

#1 Statistics - Hustle
MA@ National Convention 2024

A probability density function is defined as
 $f(x) = \frac{-8}{15}x + \frac{16}{15}$ for $[0, a]$ and 0 elsewhere.
Find a .

Answer : _____

Round 1 2 3 4 5

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#2 Statistics - Hustle
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Find the IQR of the following data set:

43, 6, 17, 1, 4, 88, 24, 75, 3, 15, 51, 35, 21

Answer : _____

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#3 Statistics – Hustle
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Charlie is running for school president and wants to determine if there is a difference in her approval rating between freshman and seniors. She randomly interviews 200 freshmen and 200 seniors. 70 freshmen say they approve of her, while 90 seniors approve of her. Assume all inference conditions are met. What is the standard error for the appropriate significance test?

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A teacher is ranking his students by their grade, with A being the highest level and F being the lowest. A student’s level would be described as a _____ variable. Find the number of distinct permutations of the consonants in the word.

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I am flipping a fair coin. Each toss is independent of each other. What is the probability that I get the 4th head on exactly the 7th flip? Express your answer as a simplified fraction.

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#6 Statistics - Hustle
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If $\bar{x} = 30$, $\bar{y} = 20$, $r = 0.8$, $S_y = 7$, and $S_x = 5$,
find the y-coordinate of the y-intercept of the
least squares regression line.

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#7 Statistics – Hustle
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I have 7 identical pieces of candy and want to distribute it amongst 4 people. If everyone must get at least one piece, how many distinct ways can they be distributed?

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#8 Statistics – Hustle
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Salaries at a company are normally distributed, with a mean of \$50000 and a standard deviation of \$2000. Using the empirical rule, what is the probability that a randomly chosen worker has a salary less than \$54000?

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#9 Statistics – Hustle
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Given the following data set:

51, 17, 6, 2, 21, 83, 22, 3, 68, 14, 43, 35, 4

Let a be the smallest integer that could be a high outlier.

Let b be the largest integer that could be a low outlier.

Find $a - b$.

Answer : _____

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#10 Statistics – Hustle
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At a school, 60% of the seniors are female, the rest are male. All seniors at the school must play either tennis or golf but not both. 70% of the females play tennis. 20% of the seniors play golf. What is the probability that a randomly selected senior is a golf player given they are male?

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#11 Statistics – Hustle
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I have two, regular, fair, six-sided die. If I roll both of them, what is the probability that the sum on the face of the two die is a prime number or a divisor of 12?

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Scientists are conducting an experiment to test the effectiveness of a new COVID medication alongside Vitamin C tablets. The scientists randomly give each patient a placebo, a 5mg pill, 10mg pill, or a 15mg pill, along with either 1, 2, or 3 Vitamin C tablets. There are a total of 252 patients in the experiment. How many patients will be assigned to each treatment?

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#13 Statistics – Hustle
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Bob is practicing his tennis serve. He only has a 0.2 probability of getting the shot in, since he is just a beginner. He will take 16 shots before going home. What is the sum of the mean and standard deviation of the number of shots that go in for this distribution?

Answer : _____

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#14 Statistics – Hustle
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Dave and Margaret are in the same statistics class. Recently, they took the same test, in which scores are normally distributed. According to their teacher, Margaret got a score of 93, which has a z-score of 3, while Dave got a score of 66, which has a z-score of -1.5. Find the sum of the mean and standard deviation of the distribution of test scores in their class.

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Dave and Margaret are playing a game, in which each person rolls a standard, fair, six-sided die. If Dave rolls a number strictly greater than Margaret's, he wins, and Margaret pays him \$5. If Dave does not win, he must pay Margaret "D" dollars. Find the value of "D" that makes the game fair. Express your answer as an improper fraction.

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#16 Statistics – Hustle
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Charlie is playing a game at a carnival, where she draws one card from a standard deck of cards. She must pay \$10 to play the game. If she draws a heart, she is paid \$3. If she draws a black card, she is paid \$1. If she draws the queen of diamonds, she is paid \$13. If she draws any other card, she wins nothing. What is the expected amount of money she will lose? Express your answer to the nearest cent. (For example, if she is expected to lose $\frac{1}{6}$ of a dollar, your answer should be \$0.17.)

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#17 Statistics – Hustle
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Bob is still practicing his tennis serve. His probability of getting the shot in has increased to 0.4. He will keep trying until he gets a shot in. What is the probability that it takes him 3 or less tries to get a shot in?

Answer : _____

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#18 Statistics – Hustle
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Let A and B be independent random variables with

$$\mu_A = 17, \sigma_A = 4, \mu_B = 34, \sigma_B = 7$$

Find the variance of $2A - 2B$.

Answer : _____

Round 1 2 3 4 5

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#19 Statistics – Hustle
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Dave is conducting a test to see if the actual mean number of potato chips in a bag is lower than the company's claim of 18 chips per bag. He takes a sample of n bags, and finds the mean to be 16, with a standard deviation of 4, producing a test statistic of -4 . Find n .

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#20 Statistics – Hustle
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The probability of a Type II error for a test is 0.27. The sum of the power, the probability of a type I error, and the probability of a type II error is 1.047. What is the alpha level of the test?

Answer : _____

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#21 Statistics - Hustle
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$P(A|B) = \frac{1}{3}$, $P(B) = 0.45$, $P(A) = 0.65$.
Find $P(A' \cap B')$.

Answer : _____

Round 1 2 3 4 5

#21 Statistics - Hustle
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#22 Statistics – Hustle
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The regression line $\hat{y} = 12.5x + 10$ is used to model the weight of a golden retriever, where y is the weight in pounds, and x is the age in years. Use this line to determine the residual for a golden retriever that is 5 years old and weighs 68 pounds.

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#22 Statistics – Hustle
MA[®] National Convention 2024

The regression line $\hat{y} = 12.5x + 10$ is used to model the weight of a golden retriever, where y is the weight in pounds, and x is the age in years. Use this line to determine the residual for a golden retriever that is 5 years old and weighs 68 pounds.

Answer : _____

Round 1 2 3 4 5

#23 Statistics – Hustle
MA[®] National Convention 2024

A confidence interval is constructed to estimate the average number of cups of coffee high school students in Florida drink. The interval is (5, 9). Find the sum of the point estimate and the margin of error of this interval.

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#24 Statistics – Hustle
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Which of the following statements is/are true?

- A. The mean of the sampling distribution is the mean of the population from which it came.
- B. The standard deviation of the sampling distribution is $\frac{\sigma}{\sqrt{n}}$.
- C. No matter the shape of the population, if the $n > 10$, the sampling distribution will be normal.
- D. As the sample size gets larger, the shape of the sampling distribution becomes more normal, by the Law of Large Numbers.

Write the letter(s) corresponding to the true statements.

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Round 1 2 3 4 5

#25 Statistics – Hustle
MA@ National Convention 2024

Given the following regression line:

$$\hat{y} = 4.5x - 1$$

Dave decides to run a significance test for the hypotheses $H_0: \beta = 0$ and $H_a: \beta > 0$. He gets a test statistic of 9. Later, Dave changes his mind and decides to do another test with the hypotheses $H_0: \beta = 1.5$ and $H_a: \beta > 1.5$. Find the test statistic for this new test. Assume all conditions for inference have been met.

Answer : _____

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