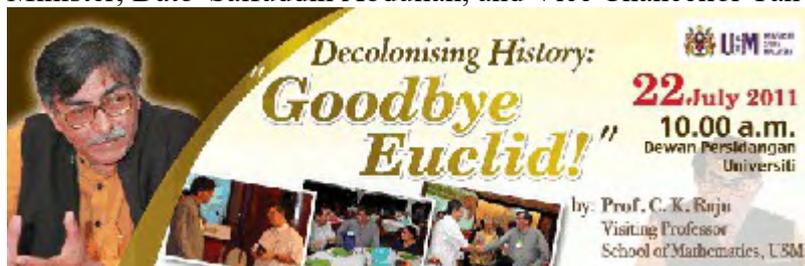


# Reading and viewing list for geometry workshop

## A. Videos

1. Euclid Challenge prize of Rs 2 lakhs (MYR 10 K) for (primary) evidence for Euclid. “Goodbye Euclid!” Talk at Universiti Sains Malaysia, Penang, chaired by Malaysian Deputy Education Minister, Dato' Saifuddin Abdullah, and Vice Chancellor Tan Sri Dzulkifli Abdul Razak..



Video: Goodbye Euclid!		
Part 1 (60 min)	Part 2 (62 mins)	Part 3 (9 mins)

2. Other related videos

How Colonial Education Changed Our Math Teaching (and what we can do about it today)	Sulba Sutra Geometry: Can we teach it in schools today?	Interview by Sanjay Dixit: Colonisation of Indian math. Shulba Sutra proof $a = \sqrt{b^2 + c^2}$	(Doordarshan) Vaartavali: Special interview with eminent Mathematician and Theoretical Physicist - Prof C K Raju

More videos at <http://www.ckraju.net/cv/6-ckr-videos.html>.

### 3. Earlier Rajju Ganita workshops

Nasik	Chamrajnagar	Gundlupete	Indore
			

Poster for Indore workshop: <http://ckraju.net/blog/?p=155>, or <http://ckraju.net/geometry/Rajju-Ganit-poster.pdf>.

Media reports. Archived at <http://ckraju.net/blog/?p=156>.

More press coverage at: <http://www.ckraju.net/press/>

### 4. Preliminary reading

#### A. Book chapters and articles:

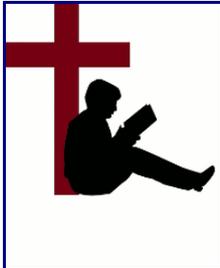
NCERT <https://ncert.nic.in/textbook.php?iemh1=5-15>. (Class IX, chp. 5: “Introduction to Euclid's geometry”. See, also, related material Appendix 1 of same class IX text on “Proofs in mathematics”: <https://ncert.nic.in/textbook.php?iemh1=a1-15>.)

NCERT <https://ncert.nic.in/textbook.php?femh1=4-14>. (Class VI, chp. 4)

C. K. Raju, “Towards Equity in Math Education 1. Good-Bye Euclid!”, *Bharatiya Samajik Chintan* 7 (4) (New Series) (2009) pp. 255–264. <http://ckraju.net/papers/MathEducation1Euclid.pdf>

C. K. Raju, “Towards Equity in Math Education 2. The Indian Rope Trick” *Bharatiya Samajik Chintan* 7 (4) (New Series) (2009) pp. 265–269. <http://ckraju.net/MathEducation2RopeTrick.pdf>.

Hindi article

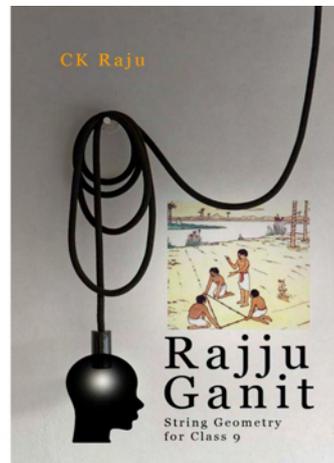
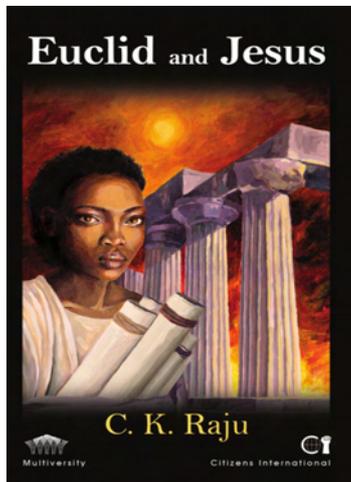


[झूठा इतिहास और अव्यवहारिक गणित सिखाती एन.सी.ई.आर.टी](http://www.ckraju.net/hindi)

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## B. Books

1. E. A. Moise, *Elementary geometry from an advanced standpoint*, Addison-Wesley, 1963. (Useful for an easy understanding of synthetic vs metric geometry, Archimedean postulate, infinities and infinitesimals in a non-Archimedean field of which the appendix accidentally gives a historically important example.)



(forthcoming)

\*2. C. K. Raju, *Euclid and Jesus: How and why the church changed mathematics and Christianity across two religious wars*, Multiversity, Penang, 2012. (Explains how geometry in Plato's time related to the soul, and was borrowed from the mystery geometry of Egypt. After the first religious war of Christians against pagans, in the 4<sup>th</sup> c., the notion of the soul was changed, and mathematics was banned from Christendom. It became the basis of Islamic rational theology. The second religious war (waged by Christians against Muslims) were prolonged military failures. Hence, the church changed its theology to Christian rational theology, copied from Islamic rational theology, the better to persuade Muslims. Overnight, from a supposed doctrine of love, Christianity changed to a doctrine of reason. Since Muslims had been made such hate figures, Christians could not acknowledge learning from Muslims, hence invented "Euclid" to claim ownership of reason. The book *Elements*, a book on mystery geometry to arouse the soul, was wrongly re-interpeted as a book about deductive reasoning intended to persuade others (a church requirement), and especially to persuade Muslims who accepted reason, but not the Christian scriptures. The book was used to teach a special kind of (formal) reasoning to priests, adapted to church theology. This interpretation does not fit the book, as was eventually accepted in the 20<sup>th</sup> c.: there is not a single pure deductive proof in the *Elements* (and there is nil evidence for Euclid). In fact, the plentiful diagrams in the book are counter-evidence that no such proofs were ever intended by the author, who intended a text on Egyptian/Platonic mystery geometry. Hilbert rewrote the whole book to provide the axiomatic proof entirely missing in it. He claimed that it is a book about synthetic (non-metric) geometry. Since the "Pythagorean" proposition is about area Hilbert, while prohibiting length measurement, nevertheless admits area measurement!)

### More advanced reading:

3. D. Hilbert, *Foundations of Geometry*, trans. E. J. Towsend, Open Court, La Salle, 1950. (The definitive text on synthetic geometry. Hilbert replaced the (politically loaded) metric term "equality" in the *Elements* by the term "congruence".) <http://www.ckraju.net/geometry/Hilbert-Foundations-of-Geometry.pdf>.

4. G. D. Birkhoff, "A set of postulates for plane geometry (based on scale and protractor)", *Ann. Math.* **33** (1932) pp. 329-345. (Shows that all the theorems of the *Elements* can be proved from a metric set of postulates using scale and protractor, rather than straight edge and (collapsible) compasses. However, the proof of the "Pythagorean theorem" becomes so easy that this essentially trivializes the *Elements* which proved the Pythagorean proposition in 47 steps. [http://www.ckraju.net/geometry/1932\\_Birkhoff.pdf](http://www.ckraju.net/geometry/1932_Birkhoff.pdf). The Yale School mathematics study group recommended after the Sputnik crisis that this should be taught. <https://archive.org/details/Geometry1/page/n5/mode/2up>
5. Bertrand Russell, *An essay on the foundations of geometry*, Cambridge university press, 1897. (Develops on the philosophical foundations of geometry based on Kant who gave a different interpretation of innate knowledge than Plato. Builds on stories about the parallel postulate and non-Euclidean geometry. These are stories, since geometry on the surface of a sphere was being done at least since the time of Bhaskar 1.) <https://archive.org/details/essayonfoundatio00russrich>.
6. Bertrand Russell, "The Teaching of Euclid", *The Mathematical Gazette* **2** (33) (1902), 165-167. (Points out that many of the so-called deductive proofs in the *Elements* are faulty regarded as deductive proofs. In fact, ALL are faulty.) <http://www.ckraju.net/geometry/Bertrand%20Russell%20on%20Euclid.htm>.
7. Bertrand Russell, "Mathematics and the metaphysicians", in: *Mysticism and logic and other essays*, Longman Green and Co., London, 1919, pp. 71-96. (An account of formal mathematics, and especially why the initial hypothesis are metaphysical.). Most important quote at: <http://www.ckraju.net/geometry/Russell%20quote%20on%20math.html>. Whole book at [https://archive.org/details/bub\\_gb\\_zwMQAAAAYAAJ](https://archive.org/details/bub_gb_zwMQAAAAYAAJ).
- \*8. C. K. Raju, *Cultural Foundations of Mathematics: the nature of mathematical proof, and the transmission of the calculus from India to Europe in the 16th c.* CE Pearson Longman, 2007.
9. T. L. Heath, *The thirteen books of Euclid's Elements: translated from the text of Heiberg*, Cambridge university press, 1908, vol. 1. (The stock story in full details, based on Heiberg's fanciful apologia about "Theonine" texts. [The name of the author found in texts of the *Elements* is that of Theon, not Euclid.] ) [https://archive.org/details/thirteenbookseuc01the\\_425](https://archive.org/details/thirteenbookseuc01the_425).
10. Proclus: *Commentaries of Proclus surnamed Plato's successor on the first book of Euclid's Elements...* trans. Thomas Taylor, London, 1788. <https://archive.org/details/philosophicalan00marigoog>.
- \*11. Proclus, *A Commentary on the First Book of Euclid's Elements*, trans. Glenn R. Morrow, Princeton University Press, Princeton, New Jersey, 1970. (Another translation.)
12. G. Friedlein, *Procli Diadochi Commentarii*, B. G. Teubner, Lipschitz, 1873. (The Greek "original". This late text, discovered in the Vatican by Heiberg, in the 19<sup>th</sup> c., is the sole source of our knowledge of "Euclid". The actual passage mentioning Euclid is quite clearly an interpolated passage.) <https://archive.org/details/proclidiadochii00friegooog>.
13. W. W. Rouse Ball, *A short account of the history of mathematics*, Macmillan and Co., London, 1912. Reprint, Dover New York, 1960. [The standard racist account of "Greek" contributions.] <https://archive.org/details/in.ernet.dli.2015.167204>.
- \*14. S. N. Sen and A. K. Bag, *The sulbasutras*, Indian National Science Academy, Delhi, 1983.

15. C. K. Raju, "Teaching mathematics with a different philosophy. Part 1: Formal mathematics as biased metaphysics." *Science and Culture* 77 (7-8) (2011) pp. 274–279.  
<http://www.scienceandculture-isna.org/July-aug-2011/03%20C%20K%20Raju.pdf>,  
arxiv:1312.2099.

16. C. K. Raju, The Pythagorean controversy, *Frontier Weekly*, 47(34) March 1-7 (2015)  
<http://www.frontierweekly.com/articles/vol-47/47-34/47-34-The%20Pythagorean%20Controversy.html>.

17. C. K. Raju, "Black Thoughts Matter: Decolonized Math, Academic Censorship, and the "Pythagorean" Proposition", *Journal of Black Studies*, 48(3), 256-278  
Article first published online: January 31, 2017.  
<https://journals.sagepub.com/doi/abs/10.1177/0021934716688311>.

18. (in Hindi) गणित बनाम मैथमेटिक्स (draft submitted for publication),  
<http://www.ckraju.net/papers/Hindi-article-for-IIAS-journal.pdf>.

\* = not available for free download. Copies may be available in libraries, or pirated copies may be available on the Internet.)