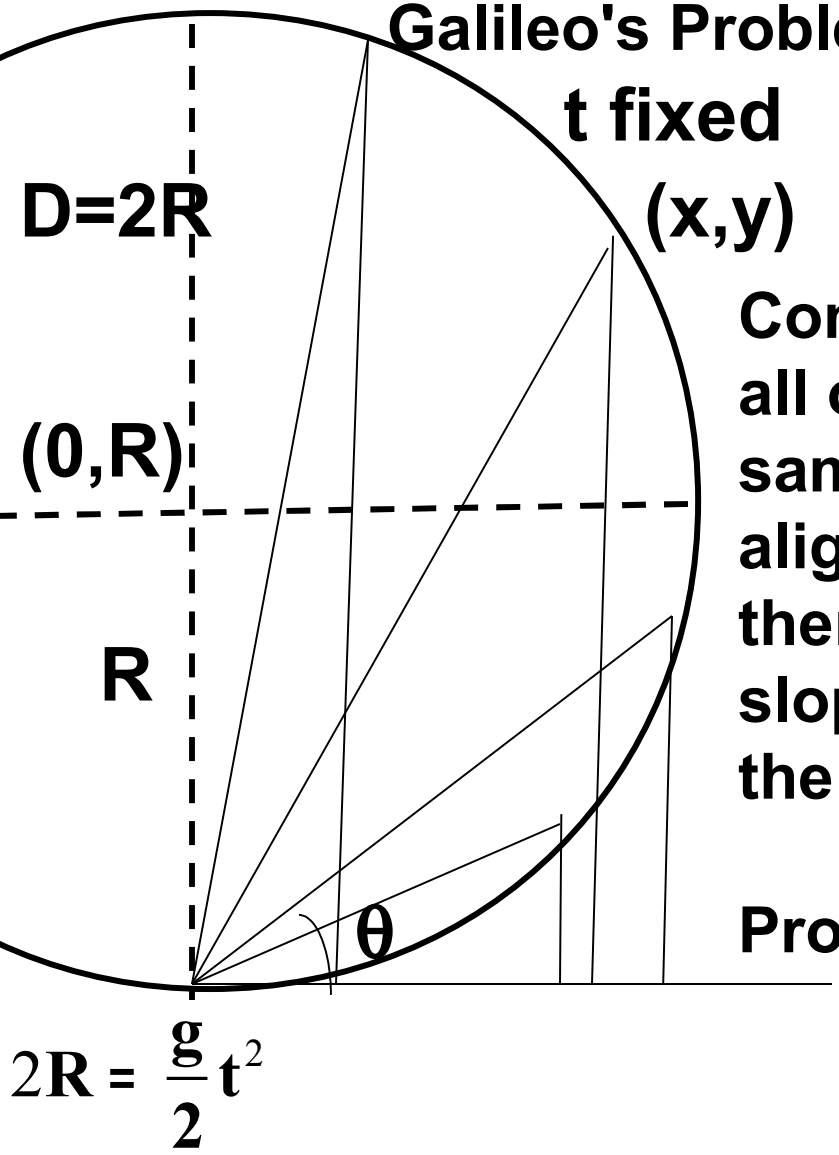
Galileo's Problem



Consider a set of inclined planes for all of which an object rolls down in the same time t. Galileo deduced that aligning all such planes at their bottom then their tops fall along a circle. The slopes of the planes form the cords of the circle.

Prove Galileo's proposition.

$$2R = \frac{g}{2}t^2$$