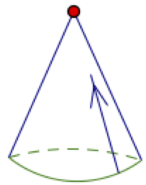
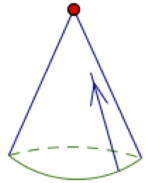


1) What happens when a bug gets to the cone point along this geodesic?

a) The geodesic ends there.

b) The bug can continue to walk straight through the cone point to the “other side” by bisecting the cone angle there.

c) other



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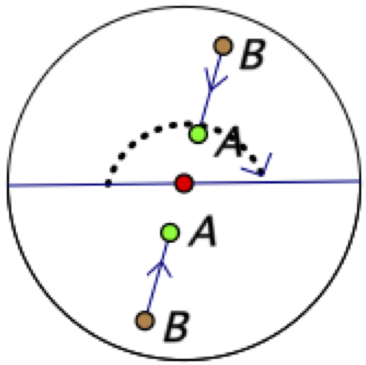
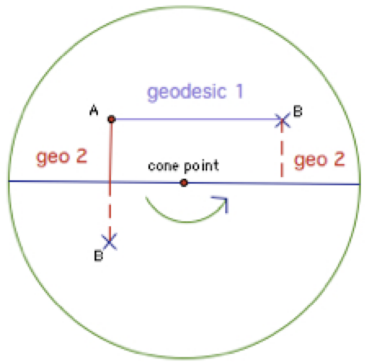
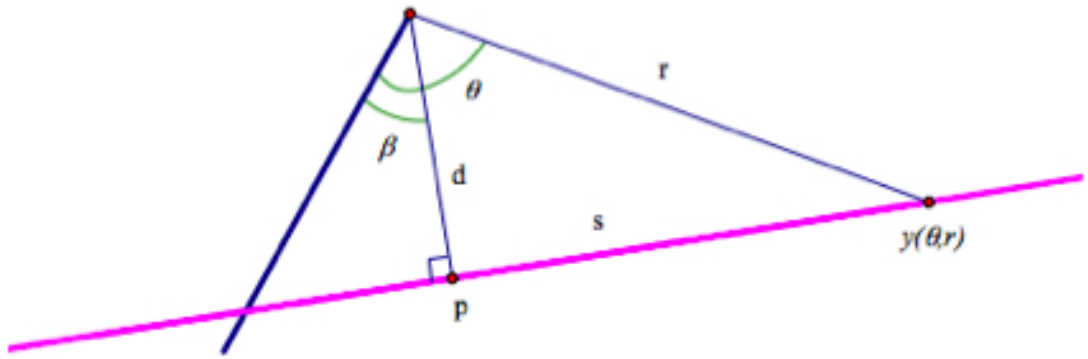




2) What is the equation of a geodesic that an arbitrary point $y(\theta, r)$ satisfies, where d and β are defined as in the hw and following picture:



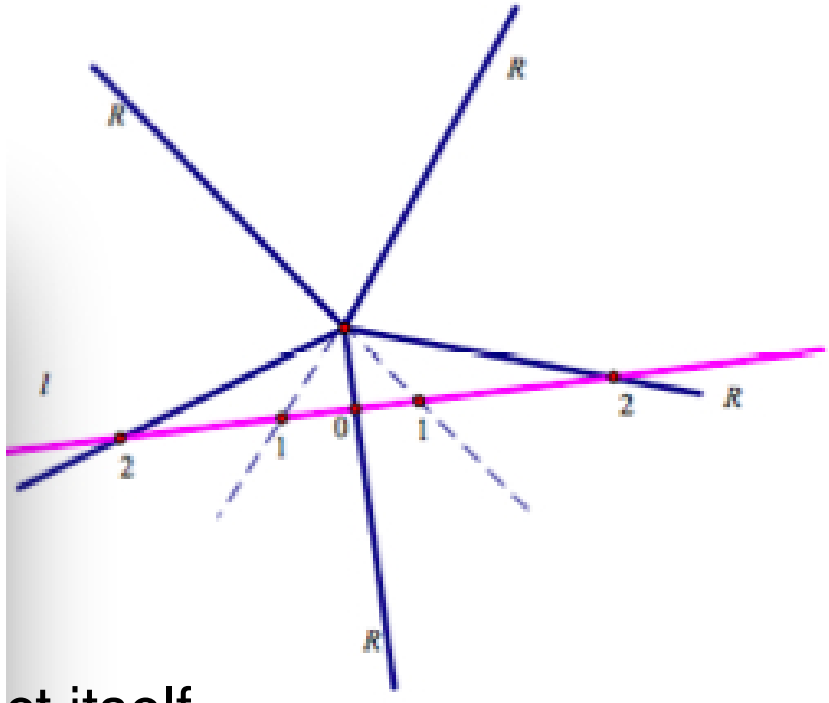
a) $r = d \sec(\theta - \beta)$

b) $d = r \sec(\theta - \beta)$

c) both

d) other

3) In general on a cone of small enough cone angle, a geodesic



a) won't intersect itself
b) will intersect itself a finite number of times with a maximum crossing number that depends on the specific cone angle
c) will intersect itself infinitely many times

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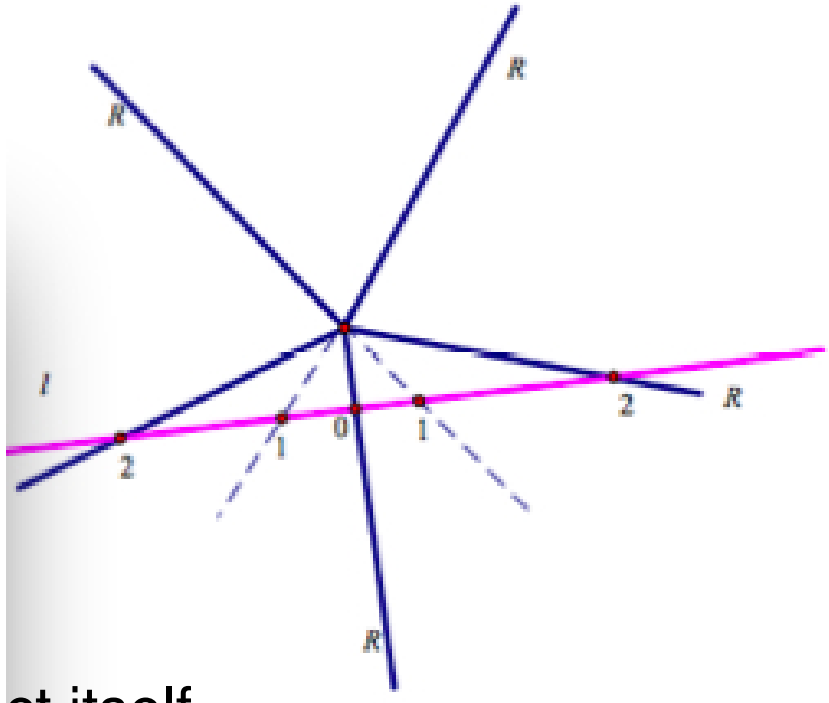

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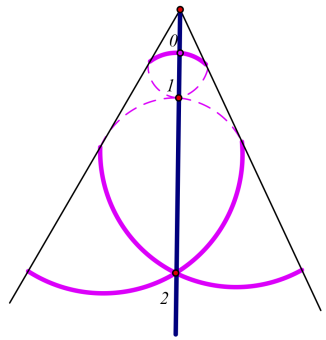

4) Extend the 450° cone in all directions so that it continues indefinitely. Can we find a point P (other than the cone point) and a geodesic l (not through the cone point) such that there are many geodesics through P that do not intersect l?

a) yes and I can sketch a diagram

b) no and I can explain why not

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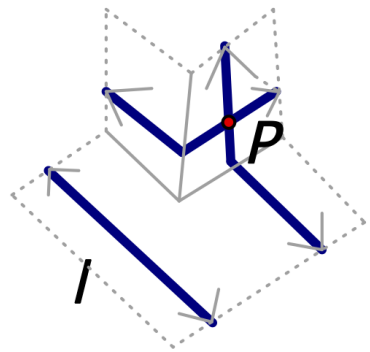

For homework today you were to read section 2.1.
Work with a neighbor to write down examples of surfaces for each type of parametrization.

a) Monge patch $x(u, v) = (u, v, f(u, v))$
b) geographical coordinates
$x(u, v) = (Rcosucosv, Rsinucosv, Rsinv)$
c) surface of revolution $x(u, v) = (g(u), h(u)cosv, h(u)sinv)$
from a planar curve $\alpha(u) = (g(u), h(u), 0)$
d) ruled surface $x(u, v) = \beta(u) + v\delta(u)$, where β and δ are curves and $x(u, v)$ is lines emanating from the directrix beta going in the direction of δ

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a) paraboloid
b) sphere
c) catenoid from catenary $y = \cosh(x)$
d) helicoid, cone, cylinder