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The Trigonometry Multiple Dimension Inverse Formul(aa)e

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ABSTRACT

In trigonometry 2 dimensional formulae is present in present scenario, but what about formulae required to calculate 3 dimensional or 4 dimensional or more than its multiple dimensional trigonometry structure? There is need to be introduced multi-dimensional structure formulae to derive more accurate and precise result in mathematics. Here by introducing some basic structure of formulae, new multidimensional mathematic structure has been derived and help to convert its more complex structure calculation in to simple small precise calculation of structure.

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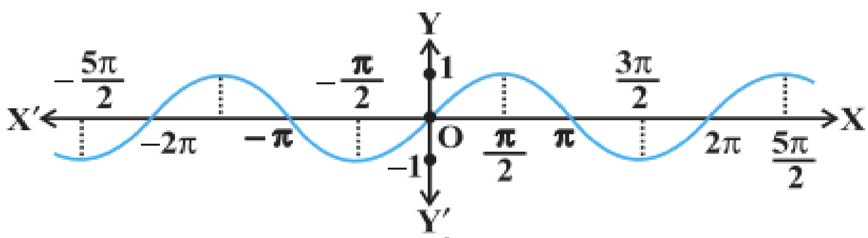
Let's have a overview on sine and sine inverse functions:

sine function, i.e., sine: R → [– 1, 1]

f: X→Y such that f(x) = y is one-one and onto, then we can define a unique function g: Y→X such that g(y) = x, where x ∈ X and y = f (x), y ∈ Y. Here, the domain of g = range of f and the range of g = domain of f.

The function g is called the inverse of f and is denoted by f –1. Further, g is also one-one and onto and inverse of g is f. Thus, $g^{-1} = (f^{-1})^{-1} = f$. We also have $(f^{-1} \circ f)(x) = f^{-1}(f(x)) = f^{-1}(y) = x$ and $(f \circ f^{-1})(y) = f(f^{-1}(y)) = f(x) = y$ Since the domain of sine function is the set of all real numbers and range is the closed interval [–1, 1].

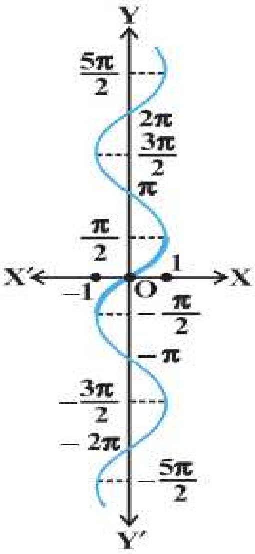
If y = f(x) is an invertible function, then $x = f^{-1}(y)$. Thus, the graph of $\sin^{-1}$ function can be obtained from the graph of original function by interchanging x and y axes, i.e., if (a, b) is a point on the graph of sine function, then (b, a) becomes the corresponding point on the graph of INVERSE TRIGONOMETRIC FUNCTIONS of sine function.



$y = \sin x$

Figure (i)

Thus, the graph of the function y = sin–1 x can be obtained from the graph of y = sin x by interchanging x and y axes. The graphs of y = sin x and $y = \sin^{-1} x$ is as given in Fig (i), (ii). The dark portion of the graph of $y = \sin^{-1} x$ represents the principal value branch. (ii) It can be shown that the graph of an inverse function can be obtained from the corresponding graph of original function as a mirror image (i.e., reflection) along the line y = x.



$y = \sin^{-1}x$

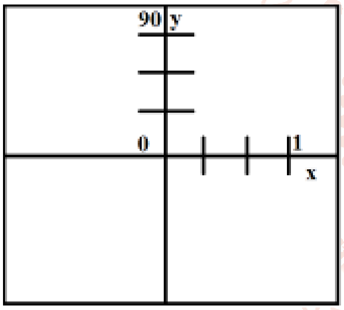
Figure (ii)

Now, let's an overview on different dimensional formulae structure:

- **2-Dimensional structure**
- IF, x = 1, and y = $\sin^{-1}(x)$, then for 2-Dimensional structure,

Y = $\sin^{-1}(x)$,

Y= $\sin^{-1}(1) = 90^o$



- IF, x = 0.5, and y = $\sin^{-1}(x)$, then for 2-Dimensional structure,

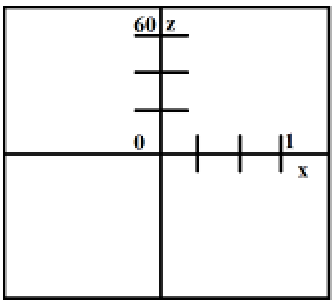
Y = $\sin^{-1}(x)$,

Y= $\sin^{-1}(0.5) = 30^o$

- **3-Dimensional structure**
- IF, x = 1, and z = $\sin^{-2}(x)$, then for 3-Dimensional structure,

Z = $\sin^{-2}(x)$,

Z = $\sin^{-2}(1) = 60^o$



- IF, x = 0.5, and z = $\sin^{-2}(x)$, then for 3-Dimensional structure,

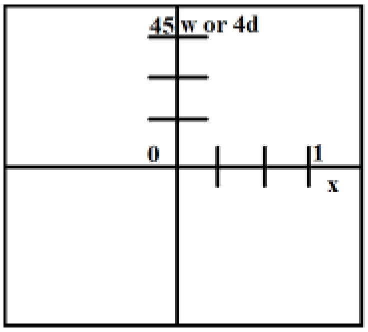
Z = $\sin^{-2}(x)$,

Z = $\sin^{-2}(0.5) = 20^o$

- **4-Dimensional structure**
- IF, x = 1, and w or 4d = $\sin^{-3}(x)$, then for 4-Dimensional structure,

W or 4d = $\sin^{-3}(x)$,

W or 4d = $\sin^{-3}(1) = 45^o$



- IF, x = 0.5, and w or 4d = $\sin^{-3}(x)$, then for 4-Dimensional structure,

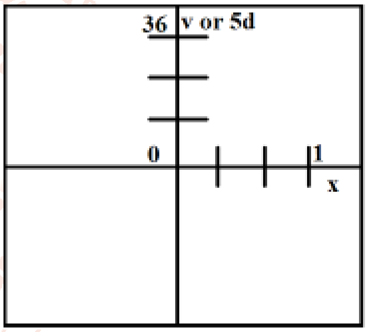
W or 4d = $\sin^{-3}(x)$,

W or 4d = $\sin^{-3}(0.5) = 15^o$

- **5-Dimensional structure**
- IF, x = 1, and v or 5d = $\sin^{-4}(x)$, then for 5-Dimensional structure,

V or 5d = $\sin^{-4}(x)$,

V or 5d = $\sin^{-4}(1) = 36^o$



- IF, x = 0.5, and v or 5d = $\sin^{-4}(x)$, then for 5-Dimensional structure,

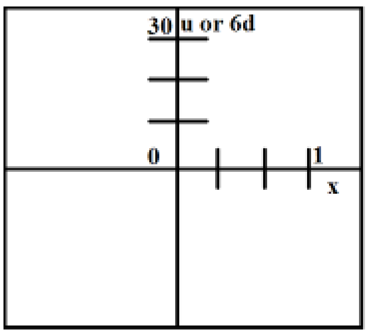
V or 5d = $\sin^{-4}(x)$,

V or 5d = $\sin^{-4}(0.5) = 15^o$

- 6-Dimensional structure
- IF, x = 1, and u or 6d = $\sin^{-5}(x)$, then for 6-Dimensional structure,

u or 6d = $\sin^{-5}(x)$,

u or 6d = $\sin^{-5}(1) = 30^o$

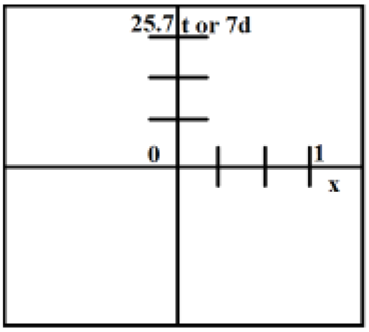


- IF, x = 0.5, and u or 6d = $\sin^{-5}(x)$, then for 6-Dimensional structure,

u or 6d = $\sin^{-5}(x)$,
u or 6d = $\sin^{-5}(0.5) = 10^o$

- **7-Dimensional structure**
- IF, x = 1, and t or 7d = $\sin^{-6}(x)$, then for 7-Dimensional structure,

t or 7d = $\sin^{-6}(x)$,
t or 7d = $\sin^{-6}(1) = 25.7^o$



- IF, x = 0.5, and t or 7d = $\sin^{-6}(x)$, then for 7-Dimensional structure,

t or 7d = $\sin^{-6}(x)$,
t or 7d = $\sin^{-6}(0.5) = 8.5^o$

Sin inverse table according to multiple Dimensions:

Sin ^{inverse} x(value)	Name of Axis	Angle at x=1	Angle at x=0.5	Angle at x=0
$\sin^{-1}x$	Y	90	30	0
$\sin^{-2}x$	Z	60	20	0
$\sin^{-3}x$	W or 4d	45	15	0
$\sin^{-4}x$	V or 5d	36	12	0
$\sin^{-5}x$	U or 6d	30	10	0
$\sin^{-6}x$	T or 7d	25.7	8.5	0
and so, on counting 8d, 9d, 10d, 11d ……...				

Conclusion:

In nut shell, by introducing multiple dimensional formulae, Ease in understanding of multidimensional complex structure of any shape of object's formation, break up points, strength, maintenance, integration and derivative functions, and behavior against different environment of different industrial or non-industrial parameters of measurement.

References:

[1] CBSE, BOOK, 11'TH STD MATHAMATICS