9A4 Newton Comprehension

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This homework is all about Issac Newton. Read the passage carefully, and answer the questions that follow in full sentences in your book.

In 1642, the year Galileo died, Isaac Newton was born in Woolsthorpe, Lincolnshire, England on Christmas Day. His father had died three months earlier, and baby Isaac, very premature, was also not expected to survive. It was said he could be fitted into a quart pot. When Isaac was three, his mother married a wealthy elderly clergyman from the next village, and went to live there, leaving Isaac behind with his grandmother. The clergyman died, and Isaac's mother came back, after eight years, bringing with her three small children. Two years later, Newton went away to the Grammar School in Grantham, where he lodged with the local apothecary, and was fascinated by the chemicals. The plan was that at age seventeen he would come home and look after the farm. He turned out to be a total failure as a farmer.

His mother's brother, a clergyman who had been an undergraduate at Cambridge, persuaded his mother that it would be better for Isaac to go to university, so in 1661 he went up to Trinity College, Cambridge. Isaac paid his way through college for the first three years by waiting tables and cleaning rooms for the fellows (faculty) and the wealthier students. In 1664, he was elected a scholar, guaranteeing four years of financial support. Unfortunately, at that time the plague was spreading across Europe, and reached Cambridge in the summer of 1665. The university closed, and Newton returned home, where he spent two years concentrating on problems in mathematics and physics. He wrote later that during this time he first understood the theory of gravitation, which we shall discuss below, and the theory of optics (he was the first to realize that white light is made up of the colors of the rainbow), and much mathematics, both integral and differential calculus and infinite series. However, he was always reluctant to publish anything, at least until it appeared someone else might get credit for what he had found earlier.

On returning to Cambridge in 1667, he began to work on alchemy, but then in 1668 Nicolas Mercator published a book containing some methods for dealing with infinite series. Newton immediately wrote a treatise, De Analysi, expounding his own wider ranging results. His friend and mentor Isaac Barrow communicated these discoveries to a London mathematician, but only after some weeks would Newton allow his name to be given. This brought his work to the attention of the mathematics community for the first time. Shortly afterwards, Barrow resigned his Lucasian Professorship (which had been established only in 1663, with Barrow the first incumbent) at Cambridge so that Newton could have the Chair.

Newton's first major public scientific achievement was the invention, design and construction of a reflecting telescope. He ground the mirror, built the tube, and even made his own tools for the job. This was a real advance in telescope technology, and ensured his election to membership in the Royal Society. The mirror gave a sharper image than was possible with a large lens because a lens focusses different colors at slightly different distances, an effect called chromatic aberration. This problem is minimized nowadays by using compound lenses, two lenses of different kinds of glass stuck together, that err in opposite directions, and thus tend to cancel each others shortcomings, but mirrors are still used in large telescopes.

Later in the 1670s, Newton became very interested in theology. He studied Hebrew scholarship and ancient and modern theologians at great length, and became convinced that Christianity had departed from the original teachings of Christ. He felt unable to accept the current beliefs of the Church of England, which was unfortunate because he was required as a Fellow of Trinity College to take holy orders. Happily, the Church of England was more flexible than Galileo had found the Catholic Church in these matters, and King Charles II issued a royal decree excusing Newton from the necessity of taking holy orders! Actually, to prevent this being a wide precedent, the decree specified that, in perpetuity, the Lucasian professor need not take holy orders. (The current Lucasian professor is Stephen Hawking.)

In 1684, three members of the Royal Society, Sir Christopher Wren, Robert Hooke and Edmond Halley, argued as to whether the elliptical orbits of the planets could result from a gravitational force towards the sun proportional to the inverse square of the distance. Halley writes:

Mr. Hook said he had had it, but that he would conceal it for some time so that others, triing and failing might know how to value it, when he should make it publick. Halley went up to Cambridge, and put the problem to Newton, who said he had solved it four years earlier, but couldn't find the proof among his papers. Three months later, he sent an improved version of the proof to Halley, and devoted himself full time to developing these ideas, culminating in the publication of the Principia in 1686. This was the book that really did change man's view of the universe, as we shall shortly discuss, and its importance was fully appreciated very quickly. Newton became a public figure. He left Cambridge for London, where he was appointed Master of the Mint, a role he pursued energetically, as always, including prosecuting counterfeiters. He was knighted by Queen Anne. He argued with Hooke about who deserved credit for discovering the connection between elliptical orbits and the inverse square law until Hooke died in 1703, and he argued with a German mathematician and philosopher, Leibniz, about which of them invented calculus. Newton died in 1727, and was buried with much pomp and circumstance in Westminster Abbey (despite his well-known reservations about the Anglican faith).

Source: `http://galileoandeinstein.physics.virginia.edu/lectures/newton.html`

a. Who died the same year Newton was born?

b. What caused Issac to leave Cambridge University?

c. What college did he study at in Cambridge?

d. What was his 1st major scientific achievement?

e. What did this correct?

f. What was the chair Newton had at Cambridge University?

g. Who is the current Lucasian Professor?

h. Who in 1684 ask Newton for a proof which led to calculus and Principa being written?

i. Who Knighted him?

j. What was he the master of?