MU ALPHA THETA - MAINE '95 NAME: ____________________

SCHOOL BOWL - ALPHA DIVISION STUDENT ID NUMBER: ____________
INDIVIDUAL ROUND I NON-CALCULATOR

TIME: CIRCLE ONE 0-60 secs. 12 pts. 60-90 secs. 8 pts 90-120 sec. 4 pts.

ANSWER - QUESTION #1: ____________

1. Find the value of x for which the following would be true?
$\frac{15}{90} + \frac{16}{96} + \frac{17}{102} + \frac{18}{108} + \frac{19}{114} + \frac{20}{120} + \frac{x}{126} = 1$

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INDIVIDUAL ROUND I NON-CALCULATOR

TIME: CIRCLE ONE 0-60 secs. 12 pts. 60-90 secs. 8 pts 90-120 sec. 4 pts.

ANSWER - QUESTION #2: ____________

2. Simplify completely: $243 - 81(35) + 10(27)(49) - 10(9)(343) + 15(49)(49) - 7^5$

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INDIVIDUAL ROUND I NON-CALCULATOR

TIME: CIRCLE ONE	0-60 secs.	60-90 secs.	90-120 sec.
	12 pts.	8 pts	4 pts.

ANSWER - QUESTION #3:________________

3. If $A = \sqrt{2+\sqrt{2+\sqrt{2+\ldots}}}$ *and* $B = \sqrt{2-\sqrt{2-\sqrt{2-\ldots}}}$ then $A+B=$

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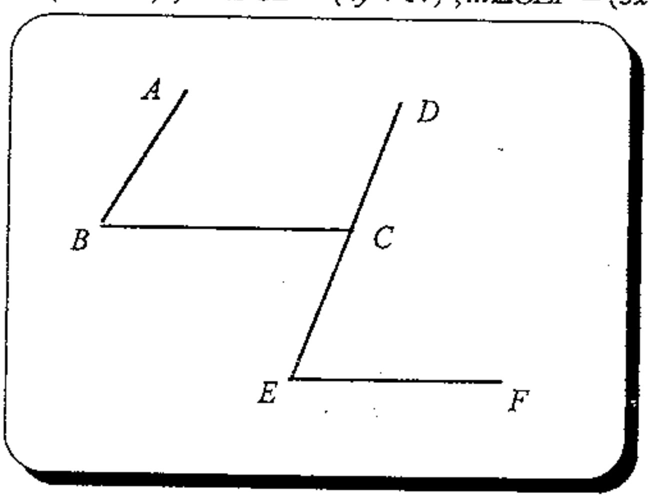
INDIVIDUAL ROUND I NON-CALCULATOR

TIME: CIRCLE ONE	0-60 secs.	60-90 secs.	90-120 sec.
	12 pts.	8 pts	4 pts.

ANSWER - QUESTION #4:________________

4. AB || DCE, BC || EF,
$m\angle ABC = (3x+12)^\circ, m\angle BCD = (4y+17)^\circ, m\angle CEF = (5x-42)^\circ$. Find the value of y.



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SCHOOL BOWL - ALPHA DIVISION STUDENT ID NUMBER:________________
TEAM ROUND II CALCULATOR

TIME: CIRCLE ONE	0- 1 min.	1 - 2 min	2 - 3 min..
	15 pts.	10 pts	5 pts.

ANSWER - QUESTION #1:________________

1. Using the digits 1, 2, 4, 5, 6, 7 without repetition, how many six digits numbers can be formed which are divisible by 25?

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TEAM ROUND II CALCULATOR

TIME: CIRCLE ONE	0- 1 min.	1 - 2 min	2 - 3 min..
	15 pts.	10 pts	5 pts.

ANSWER - QUESTION #2:________________

2. Find all order pairs of positive integers (x,y) so that

$$3^3+3^3+3^3+3^3+3^3+3^3=x\bullet 3^y$$

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TEAM ROUND II CALCULATOR

TIME: CIRCLE ONE	0- 1 min.	1 - 2 min	2 - 3 min..
	15 pts.	10 pts	5 pts.

ANSWER - QUESTION #3:________________

3. The line $3x + ky = c$ is parallel to the line $5x + 7y = 15$ and contains the point $(8,-5)$. Find the ordered pair (k,c).

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TEAM ROUND II CALCULATOR

TIME: CIRCLE ONE	0- 1 min.	1 - 2 min	2 - 3 min..
	15 pts.	10 pts	5 pts.

ANSWER - QUESTION #4:________________

4. The sum of the interior angles of two regular polygons is $3960°$. One polygon has 8 more sides than the other. Find the positive difference between the number of diagonals between these two polygons.

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TEAM ROUND III CALCULATOR

TIME: CIRCLE ONE	0- 2 mins.	2 - 3 mins	3 - 4 mins.
	20 pts.	10 pts	5 pts.

ANSWER - QUESTION #1:________________

1. Find the smallest positive number N such that 40N is a perfect square and 50N is a perfect cube.

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TEAM ROUND III CALCULATOR

TIME: CIRCLE ONE	0- 2 mins.	2 - 3 mins	3 - 4 mins.
	20 pts.	10 pts	5 pts.

ANSWER - QUESTION #2:________________

2. Simplify: $(\sqrt{6}-\sqrt{3})^2 - \sqrt[6]{8} + \left(\frac{1}{50}\right)^{\frac{-1}{2}} - \sqrt[n]{\frac{81^{n+1}}{9^{n+2}}}$

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TEAM ROUND III CALCULATOR

TIME: CIRCLE ONE	0- 2 mins.	2 - 3 mins	3 - 4 mins.
	20 pts.	10 pts	5 pts.

ANSWER - QUESTION #3: ______________

3. The sides of a right triangle are integers, and the legs are both less than 50. Find the maximum value of the perimeter.

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TEAM ROUND III CALCULATOR

TIME: CIRCLE ONE	0- 2 mins.	2 - 3 mins	3 - 4 mins.
	20 pts.	10 pts	5 pts.

ANSWER - QUESTION #4: ______________

4. Consider the parabola: $x^2 - 10x + 8y + 41 = 0$.
Let a = the y - coordinate of the focus, let b = the length of the latus rectum, let c = the x-coordinate of the vertex, and d = the number of real zeros of the polynomial.
Find $\frac{b}{a+c+d}$

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SCHOOL BOWL - ALPHA DIVISION STUDENT ID NUMBER:________________
TEAM ROUND IV CALCULATOR

TIME: CIRCLE ONE	0- 3 mins.	3 - 4 mins	4 - 5 mins.
	25 pts.	15 pts	10 pts.

ANSWER - QUESTION #1:________________

1. For how many integers n between 1 and 200 does $x^2 + x - n$ factor into the product of two linear pairs with integer coefficients?

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TEAM ROUND IV CALCULATOR

TIME: CIRCLE ONE	0- 3 mins.	3 - 4 mins	4 - 5 mins.
	25 pts.	15 pts	10 pts.

ANSWER - QUESTION #2:________________

2. Evaluate: $\tan[Sin^{-1}\left(\frac{-4}{5}\right) + Tan^{-1}\left(\frac{1}{3}\right)]$

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TEAM ROUND IV CALCULATOR

TIME: CIRCLE ONE	0- 3 mins.	3 - 4 mins	4 - 5 mins.
	25 pts.	15 pts	10 pts.

ANSWER - QUESTION #3:________________

3. The diagonals of a 5 by 12 rectangle are drawn. Circles are inscribed in the two triangles formed by the diagonals and the sides of length 5. How far apart are the centers of the circles?

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TEAM ROUND IV CALCULATOR

TIME: CIRCLE ONE	0- 3 mins.	3 - 4 mins	4 - 5 mins.
	25 pts.	15 pts	10 pts.

ANSWER - QUESTION #4:________________

4. In the Lucky 7 Lottery, all prizes are powers of 7, i.e. 1, 7, 49, 343, ... The total prize money is $1,000,000. What is the least number of prizes possible, if all money must be distributed?