Stockton University
Mathematical Mayhem 2015
Individual Round

March 21, 2015

Name: _____

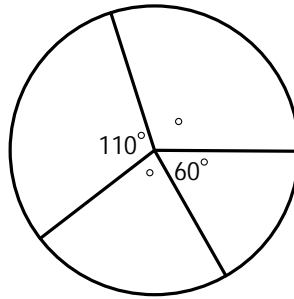High School: _____

Instructions:

Thisco15   This round consists of **18**

/ **Appetizers** /

Problem 1. In the diagram, what does $a + b$ equal?

  (A.) 10   (B.) 85   (C.) 110   (D.) 170   (E.) 190

Problem 2. What number goes in the box so that $\frac{2}{3} + \frac{3}{\square} = 1$?

  (A.) 1   (B.) 2   (C.) 3   (D.) 6   (E.) 9

Problem 3. A square with side length 1 sits inside of a rectangle that is 1 × 2 and divides the rectangle into three parts. If the area of the rectangle above the square is twice as big as the area of the rectangle below the square, what is the area of rectangle below the square?

  (A.) $1=2$ (B.) $1=3$ (C.) $1=4$ (D.) $1=5$ (E.) $1=6$

Problem 4. In the diagram, $\triangle ABC$ has a right angle at C. A square is drawn on each side of the triangle. The area of the square on side AB

Problem 5. Two high school classes took the same test. The average of the class of 20 students is 80 percent, and the average of the other class of 30 students is 70 percent. What is the average for all students in the two classes combined?

(A.) 75%   (B.) 74%   (C.) 72%   (D.) 77%   (E.) none of these

Problem 6. What is the difference between the two roots of $x^2 - 7x - 9 = 0$?

(A.) 7   (B.) 7.5   (C.) 9   (D.) $2\sqrt{85}$ (E.) $\sqrt{85}$

Problem 7. If $x^2yz^3 = 192$ and $xy^2 = 9$, then xyz

} Entrées }

Problem 9. A house and store were sold for $12,000 each. The house was sold at a loss of 20% of the cost of the house, and the store at a gain of 20% of the cost of the store. How much total money was gained or lost in the transaction?

(A.) no loss or gain   (B.) loss of $1000   (C.) gain of $1000   (D.) gain of $2000   (E.) none of these

Problem 10. A traditional six-sided die is a cube on which each side has dots representing a number 1 through 6. The sum of the numbers shown on each pair of opposite sides of a die is 7. The figure below shows two dice stacked one on top of the other with two sides touching, one from each die. What is the maximum possible sum of the numbers on the sides that are touching?

(A.) 7   (B.) 8   (C.) 9   (D.) 11   (E.) 12
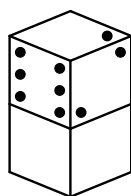
Problem 11. Which of the following is $\sqrt[q]{\frac{1}{4^2} + \frac{1}{5^2} + \frac{2}{5 \cdot 4}}$ equal to?

(A.) $\frac{9}{20}$ (B.) $\frac{9}{20} + \frac{\sqrt[p]{10}}{10}$ (C.) $\frac{1}{20}$ (D.) $\frac{81}{400}$ (E.) 1

Problem 12. Some pigs have 2-looped tails and other pigs have 3-looped tails. While walking through a pig sty one day, you count exactly 100 loops. Based on this information, which of the following conclusions must be true?

(A.) The total number of pigs with 3-looped tails is odd.   (B.) The total number of pigs is even.
(C.) The total number of pigs with 2-looped tails cannot be prime.   (D.) The total number of pigs is odd.
(E.) The total number of pigs with 3-looped tails is even.

Problem 13. Suppo711.33574 Tf 67.85hTf 67.8ba Tf 67.8off 67.8af 67.8rectanglTf 67.8isf 67.8increa Tdf 67.8b(le

~ Desserts ~

Problem 16. Two parallel chords of equal length are drawn 8 inches apart in a circle of radius 8 inches. What is the area of the part of the circle that lies between the two chords?

(A.) $21\frac{1}{3}$ $32\pi\sqrt{3}$ (B.) $21\frac{1}{3} + 32\pi\sqrt{3}$ (C.) $42\frac{2}{3} + 32\pi\sqrt{3}$ (D.) $42\frac{2}{3}$