Baccalauréat, toutes séries — Session de juin 2008

Épreuve de section européenne

How a question may be brought to an equation

After the learner has been some time exercised in managing and transforming equations, order require that he should try his skill in bringing questions to an equation. And any question being proposed, his skill is particularly required to denote all its conditions to so many equations. To do which, he must first consider whether the propositions or sentences in which it is expressed, be all of them fit to be denoted in algebraick terms, just like we express our conceptions in Latin or Greek characters. And if so, then let him give names to both known and unknown quantities, as far as occasion requires. And the conditions thus translated to algebraick terms will give as many equations as are necessary to solve it.

As if there are required three numbers in continual proportion whose sum is 20, and the sum of their squares 140 ; putting x, y and z for the names of the three numbers sought, the question will be translated out of the verbal to the symbolical expression, as follows :

The question in Words	*The same in symbols*
There are sought three numbers on these conditions :	x, y, z ?
That they shall be continually proportional.	$x : y :: y : z$, or $xz = yy$
That the sum shall be 20.	$x + y + z = 20$
And the sum of their squares 140.	$xx + yy + zz = 140$

From *Universal Arithmetic* by Sir Isaac Newton, 1720

Questions

1. What does the author mean by "bringing questions to an equation" ?
2. Explain the translation of the fact "that they shall be continually proportional".
3. A simple mathematical notation is avoided by the author in this document. Which one ?
4. Does it seem easy to you to solve this system of equations ?
5. Translate in equations the following problem :

   > A certain merchant encreases his estate yearly by a third part, abating 100 £ which he spends yearly in his family, and after three years he finds his estate doubled. *Query,* what he is worth ?