

# Reading 10: Common Probability Distributions

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## Question #1 of 104

Question ID: 413162

The Night Raiders, an expansion team in the National Indoor Football League, is having a challenging first season with a current win loss record of 0 and 4. However, the team recently signed four new defensive players and one of the team sponsors (who also happens to hold a CFA charter) calculates the probability of the team winning a game at 0.40. Assuming that whether the team wins a game is independent of whether it wins any other game, the probability that the team will win 6 out of the next 10 games is *closest* to:

- A) 0.417.
  - B) 0.350.
  - C) 0.112.
- 

## Question #2 of 104

Question ID: 413134

Which of the following is a discrete random variable?

- A) The realized return on a corporate bond.
  - B) The amount of time between two successive stock trades.
  - C) The number of advancing stocks in the DJIA in a day.
- 

## Question #3 of 104

Question ID: 413215

Given  $Y$  is lognormally distributed, then  $\ln Y$  is:

- A) normally distributed.
  - B) a lognormal distribution.
  - C) the antilog of  $Y$ .
- 

## Question #4 of 104

Question ID: 434204

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) 0.900.
  - B) 0.027.
  - C) 0.343.
-

### Question #5 of 104

Question ID: 413206

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) 2.50%.
  - B) 5.00%.
  - C) 15.87%.
- 

### Question #6 of 104

Question ID: 413201

Which of the following represents the mean, standard deviation, and variance of a standard normal distribution?

- A) 1, 2, 4.
  - B) 1, 1, 1.
  - C) 0, 1, 1.
- 

### Question #7 of 104

Question ID: 413207

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 Z.
  - C) Portfolio X.
- 

### Question #8 of 104

Question ID: 413148

A probability function:

- A) specifies the probability that the random variable takes on a specific value.
  - B) only applies to continuous distributions.
  - C) is often referred to as the "cdf."
-

Question #9 of 104

Question ID: 413223

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

- A) -6.7%.
- B) -5.7%.
- C) -6.3%.

Question #10 of 104

Question ID: 452011

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.

Question #11 of 104

Question ID: 413192

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%.

Question #12 of 104

Question ID: 413186

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.
- 

### Question #13 of 104

Question ID: 413155

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) 62.5%.
  - B) 37.5%.
  - C) 50.0%.
- 

### Question #14 of 104

Question ID: 413165

A stock priced at \$10 has a 60% probability of moving up and a 40% probability of moving down. If it moves up, it increases by a factor of 1.06. If it moves down, it decreases by a factor of 1/1.06. What is the expected stock price after two successive periods?

- A) \$10.03.
  - B) \$10.27.
  - C) \$11.24.
- 

### Question #15 of 104

Question ID: 413156

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) 0.4096.
  - B) 0.0819.
  - C) 0.7373.
- 

### Question #16 of 104

Question ID: 413147

Which of the following could *least likely* be a probability function?

- A)  $X:(1,2,3,4) \quad p(x) = (x \times x) / 30$ .
- B)  $X:(1,2,3,4) \quad p(x) = 0.2$ .

C)  $X:(1,2,3,4)$   $p(x) = x / 10$ .

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### Question #17 of 104

Question ID: 413176

A normal distribution is completely described by its:

- A) median and mode.
  - B) variance and mean.
  - C) mean, mode, and skewness.
- 

### Question #18 of 104

Question ID: 413144

Assume a discrete distribution for the number of possible sunny days in Provo, Utah during the week of April 20 through April 26. For this discrete distribution,  $p(x) = 0$  when  $x$  cannot occur, or  $p(x) > 0$  if it can. Based on this information, what is the probability of it being sunny on 5 days and on 10 days during the week, respectively?

- A) A positive value; infinite.
  - B) Zero; infinite.
  - C) A positive value; zero.
- 

### Question #19 of 104

Question ID: 413199

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) 5.71%.
  - B) 9.92%.
  - C) 15.87%.
- 

### Question #20 of 104

Question ID: 498735

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) neither of these variables.
- B) both of these variables.
- C) only one of these variables.

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**Question #21 of 104**

Question ID: 413179

The lower limit of a normal distribution is:

- A) negative one.
  - B) negative infinity.
  - C) zero.
- 

**Question #22 of 104**

Question ID: 434209

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

- A) 9.42%.
  - B) 9.20%.
  - C) 9.67%.
- 

**Question #23 of 104**

Question ID: 413173

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.
- 

**Question #24 of 104**

Question ID: 413177

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

- A) Kurtosis is equal to 3.
  - B) The distribution is completely described by its mean and variance.
  - C) Approximately 34% of the observations fall within plus or minus one standard deviation of the mean.
- 

**Question #25 of 104**

Question ID: 413175

In a normal distribution, the:

- A) mean is less than the mode.
  - B) mean is greater than the median.
  - C) median equals the mode.
- 

Question #26 of 104

Question ID: 413154

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

- A) The outcome of the roll of two standard, six-sided dice where X is the sum of the numbers facing up.
  - B) The outcome of a roll of a standard, six-sided die where X equals the number facing up on the die.
  - C) The number of heads on the flip of two coins.
- 

Question #27 of 104

Question ID: 442251

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) 14.22 pounds.
  - B) 14.00 pounds.
  - C) 15.08 pounds.
- 

Question #28 of 104

Question ID: 413137

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.
-

### Question #29 of 104

Question ID: 413157

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

- A) The expected value is a whole number.
  - B) Random variable X is discrete.
  - C) The trials are independent.
- 

### Question #30 of 104

Question ID: 413191

For a normal distribution, what *approximate* percentage of the observations fall within  $\pm 3$  standard deviation of the mean?

- A) 99%.
  - B) 95%.
  - C) 66%.
- 

### Question #31 of 104

Question ID: 413194

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) 34%.
  - B) 98%.
  - C) 84%.
- 

### Question #32 of 104

Question ID: 761034

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) 60%.
  - C) 40%.
- 

### Question #33 of 104

Question ID: 413232

The difference between a Monte Carlo simulation and a historical simulation is that a historical simulation uses randomly selected variables from past distributions, while a Monte Carlo simulation:

- A) uses randomly selected variables from future distributions.



- B)** projects variables based on *a priori* principles.
- C)** uses a computer to generate random variables.

**Question #34 of 104**

Question ID: 413221

Compared to a discretely compounded rate of return, continuous compounding will *most likely* result in a rate of return that is:

- A)** lower.
- B)** the same.
- C)** higher.

**Question #35 of 104**

Question ID: 413193

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)** 95% confidence interval.
- B)** 68% confidence interval.
- C)** 99% confidence interval.

**Question #36 of 104**

Question ID: 529150

**Standard Normal Distribution**

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

z	0.0	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)** 0.2119.
- B)** 0.3773.
- C)** 0.1057.

### Question #37 of 104

Question ID: 413151

Which of the following qualifies as a cumulative distribution function?

- A)  $F(1) = 0.5$ ,  $F(2) = 0.25$ ,  $F(3) = 0.25$ .
  - B)  $F(1) = 0$ ,  $F(2) = 0.25$ ,  $F(3) = 0.50$ ,  $F(4) = 1$ .
  - C)  $F(1) = 0$ ,  $F(2) = 0.5$ ,  $F(3) = 0.5$ ,  $F(4) = 0$ .
- 

### Question #38 of 104

Question ID: 413145

In a continuous probability density function, the probability that any single value of a random variable occurs is equal to what?

- A) One.
  - B) Zero.
  - C)  $1/N$ .
- 

### Question #39 of 104

Question ID: 413182

In a multivariate normal distribution, a correlation tells the:

- A) strength of the linear relationship between two of the variables.
  - B) relationship between the means and variances of the variables.
  - C) overall relationship between all the variables.
- 

### Question #40 of 104

Question ID: 413188

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) 0.977.
  - B) 0.750.
  - C) 0.950.
- 

### Question #41 of 104

Question ID: 413228

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)** -14.86%.

**C)** -16.09%.

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### Question #42 of 104

Question ID: 413230

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

- A)** Variables are assumed to be normally distributed but may actually have non-normal distributions.
  - B)** Outcomes of a simulation can only be as accurate as the inputs to the model.
  - C)** Simulations do not consider possible input values that lie outside historical experience.
- 

### Question #43 of 104

Question ID: 413164

A stock priced at \$20 has an 80% probability of moving up and a 20% probability of moving down. If it moves up, it increases by a factor of 1.05. If it moves down, it decreases by a factor of 1/1.05. What is the expected stock price after two successive periods?

- A)** \$20.05.
  - B)** \$21.24.
  - C)** \$22.05.
- 

### Question #44 of 104

Question ID: 413153

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)** 0.600.
  - C)** 0.333.
- 

### Question #45 of 104

Question ID: 413217

If a random variable  $x$  is lognormally distributed then  $\ln x$  is:

- A)** defined as  $e^x$ .
  - B)** normally distributed.
  - C)** abnormally distributed.
-

### Question #46 of 104

Question ID: 413142

A random variable that has a countable number of possible values is called a:

- A) continuous random variable.
  - B) discrete random variable.
  - C) probability distribution.
- 

### Question #47 of 104

Question ID: 498734

Which of the following random variables assigns an equal probability to each possible outcome?

- A) Bernoulli random variable.
  - B) Discrete uniform random variable.
  - C) Binomial random variable.
- 

### Question #48 of 104

Question ID: 413133

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

- A) A binomial distribution counts the number of successes that occur in a fixed number of independent trials that have mutually exclusive (i.e. yes or no) outcomes.
  - B) A discrete uniform random variable has varying probabilities for each outcome that total to one.
  - C) A continuous uniform distribution has a lower limit but no upper limit.
- 

### Question #49 of 104

Question ID: 434206

The safety-first criterion focuses on:

- A) shortfall risk.
  - B) SEC regulations.
  - C) margin requirements.
- 

### Question #50 of 104

Question ID: 413190

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) in excess of 16% is 0.16.
- B) between 12% and 28% is 0.95.

C) of less than 12% is 0.025.

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### Question #51 of 104

Question ID: 413187

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) 4.56%.
  - C) 2.28%.
- 

### Question #52 of 104

Question ID: 710142

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

- A)  $F(10) = 0.23$ .
  - B)  $F(12 \leq X \leq 16) = 0.307$ .
  - C)  $F(21) = 0.00$ .
- 

### Question #53 of 104

Question ID: 413184

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) overall correlation.
  - C) 10 correlations.
- 

### Question #54 of 104

Question ID: 413140

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.:  $P(\text{dividend increases}) = 0.60$ ,  $P(\text{dividend decreases}) = 0.30$ .
-

**Question #55 of 104**

Question ID: 434208

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%.
- 

**Question #56 of 104**

Question ID: 413152

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) 25%.
  - B) 14%.
  - C) 39%.
- 

**Question #57 of 104**

Question ID: 412771

An investor invested \$10,000 into an account five years ago. Today, the account value is \$18,682. What is the investor's annual rate of return on a continuously compounded basis?

- A) 12.50%.
  - B) 13.31%.
  - C) 11.33%.
- 

**Question #58 of 104**

Question ID: 413136

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) 0.200.
- B) 0.001.
- C) 0.167.

Question #59 of 104

Question ID: 413141

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

- A) Five percent of the normal curve probability is more than two standard deviations from the mean.
- B) The normal curve is asymmetrical about its mean.
- C) Sixty-eight percent of the area under the normal curve falls between the mean and 1 standard deviation above the mean.

Question #60 of 104

Question ID: 413216

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

- A) denoted as  $e^x$ .
- B) normally distributed.
- C) lognormally distributed.

Question #61 of 104

Question ID: 413208

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) 1.
- B) 2.
- C) 3.

Question #62 of 104

Question ID: 413222

Mei Tekei just celebrated her 22nd birthday. When she is 27, she will receive a \$100,000 inheritance. Tekei needs funds for the down payment on a co-op in Manhattan and has found a bank that will give her the present value of her inheritance amount, assuming an 8.0% stated annual interest rate with continuous compounding. Will the proceeds from the bank be sufficient to cover her down payment of \$65,000?

- A) Yes, Tekei will receive \$68,058.
- B) No, Tekei will only receive \$61,878.
- C) Yes, Tekei will receive \$67,028.

Question #63 of 104

Question ID: 761035

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) 3.59%.
- B) 1.80%.
- C) 96.41%.

Question #64 of 104

Question ID: 413180

Multivariate distributions can describe:

- A) continuous random variables only.
- B) discrete random variables only.
- C) either discrete or continuous random variables.

Question #65 of 104

Question ID: 413229

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

- A) Its holding period return.
- B) Neither, they will be equal.
- C) Its continuously compounded return.

Question #66 of 104

Question ID: 434207

Claude Bellow, CFA, is an analyst with a real-estate focused investment firm. Today, one of the partners e-mails Bellow the following table and requests that he look into the reward-to-variability ratios of two asset classes. The table below gives five years



of annual returns for Marley REIT (real estate investment trust) and a large urban apartment building. Marley REIT invests in commercial properties. The risk-free rate is 5.0% and the firm's threshold rate for this type of investment is 5.7%. (Note: For this question, calculate the mean returns using the *arithmetic mean*.)

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

One of the office assistants begins to "run some numbers," but is then called away to an important meeting. So far, the assistant has calculated the standard deviation of the apartment building returns at 3.97% and the standard deviation of the REIT returns at 2.65%. (He assumed that the returns given represent the entire population of returns.) Now, Bellow must finish the work.

Bellow should conclude that the:

- A) REIT has a higher excess return per unit of risk than the apartment building has per unit of risk.
- B) partner is asking Bellow to select the investment with the minimal probability that the return falls below 5.70%.
- C) safety-first ratio for the REIT is 2.49.

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### Question #67 of 104

Question ID: 413204

The standard normal distribution is *most* completely described as a:

- A) distribution that exhibits zero skewness and no excess kurtosis.
- B) symmetrical distribution with a mean equal to its median.
- C) normal distribution with a mean of zero and a standard deviation of one.

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### Question #68 of 104

Question ID: 413195

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) 87%.
- B) 79%.
- C) 68%.

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### Question #69 of 104

Question ID: 413158

Which of the following could be the set of all possible outcomes for a random variable that follows a binomial distribution?

- A) (-1, 0, 1).
  - B) (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11).
  - C) (1, 2).
- 

### Question #70 of 104

Question ID: 413183

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

- A) two or more independent random variables.
  - B) two or more dependent random variables.
  - C) a random variable with more than two possible outcomes.
- 

### Question #71 of 104

Question ID: 413218

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

- A) Lognormal distribution returns are used because this will allow for negative returns on the assets.
  - B) Lognormal distribution returns are used for asset pricing models because they will not result in an asset return of less than -100%.
  - C) Normal distribution returns are used for asset pricing models because they will only allow the asset price to fall to zero.
- 

### Question #72 of 104

Question ID: 413172

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

- A) line segment with a curvilinear slope.
  - B) line segment with a 45-degree slope.
  - C) horizontal line segment.
- 

### Question #73 of 104

Question ID: 413170

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

- A) 0.0645.
- B) 0.0546.
- C) 0.0719.

---

**Question #74 of 104**

Question ID: 413174

A normal distribution can be completely described by its:

- A) mean and mode.
- B) skewness and kurtosis.
- C) mean and variance.

---

**Question #75 of 104**

Question ID: 413211

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.

---

**Question #76 of 104**

Question ID: 413200

Standardizing a normally distributed random variable requires the:

- A) mean and the standard deviation.
- B) mean, variance and skewness.
- C) natural logarithm of X.

---

**Question #77 of 104**

Question ID: 413138

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

- A) A probability distribution is, by definition, normally distributed.
- B) In a binomial distribution each observation has only two possible outcomes that are mutually exclusive.
- C) A probability distribution includes a listing of all the possible outcomes of an experiment.

---

**Question #78 of 104**

Question ID: 413189

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.
- 

**Question #79 of 104**

Question ID: 413225

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

- A) -0.1250.
  - B) -0.1178.
  - C) -0.1000.
- 

**Question #80 of 104**

Question ID: 413205

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) 110 to 190 inches.
  - B) 117 to 183 inches.
  - C) 137 to 163 inches.
- 

**Question #81 of 104**

Question ID: 413135

The number of ships in the harbor is an example of what kind of variable?

- A) Continuous.
  - B) Discrete.
  - C) Indiscrete.
- 

**Question #82 of 104**

Question ID: 413231

Monte Carlo simulation is necessary to:

- A) reduce sampling error.
  - B) approximate solutions to complex problems.
  - C) compute continuously compounded returns.
- 

### Question #83 of 104

Question ID: 413233

Many analysts prefer to use Monte Carlo simulation rather than historical simulation because:

- A) computers can manipulate theoretical data much more quickly than historical data.
  - B) past distributions cannot address changes in correlations or events that have not happened before.
  - C) it is much easier to generate the required variables.
- 

### Question #84 of 104

Question ID: 413181

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.
- 

### Question #85 of 104

Question ID: 413143

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

- A) The rate of return on a real estate investment.
  - B) The number of days of sunshine in the month of May 2006 in a particular city.
  - C) Quoted stock prices on the NASDAQ.
- 

### Question #86 of 104

Question ID: 413209

If the threshold return is higher than the risk-free rate, what will be the relationship between Roy's safety-first ratio (SF) and Sharpe's ratio?

- A) The SF ratio may be higher or lower depending on the standard deviation.
  - B) The SF ratio will be higher.
  - C) The SF ratio will be lower.
-

**Question #87 of 104**

Question ID: 413149

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%.
- 

**Question #88 of 104**

Question ID: 413178

If  $X$  has a normal distribution with  $\mu = 100$  and  $\sigma = 5$ , then there is approximately a 90% probability that:

- A)  $P(91.8 < X < 108.3)$ .
  - B)  $P(93.4 < X < 106.7)$ .
  - C)  $P(90.2 < X < 109.8)$ .
- 

**Question #89 of 104**

Question ID: 413161

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

- A) 0.24327.
  - B) 0.15364.
  - C) 0.01536.
- 

**Question #90 of 104**

Question ID: 413163

A stock priced at \$100 has a 70% probability of moving up and a 30% probability of moving down. If it moves up, it increases by a factor of 1.02. If it moves down, it decreases by a factor of  $1/1.02$ . What is the probability that the stock will be \$100 after two successive periods?

- A) 42%.
- B) 9%.
- C) 21%.

---

**Question #91 of 104**

Question ID: 413219

The farthest point on the left side of the lognormal distribution:

- A) is skewed to the left.
  - B) can be any negative number.
  - C) is bounded by 0.
- 

**Question #92 of 104**

Question ID: 413139

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

- A) A discrete random variable is a variable that can assume only certain clearly separated values resulting from a count of some set of items.
  - B) The skewness of a normal distribution is zero.
  - C) A binomial probability distribution is an example of a continuous probability distribution.
- 

**Question #93 of 104**

Question ID: 413146

If a smooth curve is to represent a probability density function, what two requirements must be satisfied? The area under the curve must be:

- A) zero and the curve must not fall below the horizontal axis.
  - B) one and the curve must not rise above the horizontal axis.
  - C) one and the curve must not fall below the horizontal axis.
- 

**Question #94 of 104**

Question ID: 710143

A stock price decreases in one period and then increases by an equal amount in the next period. The investor calculates a holding period return for each period and calculates their arithmetic mean. The investor also calculates the continuously compounded rate of return for each period and calculates the arithmetic mean of these. Which of the arithmetic means will be greater?

- A) Neither, because both will equal zero.
  - B) The mean of the continuously compounded returns.
  - C) The mean of the holding period returns.
- 

**Question #95 of 104**

Question ID: 413213

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:

<u>Portfolio</u>	<u>Expected return</u>	<u>Standard deviation</u>
Epps	6%	4%
Flake	7%	9%
Grant	10%	15%

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

- A) Flake.
- B) Epps.
- C) Grant.

---

### Question #96 of 104

Question ID: 413224

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

- A)  $\ln(1 - R) - 1$ .
- B)  $e^R - 1$ .
- C)  $\ln(1 + R)$ .

---

### Question #97 of 104

Question ID: 413226

Assume an investor purchases a stock for \$50. One year later, the stock is worth \$60. After one more year, the stock price has fallen to the original price of \$50. Calculate the continuously compounded return for year 1 and year 2.

	<u>Year 1</u>	<u>Year 2</u>
A)	-18.23%	-18.23%
B)	18.23%	16.67%
C)	18.23%	-18.23%

---

### Question #98 of 104

Question ID: 413159

A casual laborer has a 70% chance 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) 0.6045.
- B) 0.3192.



C) 0.3087.

---

### Question #99 of 104

Question ID: 413234

Joan Biggs, CFA, acquires a large database of past returns on a variety of assets. Biggs then draws random samples of sets of returns from the database and analyzes the resulting distributions. Biggs is engaging in:

- A) Monte Carlo simulation.
  - B) historical simulation.
  - C) discrete analysis.
- 

### Question #100 of 104

Question ID: 413235

A drawback of historical simulation is it:

- A) depends on the accuracy of the random number generator.
  - B) may not account for very rare events.
  - C) may not accurately reflect possible outcomes.
- 

### Question #101 of 104

Question ID: 413150

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

- A) 0.40.
  - B) 0.50.
  - C) 1.00.
- 

### Question #102 of 104

Question ID: 413185

A multivariate distribution:

- A) specifies the probabilities associated with groups of random variables.
  - B) gives multiple probabilities for the same outcome.
  - C) applies only to binomial distributions.
- 

### Question #103 of 104

Question ID: 413196

If a stock's return is normally distributed with a mean of 16% and a standard deviation of 50%, what is the probability of a negative return in a given year?

- A)** 0.3745.
  - B)** 0.5000.
  - C)** 0.0001.
- 

### Question #104 of 104

Question ID: 413212

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 Y.
- C)** Portfolio Z.