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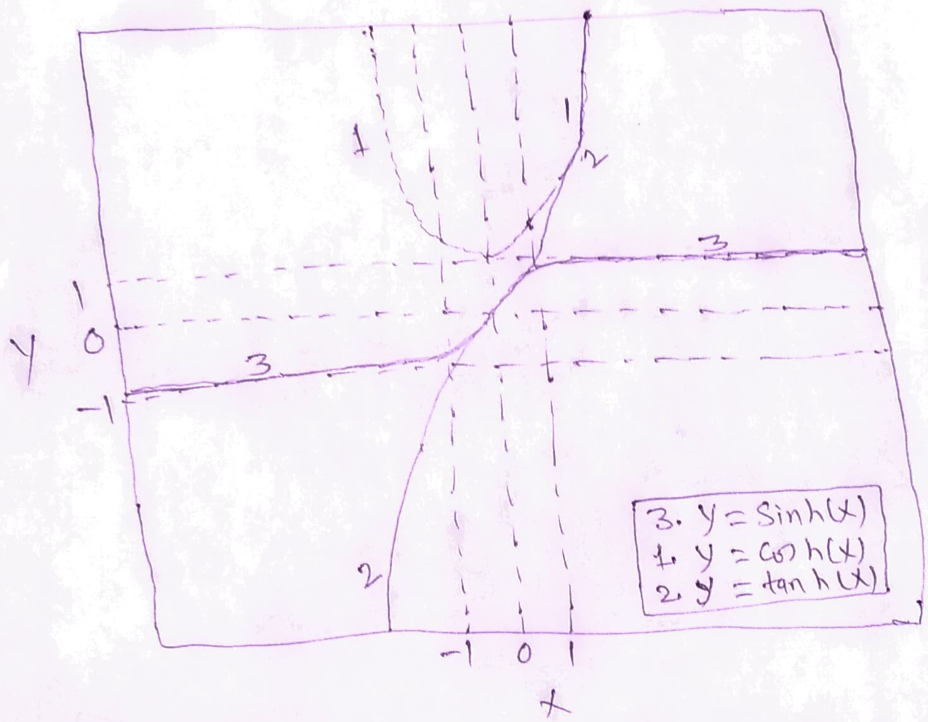
Dr. Kamlesh Kumar
Asst. Prof. (Guest Faculty)
Dept. of Mathematics
Maharaja College,
V.K.S.U, Ara

B.Sc. Part 1 (Hons) Paper - I

Hyperbolic Function :- These are analogues of the ordinary trigonometric functions, but defined using the hyperbola rather than the circle. Just as the points (cost, sint) form a circle with a unit radius, the points (cosh t, sinh t) form the right half of the unit hyperbola.



Hyperbolic functions occur in the calculations of angles and distances in hyperbolic geometry. They also occur in the solutions of many linear differential equations (Such as the equation defining a Catenary), cubic equations and Laplace's equation in Cartesian coordinates.

The basic hyperbolic functions are:-

* "Sinh" (hyperbolic sine)
* "Cosh" (hyperbolic cosine)
* "tanh" (hyperbolic tangent)
* "csch" (hyperbolic cosecant)
* "Coth" (hyperbolic cotangent)
* "Sech" (hyperbolic secant)

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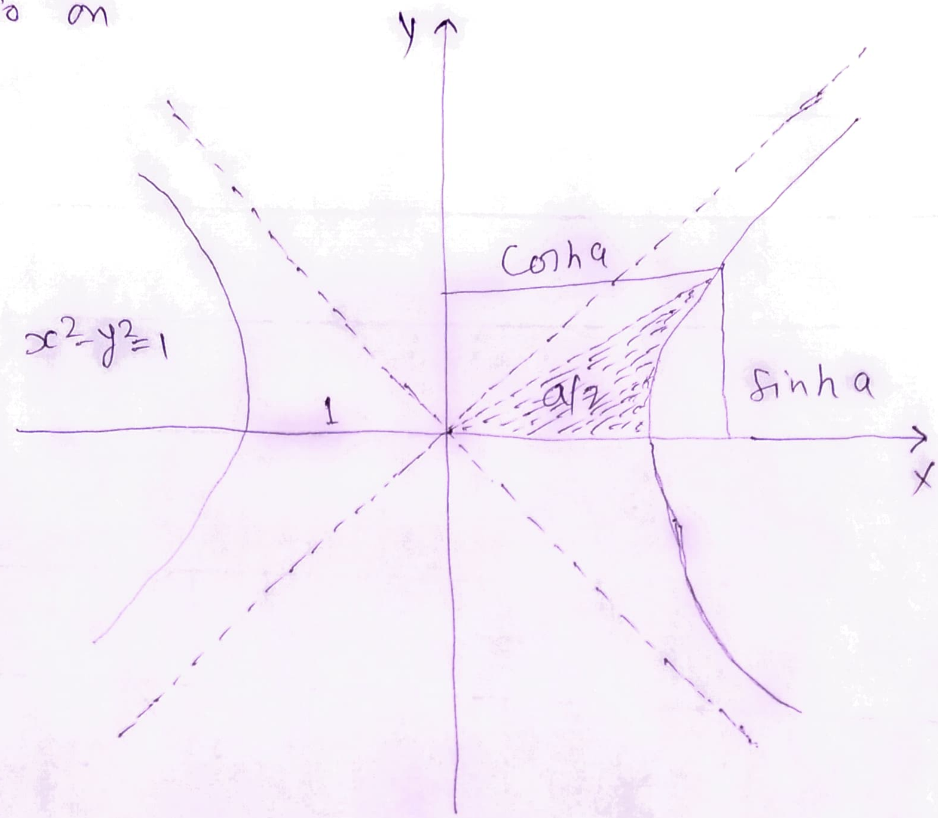
Corresponding to the desired trigonometric functions.
The inverse hyperbolic functions are :-

* area hyperbolic sine "ar sinh" or "$\sinh^{-1}$".
* area hyperbolic cosine "ar cosh" or "$\cosh^{-1}$".
* and so on



A ray through the unit hyperbola $x^2-y^2=1$ at the point (cosh a, sinh a), where a is twice the area between the ray, the hyperbola, and the x-axis, the area is considered negative for the points on the hyperbola below the x-axis.

The hyperbolic functions take a real argument called a hyperbolic angle. The size of a hyperbolic angle is twice the area of its hyperbolic sector. The hyperbolic functions may be defined in terms of the legs of a right triangle covering this sector. The hyperbolic functions have a transcendental value for every non-zero algebric value of the argument.