

January 2008 Team Questions

1. Use the following chart to answer each part of the question. Assume each part is independent of every other part. Assume each student takes only one of the classes.

	Pre Calculus (P)	English (E)	Chemistry (C)
Male (M)	27	30	21
Female (F)	15	30	16

Find the probability of the following:

A)  $P(C|M)$    B)  $P(E \cap F)$    C)  $P(M|P')$

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

2. Roque is a tennis player who gets in 72% of his first serves. Use this information to answer the following parts. Assume each part is independent of every other part.

A) During a three set match, Roque hits 82 first serves. Find the probability that Roque gets exactly 60 first serves in. Round your answer to four decimal places.

B) The next day, Roque practices his first serve. He takes 150 first serves. Find the standard deviation of this situation. Round your answer to four decimal places.

C) During his next match, Roque hits 54 first serves. Find the probability that Roque gets at least 40 first serves in. Round your answer to four decimal places.

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

3. The election for the Mu Alpha Theta President is about to take place. One candidate from each of the three regions of Mu Alpha Theta is running for President. Anna is from Region 1, Bill is from Region 2, and Connie is from Region 3. Region 1 comprises 24% of the total votes for President. In Region 1, 40% of voters vote for Anna, 32% for Bill and 28% for Connie. Region 2 comprises 36% of the total votes for President. In Region 2, 34% vote for Anna, 50% vote for Bill and 16% vote for Connie. Region 3 comprises 40% of the total votes for President. In Region 3, 20% vote for Anna, 25% vote for Bill and 55% vote for Connie. Use the information to answer the following parts. Each part is independent of every other part.

A) What percent of the total vote will Anna get?

B) What percent of the total vote will Bill get?

C) What percent of the total vote will Connie get?

Find the exact value of the following:  $2A + B - C$

4. The height of female students at Great Falls High School is measured in inches, and the data forms a normal distribution. The mean of the data is 64 inches with a standard deviation of 4 inches. Use the information to answer the following parts. Each part is independent of every other part. Use the appropriate chart to answer each part.

A) Find the probability that a female student is taller than 70 inches.

B) Find the probability that a female student is shorter than 59 inches.

C) Find the probability that a female student has a height between 59 and 70 inches.

D) Find the probability that a female student is taller than 71 inches or shorter than 54 inches.

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

5. Given the following information about two sets X and Y:

$$\bar{X} = -12, s_x = 4, \bar{Y} = 48, s_y = 9, r = .30$$

find the following:

A) the slope of the line of best fit

- B) the y intercept of the line of best fit
- C) the x intercept of the line of best fit
- D) the value of the residual when  $X = 6$  and  $Y = 80$ .

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

6. Let  $X = \{\text{the positive integral factors of } 60\}$ . Find the following:

- A) the mean of set X. B) the median of set X. C) the interquartile range of set X.
- D) the variance of set X.

Find the exact value of the following:  $\frac{AD}{BC}$

7. The following is the distribution of scores from Mr. Spencer's IB Math Exam.

Score	3	4	5	6
Frequency	4	2	15	10

Find the following:

A = the mean of the distribution B = the standard deviation of the distribution

Find the exact value of the following:  $AB$

8. Alex Jacob loves to play cards. He has a standard deck (no jokers). He draws a card from the deck, observes the card, and replaces the card within the deck. Use this information to answer the following parts. Each part is independent of every other part.

A = the probability that it takes Alex three draws before he gets an ace.

B = the probability that it takes Alex more than four draws to get a face card.

C = the probability that Alex draws a black card in three draws or less.

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

9. Mr. Jones gives his Algebra 1 midterm. The results of the midterm are a mean of 71 with a standard deviation of 6. Mr. Jones curves the exam so that the new mean and standard deviation of the midterm is 78 and 4, respectively. This curve can be represented by the equation  $y = mx + b$ , where  $x$  is the original score and  $y$  is the curved score. Use the information to find the following parts. Each part is independent of every other part.

A = the value of  $m$  in the equation. B = the value of  $b$  in the equation.

C = John's curved score, given that he got a 60 on the midterm.

D = Amy's original score, given that she got an 85 after the curve.

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

10. Suppose that 73% of an simple random sample of 100 students taking a Math class in the morning like Math, while only 62% of an simple random sample of 150 students taking a Math class in the afternoon like Math. Establish a 90% confidence interval estimate for the difference between the two times. Use the appropriate chart to answer the question. Assume a positive difference and round each end of the interval to six decimal places.

11. The heights of students in Mrs. Martinez's class are normally distributed. 5.82% of the students are greater than 75 inches and 3.59% of students are less than 60 inches.

Using the appropriate chart, find the following:

A = the mean of the distribution B = the standard deviation of the distribution

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

12. Given  $P(A) = \frac{3}{10}$ ,  $P(B) = \frac{3}{5}$ , and  $P(A|B) = \frac{1}{3}$ , find the following parts. Assume each part is independent of every other part.

$$a = P(B|A) \quad b = P(A \cup B) \quad c = P(A'|B') \quad d = P(B'|A)$$

Find the exact value of the following:  $abcd$

13. The population of Matthews High School is comprised of 40% freshman, 30% sophomores, 15% juniors and 15% seniors. Dr. Spelling's statistics class is comprised of 20 freshman, 15 sophomores, 10 juniors and 5 seniors. Find the following:

A = the chi-square value to help determine if Dr. Spelling's class is representative of the population of the school.

B = the number of degrees of freedom if a chi-square test was to be performed.

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

14. The breakdown for Mr. Hale's Math Studies class is as follows:

Grade	1	2	3	4	5	6
Percentage	.01	.01	.02	.15	.48	.33

Find the following about Mr. Hale's Math Studies class:

A = the mean of the class    B = the variance of the class, rounded to two decimal places.

Find the exact value of the following:  $AB$

15. Given the following set of data  $X = \{10, 20, 30, 40, 50, 60, 70, 80, 90, 100\}$ , find the following:

A = the mean of the data    B = the median of the data

C = the interquartile range of the data    D = the standard deviation of the data

Find the exact value of the following:  $A - B + \frac{C}{D}$