MTH. 437 4/1/2019

Summary So far

Curvature	Flat	Curved	Flat
Line Element	dx^2+dy^2	$r^2(d\theta^2+\sin^2\theta d\phi^2)$	dx^2-dt^2
Signature	0	0	1

What is the basis for trigonometry?

Circle Trig v.s. ~~Triangle Trig~~

"you measure distance with ds"

① equation of a circle: $x^2+y^2=r^2$

② measure arc length: $ds^2=dx^2+dy^2$

③ define angle: $\theta = s/r$

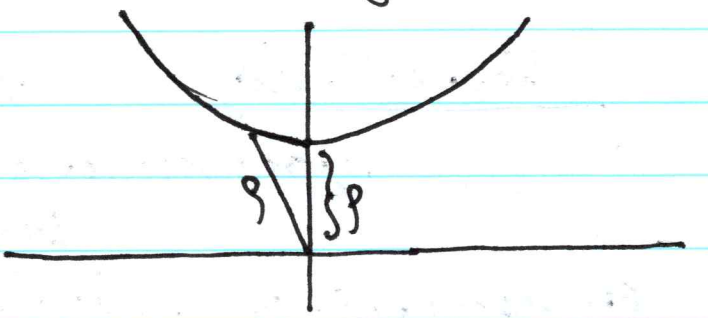
④ trig functions = coordinates on the circle : $(r\cos\theta, r\sin\theta)$

Hardest Part: Integrate for arclength w/o using a trig substitution (because we haven't yet defined the trig!).

Special Relativity: Hyperbola Geometry
note: Not hyperbolic geometry

① define hyperbolic circle e.g. hyperbola

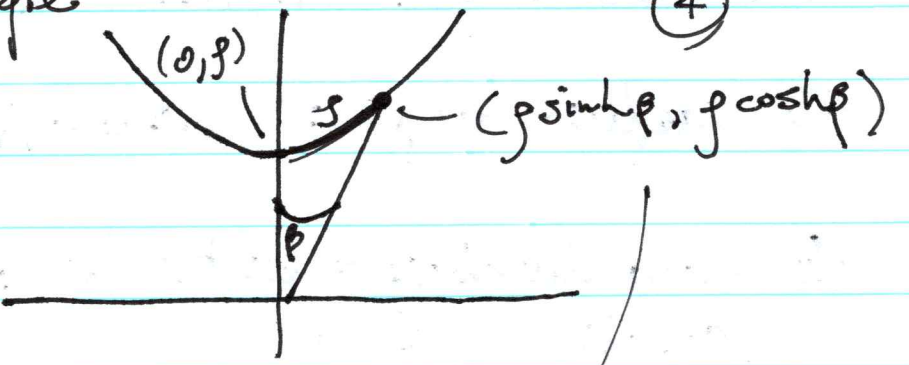
$$t^2 - x^2 = \rho^2$$



② $ds^2 = dx^2 - dt^2$ ⟶ define hyperbolic angle

③ $\beta \equiv s/\rho$

④



Note: ordering is flipped because β is measured from the y-axis (twice axis).