

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 1

Solve for x:

$$\begin{vmatrix} -1 & 2x & -x \\ 2 & -3 & 6 \\ x + 3 & x - 1 & 7 \end{vmatrix} = 57$$

ANSWER

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 2

Solve for x: $\log(x^2) + (\log x)^2 = 3$

ANSWER

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 3

Evaluate the limit, if it exists

$$\lim_{x \rightarrow 2} \frac{\sqrt[3]{x+6} - \sqrt{2x}}{x-2}$$

ANSWER

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 4

Find the coordinates of the centroid of the triangle with vertices $(2, 4)$, $(4, -8)$ and $(-6, 0)$

ANSWER

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 5

Evaluate $\tan \left[\text{Arcsin} \left(\frac{-5}{13} \right) - \text{Arccos} \frac{24}{25} \right]$

ANSWER

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 6

Find the area enclosed by the graphs of $y = x^3 - 2x^2 - 7x + 9$ and
 $y = -x^2 + x - 3$.

ANSWER

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 7

Find the partial fraction decomposition of $\frac{x^2 + 3x - 2}{x^2 - 15x + 56}$

ANSWER

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 8

The ellipse $4x^2 + 9y^2 - 16x - 18y - 11 = 0$ has 2 vertices in the first quadrant.
Find, in slope-intercept form, the equation of the line containing these two vertices.

ANSWER

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 9

Solve for θ , $0^\circ \leq \theta < 360^\circ$:

$$4 \tan 2\theta + 5 \cot \theta = 0$$

ANSWER

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 10

Find, in slope-intercept form, the equation of the line tangent to the given function at the point where $x = -2$.

$$f(x) = \arctan(x + 2) - \frac{x - 1}{x + 3} + \ln(x^2 - 3)$$

ANSWER

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 11

Solve for the matrix M:

$$M \begin{bmatrix} 6 & -2 \\ 4 & 7 \end{bmatrix} - \begin{bmatrix} 17 & -19 \\ 14 & -20 \end{bmatrix} = \begin{bmatrix} 5 & -5 \\ 4 & -3 \end{bmatrix}$$

ANSWER

1994 MAΘ NATIONAL CONVENTION
NEW ORLEANS

CODE _____

ALPHA CIPHERING

PROBLEM # 12

Two noncongruent circles are externally tangent. The distance between their centers is 4 cm and the total area enclosed by the circles is 12.5π cm². Find the radius of the smaller circle.

(π stands for pi)

ANSWER
