

2008 FAMAT State Convention Statistics Bowl Question #1

1. Mrs. Lambert is investigating the absences of her students in her AP Calculus class. She finds the following number of absences for each of her students:

8, 3, 3, 7, 10, 2, 1, 5, 3, 8

Let A = the mode of the distribution of absences

B = the median of the distribution of absences

C = the mean of the distribution of absences

Find the solutions of the quadratic equation $Ax^2 + Bx - C = 0$

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2008 FAMAT State Convention Statistics Bowl Question #2

2. Salt content is being measured in cans of soup. A random sample of 25 cans is chosen. The sample is approximately normal with a mean of 27.2 and a standard deviation of 4.13. Using the appropriate chart, calculate the 95% confidence interval for the mean content of salt for all cans of soup. Round your answers to four decimal places.

2008 FAMAT State Convention Statistics Bowl Question #2

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2008 FAMAT State Convention Statistics Bowl Question #3

3. 40% of high school students drive to school. 65% of the high school drivers are boys. Boys and girls are equally represented in the population. Find the following:

Let A = the probability that a randomly selected student is a boy who drives to school.

Let B = the probability that a randomly selected student is a girl who does not drive to school.

Find the exact value of the following: $\frac{A}{B}$

2008 FAMAT State Convention Statistics Bowl Question #3

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Find the exact value of the following: $\frac{A}{B}$

2008 FAMAT State Convention Statistics Bowl Question #4

4. The results of Mr. Scales' History test are normally distributed. 30.15% of the scores are less than 65 and 2.02% of the scores are greater than 92. Using the appropriate chart, find the following:

Let A = the mean of Mr. Scales' History test.

Let B = the standard deviation of Mr. Scales' History test.

Find the exact value of the following: $A + B$

2008 FAMAT State Convention Statistics Bowl Question #4

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Find the exact value of the following: $A + B$

2008 FAMAT State Convention Statistics Bowl Question #5

5. A study was done to try and determine a relationship between students' smoking preference and their parents. The results of the study are as follows:

Student		Parents (How many smoke?)		
		Both parents	One parent	Neither parent
Yes		415	311	254
(Do you smoke?) No		235	499	316

Find the following:

A = the probability that a randomly selected student smokes

B = the probability that a randomly selected student has both parents who smoke.

C = the probability that a randomly selected student smokes or one parent smokes.

D = Given that neither parent smokes, find the probability that the student does not smoke.

Find the value of the following to four decimal places: $A+B+C+D$

2008 FAMAT State Convention Statistics Bowl Question #5

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2008 FAMAT State Convention Statistics Bowl Question #6

6. The following is information about the SAT Math scores of New York high school students based on a simple random sample of 750 students. The hypotheses are $H_0 : \mu = 500$, $H_a : \mu > 500$. Assume that the population standard deviation is $\sigma = 100$. The test rejects H_0 at the 5% level of significance. Using the appropriate table, calculate the power of the test against the alternative $\mu = 515$. Round your answers to four decimal places.

2008 FAMAT State Convention Statistics Bowl Question #6

6. The following is information about the SAT Math scores of New York high school students based on a simple random sample of 750 students. The hypotheses are $H_0 : \mu = 500$, $H_a : \mu > 500$. Assume that the population standard deviation is $\sigma = 100$. The test rejects H_0 at the 5% level of significance. Using the appropriate table, calculate the power of the test against the alternative $\mu = 515$. Round your answers to four decimal places.

2008 FAMAT State Convention Statistics Bowl Question #7

7. Mr. Morris grades his AP Statistics exam for his 75 students. After grading each exam, he assigns each exam a score of 1, 2, 3, 4, or 5. After grading all 75 exams, Mr. Morris calculates the mean of the scores to be 3. He organizes the exams by result and comes up with the following distribution:

Score	1	2	3	4	5
Frequency	10	15	20	a	b

Using the information above, find the following:

A = the value of a.

B = the value of b.

C = the standard deviation of the 75 scores.

Find the exact value of the following:

$$\frac{BC}{A}$$

2008 FAMAT State Convention Statistics Bowl Question #7

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Using the information above, find the following:

A = the value of a.

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C = the standard deviation of the 75 scores.

Find the exact value of the following:

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2008 FAMAT State Convention Statistics Bowl Question #8

8. Mr. Jackson collects data from each of the 123 students in his classes. The average IQ of each student is $\bar{x} = 106$ with a standard deviation of $s_x = 12$. The average G.P.A. of each student is $\bar{y} = 3.20$ with a standard deviation of $s_y = .4$. The correlation coefficient between IQ and G.P.A. is .675.

Find the following:

A = the slope of the equation of the least square line for predicting G.P.A. from IQ.

B = the y-intercept of the equation of the least square line for predicting G.P.A. from IQ.

C = the proportion of the observed variation in the students' G.P.A.'s that can be explained by the linear relationship between G.P.A. and IQ.

D = a student with an IQ of 102 has a low G.P.A. of 1.50. Find the residual for this particular student.

Find the exact value of the following: $A + B + C + D$

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Find the exact value of the following: $A + B + C + D$

2008 FAMAT State Convention Statistics Bowl Question #9

9. Mrs. Lynch gives an Algebra 2 exam. The results of her exam produce a mean of 63 and a standard deviation of 5. She curves the exam so that the new results of the exam are a mean of 75 and a standard deviation of 8. Find the following:

A = the slope of the linear transformation equation

B = the y-intercept of the linear transformation equation

C = John scores a 72 on the test. What is John's score after the exam is curved?

D = Jane scores a 99 after the curve is applied. What was Jane's original score?

Find the exact value of the following:

$$A + B + C - D$$

2008 FAMAT State Convention Statistics Bowl Question #9

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2008 FAMAT State Convention Statistics Bowl Question #10

10. A school district is trying to determine if student absence is equally distributed throughout the school week. Choosing a five day week at random, a researcher contacts all of the schools and comes up with the following data:

Day of the week	Monday	Tuesday	Wednesday	Thursday	Friday
Students absent	105	92	81	91	101

A χ^2 test will be used to determine if student absences are distributed equally at the 10% level of significance. Find the following:

A = the number of degrees of freedom

B = the exact value of χ^2

C = the critical value of χ^2 from the appropriate table

Find the exact value of: $A + B + C$

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2008 FAMAT State Convention Statistics Bowl Question #11

11. Mrs. Snow asks her first grade class what their favorite foods are. The results of her census are as follows: 11 students like fish sticks, 16 like Macaroni and Cheese, and 18 like Hamburgers. 5 like only fish sticks, 4 like only Macaroni and Cheese and 8 like only Hamburgers. 2 students like all three foods, and each student in the class like at least one of the foods. Find the following:

A = the number of students who like exactly 2 of the foods.

B = the total number of students in the class.

C = the number of students who do not like Hamburgers.

Find the exact value of the following: $A + B - C$

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C = the number of students who do not like Hamburgers.

Find the exact value of the following: $A + B - C$

2008 FAMAT State Convention Statistics Bowl Question #12

12. It has been shown that a certain medication alleviates headaches in 30% of all cases. Find the following:

A = On the average, how many out of the next 40 people given the medication will have their headache alleviated?

B = What is the standard deviation for the situation described in part A?
(Please round your answer to two decimal places.)

C = What is the probability that exactly 10 out of the next 40 people will have their headache alleviated?
(Please round your answer to two decimal places.)

D = What is the probability that at most 10 out of the next 40 people will have their headache alleviated?
(Please round your answer to two decimal places.)

Find the value of the following: $A + B + C + D$

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