1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION # 1

The largest number of consecutive zero place holders that would appear in the product of 11625000 and 102120000 is what?

ANSWER BOX

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION # 3

If $\text{Log}_2 X + \text{Log}_4 X - \text{Log}_8 X = 7$, then X equals what?

ANSWER BOX

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION # 2

Three vertices of a regular hexagon are chosen at random. What is the probability that an isosceles triangle will be formed by connecting these three vertices.

ANSWER BOX

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION # 4

If $P(x + 2) = x^3 + 9x^2 + 26x + 23$, then $P(x - 2)$ is what?

ANSWER BOX

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION # 5

One side of a triangle is 4 inches longer than another side. The ray bisecting the angle between these two sides divides the third side into 3 inch and 4 inch segment. Find the perimeter, in inches, of the triangle.

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION # 7

Find the area of the triangle formed using the centers of the following conic sections.
$X^2 + Y^2 - 4X - 10Y + 25 = 0$; $3X^2 + 4Y^2 - 24X + 8Y + 40 = 0$; $3X^2 - 2Y^2 + 36X - 8Y + 94 = 0$

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION # 6

A RUNSUM is a sequence of consecutive positive integers. Three is the smallest RUNSUM of two consecutive integers. (1 + 2). Nine is the first number that has two different RUNSUMS: (2 + 3 + 4 and 4 + 5). Fifteen is the first number that has three RUNSUMS: (1 + 2 + 3 + 4 + 5 and 7 + 8 and 4 + 5 + 6) What is the smallest number with four different RUNSUMS?

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION # 8

For a given line, the sum of the x and y-intercepts is $6\frac{1}{3}$ and the product is 10. Find all possible value for the slope of this line.

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 9A

Find all rational zeros of $f(x) = 4x^3 - 12x^2 - 19x + 12$

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 9B

Find the area bounded by the functions $f(x) = -\frac{2}{3}(x + 4)^2 + 3$ and $f(x) = -3$

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 10A

Solve for x over the Real Numbers: $8^{\frac{1}{6}} + x^{\frac{1}{3}} = \frac{7}{3 - \sqrt{2}}$

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 10B

Find the positive value of m such that P (m, 2m) is 5 units from the line $12x + 5y = 1$.

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 11A

Find $g(4)$ if $g(x-1) = x^2 + 2$

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 11B

Find $g^{-1}(4)$ if $g(x) = x^3 - 4$

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 11C

Find $f^{-1}(g(h(5)))$ if $f(x) = x - 1$, $g(x) = 3x$, and $h(x) = \frac{5}{x}$

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 11D

Find the value of A if the point (3, 2) lies on the graph of the inverse of $f(x) = 2x^2 + x + A$

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 12A

Given $f = \{ (0, -3), (2, 5), (-1, 1), (4, 2) \}$, $g = \{ (-1, 2), (1, 4), (4, 3), (0, -1) \}$, and $h = \{ (4, 2), (1, 0), (-3, 4), (3, -1) \}$, find $f(g(h(x)))$.

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 12B

Solve for all values of x: $2^x + 2^x + 2^x + 2^x = 2^{x^2}$

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 12C

In the expansion of $(2x + c)^8$, for some non-zero value of the constant c, the fourth and fifth terms have the same numerical coefficient. Find the value of c.

1999 MU ALPHA THETA NATIONALS
TENNESSEE STATE BOWL
THETA DIVISION
QUESTION 12D

Find the smallest positive integer which has exactly 27 distinct positive integral factors.