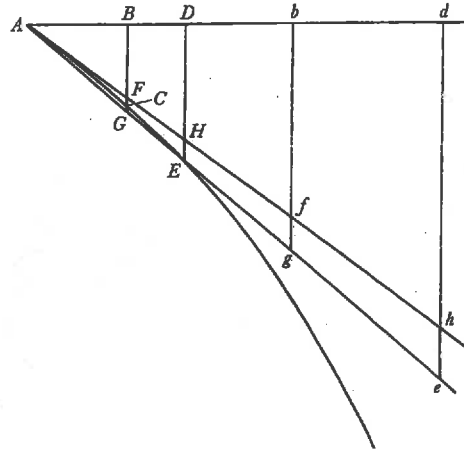


Lemma 2: The space described by a body urged by any centripetal force at the beginning of its motion is as the square of the time.



Sketch of proof:

Let the times be represented by the lines AB, AD; the spaces described under a uniform centripetal force, by the areas ABF and ADH; and the spaces described under a non-uniform centripetal force by ABC and ADE, where AH is tangent to the curve ACE at A.

Draw a straight line AGE, with the areas under it, e.g. ABG, representing the spaces described under a uniform centripetal force (greater than that corresponding to AFH); and extend the line ABD to ABDbd with AB:AD as Ab:Ad.

Since the areas under ACE, such as ABC, are greater than those under AFH, such as ABF, and less than those under AGE, such as ABG, the spaces described in times less than or equal to AD under the non-uniform force are greater than or equal to those under the uniform force corresponding to AFH and less than or equal to those under the uniform force corresponding to AGE

Let the lines AB and AD decrease in their given ratio until the points A, B, and D meet and the line Ae coincides with the tangent Ah; then the ultimate ratios of Abf to Ade and Abg to Adh become the same as the ratio of Abf to Adh. But the latter is as the square of the ratio of AB to AD, and therefore the ratio ABC to ADEC, intermediate between the ultimate ratios will also be as the square of the ratio of AB to AD.