

# PHILOSOPHY AND FUN OF ALGEBRA

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## CHAPTER 5: MATHEMATICAL CERTAINTY AND REDUCTIO AD ABSURDUM

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It is very often said that we cannot have mathematical certainty about anything except a few special subjects, such as number, or quantity, or dimensions. Mathematical certainty depends, not on the subject matter of our investigation, but upon three conditions. The first is a constant recognition of the limits of our own knowledge and the fact of our own ignorance. The second is reverence for the As-Yet-Unknown. The third is absolute fearlessness in meeting the reductio ad absurdum. In mathematics we are always delighted when we come to any such conclusion as  $2 + 3 = 7$ . We feel that we have absolutely cleared out of the way one among the several possible hypotheses, and are ready to try another.

We may be still groping in the dark, but we know that one stumbling-block has been cleared out of our path, and that we are one step "forrader" on the right road. We wish to arrive at truth about the state of our balance sheet, the number of acres in our farm, the time it will take us to get from London to Liverpool, the height of Snowdon, the distance of the moon, and the weight of the sun. We have no desire to deceive ourselves upon any of these points, and therefore we have no superstitious shrinking from the rigid reductio ad absurdum. On some other subjects people do wish to be deceived. They dislike the operation of correcting the hypothetical data which they have taken as basis. Therefore, when they begin to see looming ahead some such ridiculous result as  $2 + 3 = 7$ , they shrink into themselves and try to find some process of twisting the logic, and tinkering the equation, which will make the answer come out a truism instead of an absurdity; and then they say, "Our hypothetical premiss is most likely true because the conclusion to which it brings us is obviously and indisputably true."

If anyone points out that there seems to be a flaw in the argument, they say, "You cannot expect to get mathematical certainty in this world," or "You must not push logic too far," or "Everything is more or less compromise," and so on. Of course, there is no mathematical certainty to be had on those terms. You could have no mathematical certainty about the amount you owed your grocer if you tinkered the process of adding up his bill. I wish to call your attention to the fact that even in this world there is a good



deal of mathematical certainty to be had by whosoever has endless patience, scrupulous accuracy in stating his own ignorance, reverence for the As-Yet-Unknown, and perfect fearlessness in meeting the reductio ad absurdum.

