

CNCM Math Bowl Preliminary Round 2

CNCM Administration

$\sqrt{x} + \sqrt{\sqrt{x}} = 12$. Find all real values of x .

Find the number of ordered pairs (x, y) that make the number $3X,4Y1$ divisible by 9.

Let $f(x) = g^{-1}(x + 1)$. Find $f(g(f(g(f(g(f(7)))))))$ given that $f(x) = x^2 + 2x - 3$.

Compute $\frac{3}{2 - \frac{\frac{8}{6 + \frac{20}{1 + 1}}}}$ to three decimal places.

Find the horizontal asymptotes of the function $y = \frac{(2x + 5)(3x - 5)(2 - x)}{(7x + 3)(2 + x)(5 - x)}$

When a is multiplied by n , the result is a number 37812 less than the result when a is multiplied by $n + 2$. Find a .

An equilateral triangle with side length $2\sqrt{3}$ is inscribed in side a circle. Find the area in terms of π .

9 points, forming a set S of points, are on a circle. Each chord connecting two points in S is drawn. On each chord, a penny is randomly placed on one of its endpoints. What is the probability none of the points in S have 0 or 8 pennies stacked on top of them?

The graph $x = y^4 - 8y^3 + 25y^2 - 35y + 18$ is symmetrical about some horizontal line. Translate the graph up 3 units and right two units, and call this translated graph $x = G(y)$. Find the line of symmetry of $G(y)$.

A shop has 4 bundle offers.

- Buying 1 pant costs \$8.03
- Buying 5 pants costs \$40.13
- Buying 31 pants costs \$248.84
- Buying 78 pants costs \$626.00

What is the least amount of money that must be spent to buy exactly 145 pants?

Find all roots of $x^4 = -4$.

The sum of the geometric series with first term 6, common ratio 4, and 31 terms is expressed in base 4. Find the sum of the digits of this base 4 representation. (Express your sum in base 10.)

Find all x such that $\sin x = 2 \cos x + 1$.

Find c where the roots of $x(y + 3) + 4y + c = 0$ in the ordered pair (x, y) are $(-3, -4)$.

Find the sum of all x that satisfies $\frac{1}{1-x^2} + \frac{3}{3-x^2} = 0$.