

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION  
INDIVIDUAL ROUND I

STUDENT ID NUMBER: \_\_\_\_\_  
CALCULATOR

TIME: CIRCLE ONE

0-60 secs.  
12 pts.

60-90 secs.  
8 pts

90-120 sec.  
4 pts.

ANSWER - QUESTION #1: \_\_\_\_\_

1. Solve for x:  $125^{4-3x} = 625^{2x}$

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION  
INDIVIDUAL ROUND I

STUDENT ID NUMBER: \_\_\_\_\_  
CALCULATOR

TIME: CIRCLE ONE

0-60 secs.  
12 pts.

60-90 secs.  
8 pts

90-120 sec.  
4 pts.

ANSWER - QUESTION #2: \_\_\_\_\_

2. There are three different digits such that any two of them, written in any order, serve as the digits of a two-digit prime. What are all three of these digits?

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION  
INDIVIDUAL ROUND I

STUDENT ID NUMBER: \_\_\_\_\_  
CALCULATOR

TIME: CIRCLE ONE

0-60 secs.  
12 pts.

60-90 secs.  
8 pts

90-120 sec.  
4 pts.

ANSWER - QUESTION #3: \_\_\_\_\_

3. How many multiples of 6 are there between 1,111 and 4,444?

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION  
INDIVIDUAL ROUND I

STUDENT ID NUMBER: \_\_\_\_\_  
CALCULATOR

TIME: CIRCLE ONE

0-60 secs.  
12 pts.

60-90 secs.  
8 pts

90-120 sec.  
4 pts.

ANSWER - QUESTION #4: \_\_\_\_\_

4. Find the greatest number of sides that a regular polygon can have and yet still have an integral number of degrees in each interior angle.

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE 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. 81, x, y, 192 form a geometric progression. Find y.

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA 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 #2: \_\_\_\_\_

2. Given that  $N^* = \frac{(N-1)!}{N}$  where N is a natural number. Find the two smallest natural numbers greater than 20 for which  $N^*$  will not equal a natural number.

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION  
TEAM ROUND II

STUDENT ID NUMBER: \_\_\_\_\_

CALCULATOR

TIME: CIRCLE ONE

0- 1 min.  
15 pts.

1 - 2 min  
10 pts

2 - 3 min..  
5 pts.

ANSWER - QUESTION #3: \_\_\_\_\_

3. Solve for x:  $\left(\frac{1}{\sqrt[3]{2}}\right)^{9+6x} \cdot 32^{2-x} = \left(\sqrt[3]{8}\right)^{-10x-5}$

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION  
TEAM ROUND II

STUDENT ID NUMBER: \_\_\_\_\_

CALCULATOR

TIME: CIRCLE ONE

0- 1 min.  
15 pts.

1 - 2 min  
10 pts

2 - 3 min..  
5 pts.

ANSWER - QUESTION #4: \_\_\_\_\_

4. The sum of 7 angles of a decagon is  $1220^\circ$ . Of the remaining 3 angles, exactly two are complementary and exactly two are supplementary. Find the measure, in degrees, of the smallest of the three angles.

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - ALPHA DIVISION

STUDENT ID NUMBER: \_\_\_\_\_

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 two non-zero numbers whose sum, difference, and product are proportional to 5, 3, and 16.

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION STUDENT ID NUMBER: \_\_\_\_\_

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. Consider the equations of the form  $x^2 + bx + c = 0$ . How many such equations have real roots and have coefficients  $b$  and  $c$  selected from the set of integers  $\{1, 2, 3, 4, 5, 6\}$

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION STUDENT ID NUMBER: \_\_\_\_\_

TEAM ROUND III CALCULATOR

TIME: CIRCLE ONE

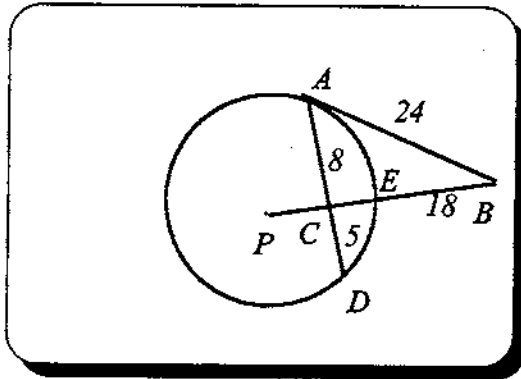
0- 2 mins.  
20 pts.

2 - 3 mins  
10 pts

3 - 4 mins.  
5 pts.

ANSWER - QUESTION #3: \_\_\_\_\_

3. BA is tangent to this circle at A. P is the center. AC = 8, CD = 5, BE = 18 and AB = 24. Find the length of CE.



MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION STUDENT ID NUMBER: \_\_\_\_\_

TEAM ROUND III CALCULATOR

TIME: CIRCLE ONE

0- 2 mins.  
20 pts.

2 - 3 mins  
10 pts

3 - 4 mins.  
5 pts.

ANSWER - QUESTION #4: \_\_\_\_\_

4. Matilda (the Cleaner) sells customized Station wagons. In 1994 she sold \$250000 worth of cars at a commission rate of 25%. In 1995 she is on pace to sell \$320000 worth of cars. Her commission for 1995, however, projects to be only 82% of her 1994 earnings. What was her commission rate in 1995 to the nearest percent?

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION  
TEAM ROUND IV

STUDENT ID NUMBER: \_\_\_\_\_

CALCULATOR

TIME: CIRCLE ONE

0- 3 mins.  
25 pts.

3 - 4 mins  
15 pts

4 - 5 mins.  
10 pts.

ANSWER - QUESTION #1: \_\_\_\_\_

1. Consider a regular quadrilateral with side length 10 cm. Let  $a$  = the perimeter,  $b$  = the area,  $c$  = the length of the diagonal,  $d$  = length of the radius, and  $e$  = the length of its apothem. Find  $\frac{abc}{de}$

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION  
TEAM ROUND IV

STUDENT ID NUMBER: \_\_\_\_\_

CALCULATOR

TIME: CIRCLE ONE

0- 3 mins.  
25 pts.

3 - 4 mins  
15 pts

4 - 5 mins.  
10 pts.

ANSWER - QUESTION #2: \_\_\_\_\_

2. There are three real roots to the equation  $(x)(x)^{\frac{3}{2}} = \frac{x^2}{x}$ . Find the sum of the three roots.

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION  
TEAM ROUND IV

STUDENT ID NUMBER: \_\_\_\_\_

CALCULATOR

TIME: CIRCLE ONE

0- 3 mins.  
25 pts.

3 - 4 mins  
15 pts

4 - 5 mins.  
10 pts.

ANSWER - QUESTION #3: \_\_\_\_\_

3. The product of 99 and an integer  $k$  is  $50x8x$  where  $x$  represents a digit in the product. Find the integer  $k$ .

MU ALPHA THETA - MAINE '95

NAME: \_\_\_\_\_

STATE BOWL - THETA DIVISION  
TEAM ROUND IV

STUDENT ID NUMBER: \_\_\_\_\_

CALCULATOR

TIME: CIRCLE ONE

0- 3 mins.  
25 pts.

3 - 4 mins  
15 pts

4 - 5 mins.  
10 pts.

ANSWER - QUESTION #4: \_\_\_\_\_

4. Bill and Andrea are rollerblading toward each other at speeds of 10 ft/sec. They start out one fourth mile apart. A single photon begins reflecting back and forth from Andrea to Bill when they start out. They are each wearing small reflector dishes on their helmets. Approximately how many miles will the photon beam travel going back and forth until Andrea and Bill past one another (or crash)? The speed of light is approximately 186,000 miles per second.