

Probability distributions. Binomial Probability distribution. The Uniform and the Normal distribution. Confidence intervals.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the mean of the given probability distribution.

1) 1) _____

x	P(x)
0	0.23
1	0.20
2	0.37
3	0.06
4	0.14

A) $\mu = 1.91$ B) $\mu = 1.58$ C) $\mu = 1.68$ D) $\mu = 1.81$

Provide an appropriate response. Round to the nearest hundredth.

2) Find the standard deviation for the given probability distribution. 2) _____

x	P(x)
0	0.19
1	0.26
2	0.18
3	0.24
4	0.13

A) $\sigma = 1.33$ B) $\sigma = 1.40$ C) $\sigma = 1.76$ D) $\sigma = 2.28$

Answer the question.

3) Assume that there is a 0.15 probability that a basketball playoff series will last four games, a 0.30 probability that it will last five games, a 0.25 probability that it will last six games, and a 0.30 probability that it will last seven games. Is it unusual for a team to win a series in 7 games? 3) _____

A) Yes B) No

Assume that a procedure yields a binomial distribution with a trial repeated n times. Use the binomial probability formula to find the probability of x successes given the probability p of success on a single trial. Round to three decimal places.

4) $n = 12, x = 5, p = 0.25$ 4) _____

A) 0.027 B) 0.091 C) 0.103 D) 0.082

Find the indicated probability. Round to three decimal places.

5) A test consists of 10 true/false questions. To pass the test a student must answer at least 9 questions correctly. If a student guesses on each question, what is the probability that the student will pass the test? 5) _____

A) 0.010 B) 0.011 C) 0.001 D) 0.999

6) In a study, 38% of adults questioned reported that their health was excellent. A researcher wishes to study the health of people living close to a nuclear power plant. Among 12 adults randomly selected from this area, only 3 reported that their health was excellent. Find the probability that when 12 adults are randomly selected, 3 or fewer are in excellent health. 6) _____

A) 0.163 B) 0.185 C) 0.270 D) 0.107

Find the indicated probability.

7) A tennis player makes a successful first serve 46% of the time. If she serves 8 times, what is the probability that she gets exactly 3 first serves in? Assume that each serve is independent of the others. 7) _____

- A) 0.0973 B) 0.00447 C) 0.250 D) 0.147

8) A multiple choice test has 7 questions each of which has 5 possible answers, only one of which is correct. If Judy, who forgot to study for the test, guesses on all questions, what is the probability that she will answer exactly 3 questions correctly? 8) _____

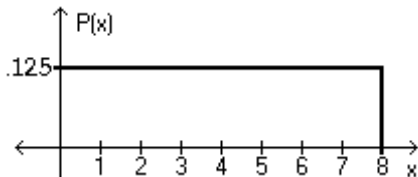
- A) 0.885 B) 0.275 C) 0.00800 D) 0.115

Use the given values of n and p to find the minimum usual value $\mu - 2\sigma$ and the maximum usual value $\mu + 2\sigma$. Round your answer to the nearest hundredth unless otherwise noted.

9) $n = 166$, $p = 0.15$ 9) _____

- A) Minimum: 20.3; maximum: 29.5 B) Minimum: 15.7; maximum: 34.1
C) Minimum: 34.1; maximum: 15.7 D) Minimum: -17.43; maximum: 67.23

Using the following uniform density curve, answer the question.



10) What is the probability that the random variable has a value between 2.3 and 5? 10) _____

- A) 0.5875 B) 0.2125 C) 0.3375 D) 0.4625

Assume that the weight loss for the first month of a diet program varies between 6 pounds and 12 pounds, and is spread evenly over the range of possibilities, so that there is a uniform distribution. Find the probability of the given range of pounds lost.

11) Less than 11 pounds 11) _____

- A) $\frac{5}{7}$ B) $\frac{1}{3}$ C) $\frac{1}{6}$ D) $\frac{5}{6}$

If z is a standard normal variable, find the probability.

12) The probability that z is less than 1.13 12) _____

- A) 0.1292 B) 0.8485 C) 0.8708 D) 0.8907

13) The probability that z lies between -1.10 and -0.36 13) _____

- A) -0.2237 B) 0.2237 C) 0.2239 D) 0.4951

Provide an appropriate response.

14) Assume that adults have IQ scores that are normally distributed with a mean of 100 and a standard deviation of 15 (as on the Wechsler test). Find the probability that a randomly selected adult has an IQ between 90 and 120 (somewhere in the range of normal to bright normal). 14) _____

- A) 0.6977 B) 0.6227 C) 0.6014 D) 0.6568

- 15) Assume that adults have IQ scores that are normally distributed with a mean of 100 and a standard deviation of 15 (as on the Wechsler test). Find P_{10} , which is the IQ score separating the bottom 10% from the top 90%. 15) _____
- A) 80.1 B) 81.3 C) 80.8 D) 81.9

Assume that X has a normal distribution, and find the indicated probability.

- 16) The mean is $\mu = 137.0$ and the standard deviation is $\sigma = 5.3$. Find the probability that X is between 134.4 and 140.1. 16) _____
- A) 0.8138 B) 0.4069 C) 0.6242 D) 1.0311

Solve the problem.

- 17) The scores on a certain test are normally distributed with a mean score of 53 and a standard deviation of 5. What is the probability that a sample of 90 students will have a mean score of at least 53.527? 17) _____
- A) 0.3174 B) 0.8413 C) 0.3413 D) 0.1587
- 18) A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. If 40 different applicants are randomly selected, find the probability that their mean is above 215. 18) _____
- A) 0.1179 B) 0.3821 C) 0.4713 D) 0.0287

Assume that a sample is used to estimate a population proportion p. Find the margin of error E that corresponds to the given statistics and confidence level. Round the margin of error to four decimal places.

- 19) 99% confidence; $n = 6400$, $x = 1920$ 19) _____
- A) 0.0147 B) 0.0112 C) 0.0129 D) 0.00840

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p.

- 20) $n = 171$, $x = 124$; 95% confidence 20) _____
- A) $0.671 < p < 0.779$ B) $0.672 < p < 0.778$
 C) $0.658 < p < 0.792$ D) $0.657 < p < 0.793$

Use the given data to find the minimum sample size required to estimate the population proportion.

- 21) Margin of error: 0.008; confidence level: 99%; \hat{p} and \hat{q} unknown 21) _____
- A) 26,024 B) 25,901 C) 15,900 D) 25,894
- 22) Margin of error: 0.09; confidence level: 95%; from a prior study, \hat{p} is estimated by the decimal equivalent of 87%. 22) _____
- A) 48 B) 54 C) 162 D) 5

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p.

- 23) A survey of 865 voters in one state reveals that 408 favor approval of an issue before the legislature. Construct the 95% confidence interval for the true proportion of all voters in the state who favor approval. 23) _____
- A) $0.438 < p < 0.505$ B) $0.435 < p < 0.508$
 C) $0.471 < p < 0.472$ D) $0.444 < p < 0.500$

Use the given degree of confidence and sample data to construct a confidence interval for the population mean μ . Assume that the population has a normal distribution.

- 24) $n = 10$, $\bar{x} = 12.7$, $s = 3.7$, 95% confidence 24) _____
A) $10.09 < \mu < 15.31$ B) $10.56 < \mu < 14.84$
C) $10.07 < \mu < 15.33$ D) $10.05 < \mu < 15.35$

- 25) A laboratory tested twelve chicken eggs and found that the mean amount of cholesterol was 198 milligrams with $s = 10.5$ milligrams. Construct a 95% confidence interval for the true mean cholesterol content of all such eggs. 25) _____
A) $192.6 \text{ mg} < \mu < 203.4 \text{ mg}$ B) $191.4 \text{ mg} < \mu < 204.6 \text{ mg}$
C) $191.2 \text{ mg} < \mu < 204.8 \text{ mg}$ D) $191.3 \text{ mg} < \mu < 204.7 \text{ mg}$

- 26) The football coach randomly selected ten players and timed how long each player took to perform a certain drill. The times (in minutes) were: 26) _____
7.1 10.7 9.4 8.6 11.4
7.1 6.6 11.2 10.0 12.3
Determine a 95% confidence interval for the mean time for all players.
A) $8.07 \text{ min} < \mu < 10.81 \text{ min}$ B) $10.91 \text{ min} < \mu < 7.97 \text{ min}$
C) $10.81 \text{ min} < \mu < 8.07 \text{ min}$ D) $7.97 \text{ min} < \mu < 10.91 \text{ min}$

Use the confidence level and sample data to find a confidence interval for estimating the population μ . Round your answer to the same number of decimal places as the sample mean.

- 27) A random sample of 108 light bulbs had a mean life of $\bar{x} = 547$ hours with a standard deviation of $\sigma = 36$ hours. Construct a 90% confidence interval for the mean life, μ , of all light bulbs of this type. 27) _____
A) $540 \text{ hr} < \mu < 554 \text{ hr}$ B) $541 \text{ hr} < \mu < 553 \text{ hr}$
C) $538 \text{ hr} < \mu < 556 \text{ hr}$ D) $539 \text{ hr} < \mu < 555 \text{ hr}$

- 28) A random sample of 136 full-grown lobsters had a mean weight of 22 ounces and a standard deviation of 3.2 ounces. Construct a 98% confidence interval for the population mean μ . 28) _____
A) $21 \text{ oz} < \mu < 24 \text{ oz}$ B) $22 \text{ oz} < \mu < 24 \text{ oz}$
C) $21 \text{ oz} < \mu < 23 \text{ oz}$ D) $20 \text{ oz} < \mu < 22 \text{ oz}$

Use the given information to find the minimum sample size required to estimate an unknown population mean μ .

- 29) Margin of error: \$136, confidence level: 99%, $\sigma = \$584$ 29) _____
A) 71 B) 50 C) 123 D) 62

- 30) How many women must be randomly selected to estimate the mean weight of women in one age group. We want 90% confidence that the sample mean is within 2.8 lb of the population mean, and the population standard deviation is known to be 27 lb. 30) _____
A) 253 B) 358 C) 250 D) 252