 65%.

B) 90%.

C) 95%.

Explanation

A 90% confidence level includes the range between plus and minus 1.65 standard deviations from the mean.

(91 – 25) / 40 = 1.65 and (-41 – 25) / 40 = -1.65.

(Module 4.2, LOS 4.h)

Question #35 of 96

Question ID: 1456475

The mean return of a portfolio is 20% and its standard deviation is 4%. The returns are normally distributed. Which of the following statements about this distribution are *least* accurate? The probability of receiving a return:

A) of less than 12% is 0.025.

B) in excess of 16% is 0.16.

C) between 12% and 28% is 0.95.

Explanation

The probability of receiving a return greater than 16% is calculated by adding the probability of a return between 16% and 20% (given a mean of 20% and a standard deviation of 4%, this interval is the left tail of one standard deviation from the mean, which includes 34% of the observations.) to the area from 20% and higher (which starts at the mean and increases to infinity and includes 50% of the observations.) The probability of a return greater than 16% is 34 + 50 = 84%.

Note: 0.16 is the probability of receiving a return *less* than 16%.

(Module 4.2, LOS 4.h)

Question #36 of 96

Question ID: 1456439

Which of the following qualifies as a cumulative distribution function?

A) F(1) = 0, F(2) = 0.25, F(3) = 0.50, F(4) = 1.

B) F(1) = 0, F(2) = 0.5, F(3) = 0.5, F(4) = 0.

C) F(1) = 0.5, F(2) = 0.25, F(3) = 0.25, F(4) – 1.

Explanation

Because a cumulative probability function defines the probability that a random variable takes a value equal to or less than a given number, for successively larger numbers, the cumulative probability values must stay the same or increase.

(Module 4.1, LOS 4.b)

Question #37 of 96

Question ID: 1456441

For a random variable defined over the interval 0 to 1 that has a cumulative distribution function of $F(x) = x^3$, the probability of an outcome between 20% and 70% is *closest* to:

A) 1/4.

B) 1/3.

C) 1/2.

Explanation

The probability of $x < 0.7$ is $0.7^3 = 0.343$, and the probability of $x < 0.2 = 0.2^3 = 0.008$, so the probability of $0.2 < x < 0.7 = 0.343 – 0.008 = 33.5\%$, which is closest to 1/3.

(Module 4.1, LOS 4.b)

Question #38 of 96

Question ID: 1456523

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 4.3, LOS 4.p)

Question #39 of 96

Question ID: 1456491

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 X. ✗

B) Portfolio Y. ✗

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 4.2, LOS 4.k)

Question #40 of 96

Question ID: 1456448

The probability density function of a continuous uniform distribution is *best* described by a:

A) line segment with a 45-degree slope. ✗

B) horizontal line segment. ✓

C) line segment with a curvilinear slope. ✗

Explanation

By definition, for a continuous uniform distribution, the probability density function is a horizontal line segment over a range of values such that the area under the segment (total probability of an outcome in the range) equals one.

(Module 4.1, LOS 4.d)

Question #41 of 96

Question ID: 1456437

Question #41 of 96

Question ID: 1456437

The cumulative distribution function for a random variable X is given in the following table:

x	*F(x)*
5	0.15
10	0.30
15	0.45
20	0.75
25	1.00

The probability of an outcome greater than 15 is:

A) 75%.

B) 45%.

C) 55%.

Explanation

A cumulative distribution function (cdf) gives the probability of an outcome for a random variable less than or equal to a specific value. For the random variable X, the cdf for the outcome 15 is 0.45, which means there is a 45% probability that X will take a value less than or equal to 15. Therefore, the probability of a value greater than 15 equals 100% – 45% = 55%.

(Module 4.1, LOS 4.b)

Question #42 of 96

Question ID: 1456504

The continuously compounded rate of return that will generate a one-year holding period return of -6.5% is *closest* to:

A) -5.7%.

B) -6.3%.

C) -6.7%.

Explanation

Continuously compounded rate of return = ln(1 – 0.065) = -6.72%.

(Module 4.3, LOS 4.m)

Question #43 of 96

Question ID: 1456443

Which of the following random variables would be *most likely* to follow a discrete uniform distribution?

A) The number of heads on the flip of two coins.

B) The outcome of a roll of a standard, six-sided die where X equals the number facing up on the die.

C) The outcome of the roll of two standard, six-sided dice where X is the sum of the numbers facing up.

Explanation

The discrete uniform distribution is characterized by an equal probability for each outcome. A single die roll is an often-used example of a uniform distribution. In combining two random variables, such as coin flip or die roll outcomes, the sum will not be uniformly distributed.

(Module 4.1, LOS 4.c)

Question #44 of 96

Question ID: 1456433

Which of the following statements about the normal probability distribution is *most* accurate?

A) Sixty-eight percent of the area under the normal curve falls between the mean and 1 standard deviation above the mean.

B) The normal curve is asymmetrical about its mean.

C) Five percent of the normal curve probability is more than two standard deviations from the mean.

Explanation

The normal curve is symmetrical about its mean with 34% of the area under the normal curve falling between the mean and one standard deviation above the mean. Ninety-five percent of the normal curve is within two standard deviations of the mean, so five percent of the normal curve falls outside two standard deviations from the mean.

(Module 4.1, LOS 4.a)

Question #45 of 96

Question ID: 1456470

A multivariate distribution:

A) applies only to binomial distributions.

B) gives multiple probabilities for the same outcome.

C) specifies the probabilities associated with groups of random variables.

Explanation

A multivariate distribution specifies the probabilities for a group of related random variables.

(Module 4.2, LOS 4.g)

Question #46 of 96

Question ID: 1456502

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) –5.04%.

B) +5.17%.

C) –5.17%.

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 4.3, LOS 4.m)

Question #47 of 96

Question ID: 1456484

The average amount of snow that falls during January in Frostbite Falls is normally distributed with a mean of 35 inches and a standard deviation of 5 inches. The probability that the snowfall amount in January of next year will be between 40 inches and 26.75 inches is *closest* to:

A) 68%.

B) 79%.

C) 87%.

Explanation

To calculate this answer, we will use the properties of the standard normal distribution. First, we will calculate the Z-value for the upper and lower points and then we will determine the approximate probability covering that range. *Note:* This question is an example of why it is important to memorize the general properties of the normal distribution.

Z = (observation – population mean) / standard deviation

- $Z_{26.75}$ = (26.75 – 35) / 5 = -1.65. (1.65 standard deviations to the left of the mean)
- Z_{40} = (40 – 35) / 5 = 1.0 (1 standard deviation to the right of the mean)

Using the general approximations of the normal distribution:

- 68% of the observations fall within ± one standard deviation of the mean. So, 34% of the area falls between 0 and +1 standard deviation from the mean.
- 90% of the observations fall within ± 1.65 standard deviations of the mean. So, 45% of the area falls between 0 and +1.65 standard deviations from the mean.

Here, we have 34% to the right of the mean and 45% to the left of the mean, for a total of **79%.**

(Module 4.2, LOS 4.j)

Question #48 of 96

Question ID: 1456501

A lognormal distribution is *least likely* to be:

A) negatively skewed.

B) used to model stock prices.

C) bounded below by zero.

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 4.3, LOS 4.l)

Question #49 of 96

Question ID: 1456505

Given a holding period return of R, the continuously compounded rate of return is:

A) $e^R - 1$.

B) ln(1 + R).

C) ln(1 + R) – 1.

Explanation

This is the formula for the continuously compounded rate of return.

(Module 4.3, LOS 4.m)

Question #50 of 96

Question ID: 1456457

A normal distribution can be completely described by its:

A) mean and mode.

B) mean and variance.

C) skewness and kurtosis.

Explanation

The normal distribution can be completely described by its mean and variance.

(Module 4.2, LOS 4.f)

Question #51 of 96

Question ID: 1456466

A multivariate normal distribution that includes three random variables can be completely described by the means and variances of each of the random variables and the:

A) correlation coefficient of the three random variables.

B) correlations between each pair of random variables.

C) conditional probabilities among the three random variables.

Explanation

A multivariate normal distribution that includes three random variables can be completely described by the means and variances of each of the random variables and the correlations between each pair of random variables. Correlation measures the strength of the linear relationship between two random variables (thus, "the correlation coefficient of the three random variables" is inaccurate).

(Module 4.2, LOS 4.g)

Question #52 of 96

Question ID: 1456474

An investment has a mean return of 15% and a standard deviation of returns equal to 10%. If returns are normally distributed, which of the following statements is *least* accurate? The probability of obtaining a return:

A) greater than 25% is 0.32. ✓

B) greater than 35% is 0.025. ✗

C) between 5% and 25% is 0.68. ✗

Explanation

Sixty-eight percent of all observations fall within +/- one standard deviation of the mean of a normal distribution. Given a mean of 15 and a standard deviation of 10, the probability of having an actual observation fall within one standard deviation, between 5 and 25, is 68%. The probability of an observation greater than 25 is half of the remaining 32%, or 16%. This is the same probability as an observation less than 5. Because 95% of all observations will fall within 20 of the mean, the probability of an actual observation being greater than 35 is half of the remaining 5%, or 2.5%.

(Module 4.2, LOS 4.h)

Question #53 of 96

Question ID: 1456444

Possible outcomes for a discrete uniform distribution are the integers 2 to 9 inclusive. What is the probability of an outcome less than 5?

A) 50.0%. ✗

B) 62.5%. ✗

C) 37.5%. ✓

Explanation

This distribution has eight discrete outcomes, each with an equal probability of 1/8 or 12.5%. Because three of the eight outcomes are less than 5, the probability of an outcome less than 5 is 3/8 or 37.5%.

(Module 4.1, LOS 4.c)

Question #54 of 96

Question ID: 1456440

A cumulative distribution function for a random variable *X* is given as follows:

x	*F(x)*
5	0.14
10	0.25
15	0.86
20	1.00

The probability of an outcome less than or equal to 10 is:

A) 14%.

B) 39%.

C) 25%.

Explanation

A cumulative distribution function (cdf) gives the probability of an outcome for a random variable less than or equal to a specific value. For the random variable *X*, the cdf for the outcome 10 is 0.25, which means there is a 25% probability that *X* will take a value less than or equal to 10.

(Module 4.1, LOS 4.b)

Question #55 of 96

Question ID: 1456492

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) 3.

B) 2.

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 4.2, LOS 4.k)

Question #56 of 96

Question ID: 1456485

Standard Normal Distribution

$P(Z \leq z) = N(z)$ for $z \geq 0$

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389

John Cupp, CFA, has several hundred clients. The values of the portfolios Cupp manages are approximately normally distributed with a mean of $800,000 and a standard deviation of $250,000. The probability of a randomly selected portfolio being in excess of $1,000,000 is:

A) 78.81%.

B) 17.36%.

C) 21.19%.

Explanation

First, we need to standardize the value of $1,000,000 by calculate its z-value.

z-value = x – μ / σ

= 1,000,000 – 800,000 / 250,000

= 0.8.

This tells us that $1,000,000 lies 0.8 standard deviations from the mean.

Looking up 0.8 in the z-value table gives a probability of 0.7881. This means there is a 78.81% probability that the value of a portfolio selected at random will be less than 0.8 standard deviations above the mean, or in this case, less than $1,000,000.

The probability that a portfolio selected at random is greater than $1,000,000 is, therefore, 1 – 78.81% = 21.19%

(Module 4.2, LOS 4.j)

Question #57 of 96

Question ID: 1456461

If X has a normal distribution with μ = 100 and σ = 5, then there is approximately a 90% probability that:

A) P(90.2 < X < 109.8).

B) P(91.8 < X < 108.3).

C) P(93.4 < X < 106.7).

Explanation

100 +/- 1.65 (5) = 91.75 to 108.25 or P(91.75 < X < 108.25) = 90%.

(Module 4.2, LOS 4.f)

Question #58 of 96

Question ID: 1456499

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 4.3, LOS 4.l)

Question #59 of 96

Question ID: 1456488

The annual rainfall amount in Yucutat, Alaska, is normally distributed with a mean of 150 inches and a standard deviation of 20 inches. The 90% confidence interval for the annual rainfall in Yucutat is *closest* to:

A) 137 to 163 inches.

B) 117 to 183 inches.

C) 110 to 190 inches.

Explanation

The 90% confidence interval is μ ± 1.65 standard deviations.

150 – 1.65(20) = 117 and 150 + 1.65(20) = 183.

(Module 4.2, LOS 4.j)

Question #60 of 96

Question ID: 1456472

A portfolio manager is looking at an investment that has an expected annual return of 10% with a standard deviation of annual returns of 5%. Assuming the returns are approximately normally distributed, the probability that the return will exceed 20% in any given year is *closest* to:

A) 0.0%.

B) 2.28%.

C) 4.56%.

Explanation

Given that the standard deviation is 5%, a 20% return is two standard deviations above the expected return of 10%. Assuming a normal distribution, the probability of getting a result more than two standard deviations above the expected return is 1 – Prob(Z ≤ 2) = 1 – 0.9772 = 0.0228 or 2.28% (from the Z table).

(Module 4.2, LOS 4.h)

Question #61 of 96

Question ID: 1456516

Which of the following distributions can only take on positive values?

A) F-distribution.

B) Normal distribution.

C) Student's *t*-distribution.

Explanation

The F-distribution can only take on positive values. Normal distributions and Student's *t*-distribution can have both positive and negative values.

(Module 4.3, LOS 4.o)

Question #62 of 96

Question ID: 1456429

A probability distribution is *least likely* to:

A) contain all the possible outcomes.

B) have only non-negative probabilities.

C) give the probability that the distribution is realistic.

Explanation

The probability distribution may or may not reflect reality. But the probability distribution must list all possible outcomes, and probabilities can only have non-negative values.

(Module 4.1, LOS 4.a)

Question #63 of 96

Question ID: 1456479

Approximately 95% of all observations for a normally distributed random variable fall in the interval:

A) $\mu \pm 3\sigma$.

B) $\mu \pm 2\sigma$.

C) $\mu \pm \sigma$.

Explanation

The following confidence intervals give the range within which a normally distributed random variable will lie a certain percentage of the time.

68% confidence interval: $\mu \pm 1\sigma$

90% confidence interval: $\mu \pm 1.65\sigma$

95% confidence interval: $\mu \pm 1.96\sigma$

99% confidence interval: $\mu \pm 2.58\sigma$

So 95% of observations roughly lie 2 standard deviations of the mean.

(Module 4.2, LOS 4.h)

Question #64 of 96

Question ID: 1456455

There is an 80% probability of rain on each of the next six days. What is the probability that it will rain on exactly two of those days?

A) 0.15364.

B) 0.01536.

C) 0.24327.

Explanation

$$P(2) = 6! / [(6 - 2)! \times 2!] \times (0.8^2) \times (0.2^4) = 0.01536 = 6 \text{ nCr } 2 \times (0.8)^2 \times (0.2)^4$$

(Module 4.1, LOS 4.e)

Question #65 of 96

Question ID: 1456494

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 X.

B) Portfolio Z.

C) Portfolio Y.

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 4.2, LOS 4.k)

Question #66 of 96

Question ID: 1456478

A group of investors wants to be sure to always earn at least a 5% rate of return on their investments. They are looking at an investment that has a normally distributed probability distribution with an expected rate of return of 10% and a standard deviation of 5%. The probability of meeting or exceeding the investors' desired return in any given year is *closest to:*

A) 98%.

B) 84%.

C) 34%.

Explanation

The mean is 10% and the standard deviation is 5%. You want to know the probability of a return 5% or better. 10% - 5% = 5% , so 5% is one standard deviation less than the mean. Thirty-four percent of the observations are between the mean and one standard deviation on the down side. Fifty percent of the observations are greater than the mean. So the probability of a return 5% or higher is 34% + 50% = 84%.

(Module 4.2, LOS 4.h)

Question #67 of 96

Question ID: 1456487

Cumulative z-table:

z	0.00	0.01	0.02	0.03
1.6	0.9452	0.9463	0.9474	0.9484
1.7	0.9554	0.9564	0.9573	0.9582
1.8	0.9641	0.9649	0.9656	0.9664

Monthly sales of hot water heaters are approximately normally distributed with a mean of 21 and a standard deviation of 5. What is the probability of selling 12 hot water heaters or less next month?

A) 1.80%.

B) 96.41%.

C) 3.59%.

Explanation

Z = (12 – 21) / 5 = -1.8

From the cumulative *z*-table, the probability of being more than 1.8 standard deviations below the mean, probability x < -1.8, is 3.59%.

(Module 4.2, LOS 4.j)

Question #68 of 96

Question ID: 1456496

An investor is considering investing in one of the following three portfolios:

Statistical Measures	Portfolio X	Portfolio Y	Portfolio Z
Expected annual return	12%	17%	22%
Standard deviation of return	14%	20%	25%

If the investor's minimum acceptable return is 5%, the optimal portfolio using Roy's safety-first criterion is:

A) Portfolio Z.

B) Portfolio Y.

C) Portfolio X.

Explanation

$$\begin{aligned}\text{Portfolio X: SFRatio} &= \frac{12-5}{14} = 0.50\\ \text{Portfolio Y: SFRatio} &= \frac{17-5}{20} = 0.60\\ \text{Portfolio Z: SFRatio} &= \frac{22-5}{25} = 0.68\end{aligned}$$

According to the safety-first criterion, Portfolio Z, with the largest ratio (0.68), is the best alternative. (Module 4.2, LOS 4.k)

Question #69 of 96

Question ID: 1456459

A normal distribution is completely described by its:

A) mean, mode, and skewness.

B) variance and mean.

C) median and mode.

Explanation

By definition, a normal distribution is completely described by its mean and variance.

(Module 4.2, LOS 4.f)

Question #70 of 96

Question ID: 1456471

Which of the following would *least likely* be categorized as a multivariate distribution?

A) The return of a stock and the return of the DJIA.

B) The days a stock traded and the days it did not trade.

C) The returns of the stocks in the DJIA.

Explanation

The number of days a stock traded and did not trade describes only one random variable. Both of the other cases involve two or more random variables.

(Module 4.2, LOS 4.g)

Question #71 of 96

Question ID: 1456509

A stated interest rate of 9% compounded continuously results in an effective annual rate *closest to*:

A) 9.20%.

B) 9.42%.

C) 9.67%.

Explanation

The effective annual rate with continuous compounding = $e^r - 1 = e^{0.09} - 1 = 0.09417$, or 9.42%.

(Module 4.3, LOS 4.m)

Question #72 of 96

Question ID: 1456463

A normal distribution has a mean of 10 and a standard deviation of 4. Which of the following statements is *most accurate*?

A) 81.5% of all the observations will fall between 6 and 18.

B) The probability of finding an observation below 2 is 5%.

C) The probability of finding an observation at 14 or above is 32%.

Explanation

68% of all observations will fall in the interval plus or minus one standard deviation from the mean (6 to 14), so 32% of the observations will fall outside this range, with 16% greater than 14 and 16% less than 6. Because 95% will fall in the interval plus or minus two standard deviations from the mean (2 to 18), 2.5% will fall below 2. The percentage of observations between 6 (−1 standard deviations) and 18 (+2 standard deviations) is 0.5(68%) + 0.5(95%) = 81.5%.

(Module 4.2, LOS 4.f)

Question #73 of 96

Question ID: 1456449

A discount brokerage firm states that the time between a customer order for a trade and the execution of the order is uniformly distributed between three minutes and fifteen minutes. If a customer orders a trade at 11:54 A.M., what is the probability that the order is executed after noon?

A) 0.500.

B) 0.250.

C) 0.750.

Explanation

The limits of the uniform distribution are three and 15. Since the problem concerns time, it is continuous. Noon is six minutes after 11:54 A.M. The probability the order is executed after noon is (15 – 6) / (15 – 3) = 0.75.

(Module 4.1, LOS 4.d)

Question #74 of 96

Question ID: 1456469

In addition to the usual parameters that describe a normal distribution, to completely describe 10 random variables, a multivariate normal distribution requires knowing the:

A) 45 correlations.

B) 10 correlations.

C) overall correlation.

Explanation

The number of correlations in a multivariate normal distribution of *n* variables is computed by the formula ((n) × (n-1)) / 2, in this case (10 × 9) / 2 = 45.

(Module 4.2, LOS 4.g)

Question #75 of 96

Question ID: 1462768

For a binomial random variable with a 40% probability of success on each trial, the expected number of successes in 12 trials is *closest* to:

A) 5.6.

B) 4.8.

C) 7.2.

Explanation

A binomial random variable has an expected value or mean equal to *np*. Mean = 12(0.4) = 4.8.

(Module 4.1, LOS 4.e)

Question #76 of 96

Question ID: 1456428

A dealer in a casino has rolled a five on a single die three times in a row. What is the probability of her rolling another five on the next roll, assuming it is a fair die?

A) 0.167.

B) 0.200.

C) 0.001.

Explanation

The probability of a value being rolled is 1/6 regardless of the previous value rolled.

(Module 4.1, LOS 4.a)

Question #77 of 96

Question ID: 1456473

A client will move his investment account unless the portfolio manager earns at least a 10% rate of return on his account. The rate of return for the portfolio that the portfolio manager has chosen has a normal probability distribution with an expected return of 19% and a standard deviation of 4.5%. What is the probability that the portfolio manager will keep this account?

A) 0.750.

B) 0.950.

C) 0.977.

Explanation

Since we are only concerned with values that are below a 10% return this is a 1 tailed test to the left of the mean on the normal curve. With $\mu = 19$ and $\sigma = 4.5$, $P(X \geq 10) = P(X \geq \mu - 2\sigma)$ therefore looking up -2 on the cumulative Z table gives us a value of 0.0228, meaning that (1 – 0.0228) = 97.72% of the area under the normal curve is above a Z score of -2. Since the Z score of -2 corresponds with the lower level 10% rate of return of the portfolio this means that there is a 97.72% probability that the portfolio will earn at least a 10% rate of return.

(Module 4.2, LOS 4.h)

Question #78 of 96

Question ID: 1456511

The *t*-distribution is appropriate for constructing confidence intervals based on small samples from a population with:

A) unknown variance and a normal distribution.

B) known variance and a non-normal distribution.

C) unknown variance and a non-normal distribution.

Explanation

The *t*-distribution is the appropriate distribution to use when constructing confidence intervals based on small samples from populations with unknown variance that are normally distributed. If the population is not normally distributed, no test statistic is available for small samples regardless of whether the population variance is known.

(Module 4.3, LOS 4.n)

Question #79 of 96

Question ID: 1456519

For an F-distribution where both chi-square random variables are based on a sample size of 10, the degrees of freedom in the numerator are:

A) 19.

B) 8.

C) 9.

Explanation

The degrees of freedom in the numerator and the denominator are the sample size minus one.

(Module 4.3, LOS 4.o)

Question #80 of 96

Question ID: 1456495

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) Flake.

C) Epps.

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 4.2, LOS 4.k)

Question #81 of 96

Question ID: 1456445

If X follows a continuous uniform distribution over the interval 1 < X < 26, the probability that X is between 5 and 15 is *closest* to:

A) 10%.

B) 40%.

C) 60%.

Explanation

Because this distribution is uniform, the probability of an outcome between 5 and 15 is the ratio of that interval to the entire interval from 1 to 26.

(15 – 5) / (26 – 1) = 10 / 25 = 0.40.

(Module 4.1, LOS 4.d)

Question #82 of 96

Question ID: 1456442

The number of days a particular stock increases in a given five-day period is uniformly distributed between zero and five inclusive. In a given five-day trading week, what is the probability that the stock will increase exactly three days?

A) 0.167.

B) 0.333.

C) 0.600.

Explanation

If the possible outcomes are X:(0,1,2,3,4,5), then the probability of each of the six outcomes is 1 / 6 = 0.167.

(Module 4.1, LOS 4.c)

Question #83 of 96

Question ID: 1456513

Which statement *best* describes the properties of Student's t-distribution? The t-distribution is:

A) symmetrical, and defined by a single parameter.

B) symmetrical, and defined by two parameters.

C) skewed, and defined by a single parameter.

Explanation

The t-distribution is symmetrical like the normal distribution but unlike the normal distribution is defined by a single parameter known as the degrees of freedom.

(Module 4.3, LOS 4.n)

Question #84 of 96

Question ID: 1456482

Standardizing a normally distributed random variable requires the:

A) mean, variance and skewness.

B) natural logarithm of X.

C) mean and the standard deviation.

Explanation

All that is necessary is to know the mean and the variance. Subtracting the mean from the random variable and dividing the difference by the standard deviation standardizes the variable.

(Module 4.2, LOS 4.i)

Question #85 of 96

Question ID: 1456522

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) only one of these variables.

B) neither of these variables.

C) both of these variables.

Explanation

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

(Module 4.3, LOS 4.p)

Question #86 of 96

Question ID: 1456432

Which of the following is *least likely* a probability distribution?

A) Flip a coin: P(H) = P(T) = 0.5.

B) Roll an irregular die: p(1) = p(2) = p(3) = p(4) = 0.2 and p(5) = p(6) = 0.1.

C) Zeta Corp.: P(dividend increases) = 0.60, P(dividend decreases) = 0.30.

Explanation

All the probabilities must be listed. In the case of Zeta Corp. the probabilities do not sum to one.

(Module 4.1, LOS 4.a)

Question #87 of 96

Question ID: 1456517

As degrees of freedom increase, the Chi-square and F-distributions *most likely* become more:

A) negative.

B) asymmetric.

C) bell shaped.

Explanation

As the degrees of freedom increase, the Chi-square and F-distributions become more symmetric and bell shaped. These distributions can only take on positive values.

(Module 4.3, LOS 4.o)

Question #88 of 96

Question ID: 1456446

A random variable follows a continuous uniform distribution over 27 to 89. What is the probability of an outcome between 34 and 38?

A) 0.0546.

B) 0.0645.

C) 0.0719.

Explanation

$P(34 \leq X \leq 38) = (38 - 34) / (89 - 27) = 0.0645$

(Module 4.1, LOS 4.d)

Question #89 of 96

Question ID: 1456503

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) higher.

B) the same.

C) lower.

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 4.3, LOS 4.m)

Question #90 of 96

Question ID: 1456518

For a Chi-square distribution with a sample size of 10 the degrees of freedom are:

A) 10.

B) 9.

C) 8.

Explanation

Degrees of freedom for the Chi-square distribution are the sample size minus one.

(Module 4.3, LOS 4.o)

Question #91 of 96

Question ID: 1456507

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) -13.84%.

B) -16.09%.

C) -14.86%.

Explanation

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

(Module 4.3, LOS 4.m)

Question #92 of 96

Question ID: 1456462

The lower limit of a normal distribution is:

A) negative one.

B) zero.

C) negative infinity.

Explanation

By definition, a true normal distribution has a positive probability density function from negative to positive infinity.

(Module 4.2, LOS 4.f)

Question #93 of 96

Question ID: 1456464

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

A) Approximately 68% of the observations lie within +/- 1 standard deviation of the mean.

B) The mean and variance completely define a normal distribution.

C) A normal distribution has excess kurtosis of three.

Explanation

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

(Module 4.2, LOS 4.f)

Question #94 of 96

Question ID: 1456521

Monte Carlo simulation is necessary to:

A) approximate solutions to complex problems.

B) compute continuously compounded returns.

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 4.3, LOS 4.p)

Question #95 of 96

Question ID: 1456500

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

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

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

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

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 4.3, LOS 4.l)

Question #96 of 96

Question ID: 1456436

Which of the following distributions is *most likely* a discrete distribution?

A) A univariate distribution.

B) A normal distribution.

C) A binomial distribution.

Explanation

The binomial distribution is a discrete distribution, while the normal distribution is an example of a continuous distribution. Univariate distributions can be discrete or continuous.

(Module 4.1, LOS 4.a)