Phyztorical Reenactment: Be Newton for a Day!

Your legal mark and title: .....

Isaac Newton often recorded his findings and drew conclusions using the "query" approach shown below. The following is a sequence of queries Newton might have used to convince his reader of his theory of universal gravitation. Read the following queries and fill in the missing math (equations and simplifications).

Newton completed this derivation at the age of 22 while on recess from college (during an outbreak of the Black Plague in London).

Query 1: Is it not true that all objects tend to maintain their state of rest or of uniform motion in a straight line unless compelled to change that state by unbalanced external forces impressed upon them?

Query 2: Does not the moon travel in circular motion around the earth, revolving once every 27.3 days?

Query 3: Is not circular motion a deviation from motion in straight line; does not circular motion (such as swinging an Odie doll about one's head) involve an acceleration that requires a central force to be impressed upon the moving object?

Query 4: Should not the moon require a force to remain in orbit around the earth?

Query 5: Is the relation between force, mass and acceleration not

$F =$ ma

Query 6: And is not the acceleration of a body in circular motion

$a =$ v^2/R

Query 7: Does not simple geometry show that the speed of a body in circular motion is

$v =$ $2 R/T$ and thus $v^2 =$ $4 ^2R^2/T^2$

Query 8: And through algebraic substitution and simplification, does not the expression in query 6 become

$a =$ $4 ^2R/T^2$

Query 9: By substitution, does not the expression in query 5 become

$F =$ $4 ^2Rm/T^2$

Query 10: But did not Kepler reveal that the orbital radius of a planet cubed divided by the orbital period of that planet squared is a constant value for all planets? Is not Kepler's Rule:

$R^3/T^2=K$? (Rearranged for T^2, this is $T^2 =$.)

Query 11: Cannot T^2 be eliminated from the expression in query 9 by using Kepler's Rule, such that

$F = 4\ ^2Km/R^2$

It is my assumption that any two objects attract each other, and that the force of this attraction is in proportion to the product of their masses:

$F \propto M \cdot m.$

I further this assumption to suggest that the constant K in Kepler's Rule is a quantity that depends on the mass M of the central object (i.e. the sun or the earth): $K \propto M$.

I thus impose my assumption mathematically by the following statement:

$4\pi^2K = GM,$ wherein G is a new constant.

Query 12: Could I not, then, rewrite the expression in query 11 to read

$F = GMm/R^2$

Query 13: Does this not show that the force acting on the moon is a force that acts between two masses M and m that are a distance R away from each other; and is this force not strengthened by the greatness of mass involved and diluted by increased distance between them; and could not this force act between any two masses in the universe?

Query 14: Should I not add another query so that I don't end on the unlucky number 13?

As brilliant as he was, Isaac Newton was also consumed with numerology, alchemy, and Biblical chronology. He considered his work in these fields to be as important (and often more important) than his work in physics. This is not uncommon among those we consider worthy of the title "genius." Their moments of brilliance are often matched by their moments of insanity. Make no mistake: Sir Isaac Newton was a genius if ever there was one. But he was also a mean, spiteful person who spent much of his time pursuing fruitless discoveries in pseudoscience and pseudoreligion.