Answer # S1

Sample Questions

Sample 1: Find the sum of the odd perfect squares less than 98.

Answer # S2

Sample 2: If (x, y) is the solution to the system of equations:
$\begin{cases} 2x+y=17 \\ 3x-2y=43 \end{cases}$, then find the value of xy.

Answer # 1

Question #1

If $5^{x^2-9}=25^{4x}$, then find the smallest possible value of x.

Answer # 2

Question #2

Find the sum of all values of x that satisfy the equation
$\log_x\left(4x^2-x-6\right)=3$.

Answer # 3

Question #3

Given $f(x)=\frac{2x+1}{5x-3}$, then find $\left[f^{-1}\left(\frac{4}{7}\right)\right]^{-1}$.

Answer # 4

Question #4

If $a_1=1$, $a_2=2$, and $a_n=2a_{n-2}-a_{n-1}$, then find the value of a_{12}.

Answer # 5

Question #5

A regular convex polygon has n sides and 3n diagonals, find the measure of one of its interior angles.

Answer # 6

Question #6

If $f(x)=\frac{1}{x^2}-8$ and $g(x)=\cos x$, find the value of $f\left(g\left(\frac{\pi}{3}\right)\right)$.

Answer # 7

Question #7

Find the sum of the positive, odd, integral divisors of 4320.

Answer # 8

Question #8

For what values of x does the following represent a real number:

$\frac{\sqrt{x+4}}{\sqrt{2x-7}}$?

Answer # 9

Question #9

Find the area of the region enclosed by the graphs of

$y = |x| - 4$ and $y = -2|x| + 8$.

Answer # 10

Question #10

If $f(x) = \frac{\sin(2x)(\cot x + \tan x)}{\sec x \csc x(1 + \cos 2x)}$, then find $f\left(\frac{2\pi}{3}\right)$.

Answer # 11

Question #11

Find all real roots of the equation $x^5 - 2x^4 - 25x^3 + 54x^2 - 54x = 0$, given that $1+i$ is an imaginary root of the equation.

Answer # 12

Question #12

Evaluate $\lim_{x \to 4} \frac{x^3 - 64}{x - 4}$.