

ALPHA DIVISION CIPHERING: QUESTION 1

How many diagonals does a twenty-sided polygon have?

ALPHA DIVISION CIPHERING: QUESTION 2

If all of the roots of the equation $3x^4 - 5x^3 + 2x^2 - 3x - 4 = 0$ were increased by $\frac{1}{6}$, what would their sum be?

ALPHA DIVISION CIPHERING: QUESTION 3

Find the 26th number in the 29th row of Pascal's triangle.

ALPHA DIVISION CIPHERING: QUESTION 4

How many whole number factors does 5000 have?

ALPHA DIVISION CIPHERING: QUESTION 5

Let $Ax + By + C = 0$ (with A, B and C integers, $A > 0$, and $\text{GCF}(A, B, C) = 1$) be the equation of the line which is the perpendicular bisector of the segment joining the points $(-1, 3)$ and $(-4, 5)$. Find the value of $A+B+C$.

ALPHA DIVISION CIPHERING: QUESTION 6

Find the sum of the digits of the base 8 number which is equivalent to 101101110_{two} .

ALPHA DIVISION CIPHERING: QUESTION 7

The repeating decimal $.\overline{132}$ may be written as a fraction in the form $\frac{p}{q}$ where p and q are relatively prime. Find $p+q$.

ALPHA DIVISION CIPHERING: QUESTION 8

The number $2 - \sqrt{2} + 2\sqrt{2}i$ has five fifth roots. Find the sum of the five fifth roots of $2\sqrt{2} + 2\sqrt{2}i$.

ALPHA DIVISION CIPHERING: QUESTION 9

The locus of points given by $r = \frac{2}{3 + 2 \cos \theta}$

is a graph whose shape is one of the conic sections. Identify the shape of the graph.

ALPHA DIVISION CIPHERING: QUESTION 10

Evaluate: $\frac{1}{2} + \frac{1}{2} + \frac{3}{8} + \frac{1}{4} + \frac{5}{32} \dots$

ALPHA DIVISION CIPHERING: QUESTION 11

Resolve $\frac{3x^2 - 5x - 16}{x^3 + 2x^2 - x - 2}$ into partial

fractions of the form

$\frac{A}{x+d} + \frac{B}{x+e} + \frac{C}{x+f}$ and find the value of $A+B+C$.

ALPHA DIVISION CIPHERING: QUESTION 12

Find the numerical coefficient of the term of the expansion

$(\frac{2}{x^2} - 3x)^5$ which contains x^{-4} .

ALPHA DIVISION CIPHERING: QUESTION 13

Let a, b and c be the roots of the equation $x^3 + 2x^2 - x + 1 = 0$.

Find the value of $a^2 + b^2 + c^2$.

ALPHA DIVISION CIPHERING: QUESTION 14

Solve for x : $\log_5 25 + \log_3 9 - \log_6 6 - \log_2 x = 4$

ALPHA DIVISION CIPHERING: QUESTION 15

Given a rectangular solid whose width is 4 inches, whose height is 2 inches and whose volume is 48 cubic inches, find the number of inches in a diagonal of the solid.