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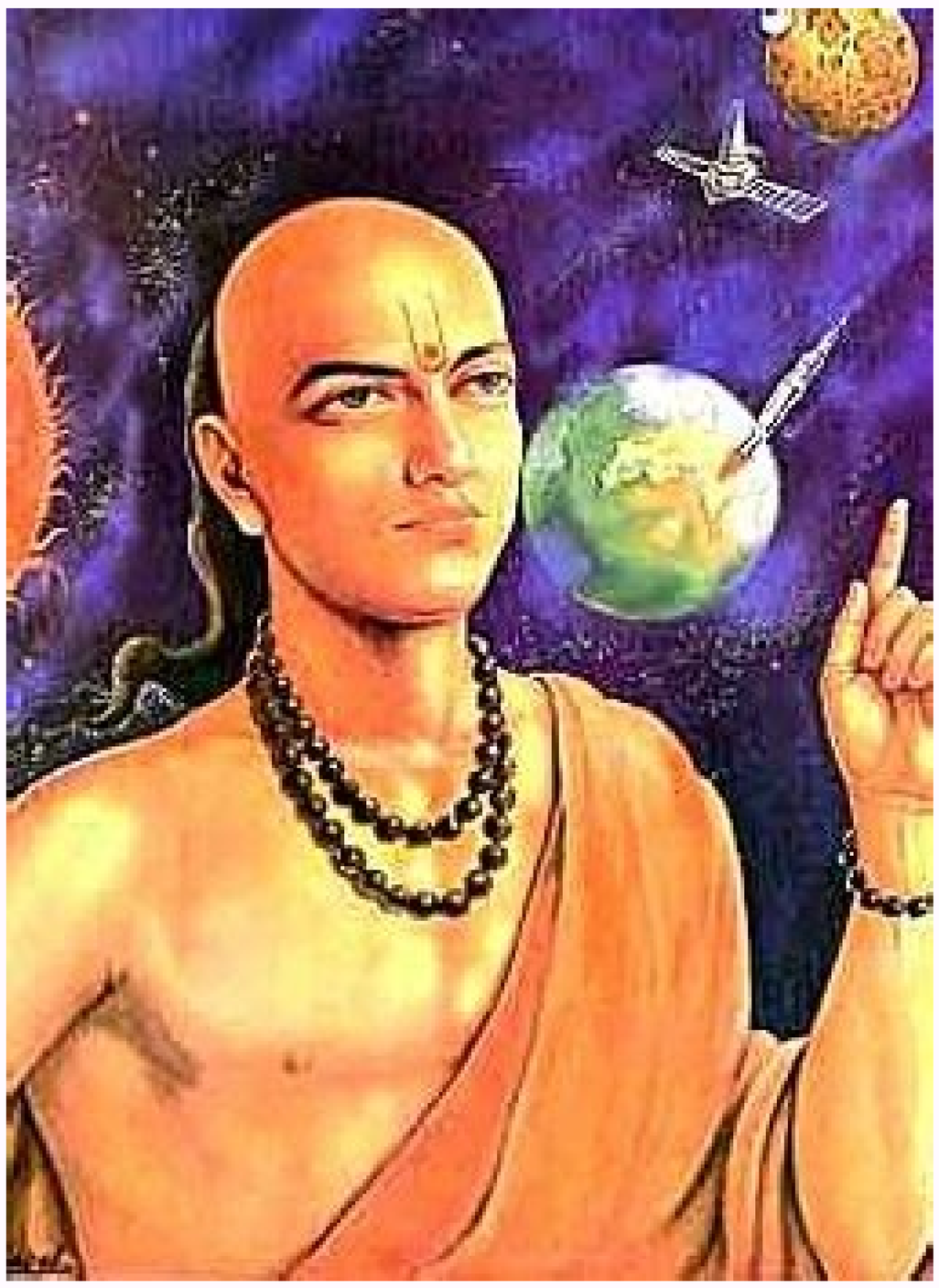

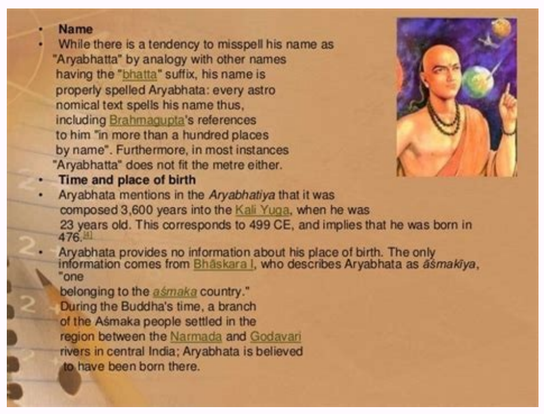

In the case of Mars, Jupiter, and Saturn, they move around the Earth at specific speeds, representing each planet's motion through the zodiac. p. 82. In the Islamic world, they formed the basis of the Jalali calendar introduced in 1073 CE by a group of astronomers including Omar Khayyam,[45] versions of which (modified in 1925) are the national calendars in use in Iran and Afghanistan today. ^ Radhakrishnan Kuttoor (25 June 2007), "Aryabhata lived in Ponnani?", The Hindu, archived from the original on 1 July 2007 ^ See: *Clark 1930 *S. He discovered that the apparent westward motion of stars is due to the spherical Earth's rotation about its own axis. ISBN 978-81-317-2890-1. Shukla and K. "Astronomy in India". Calendric calculations devised by Aryabhata and his followers have been in continuous use in India for the practical purposes of fixing the Panchangam (the Hindu calendar). In some texts, he seems to ascribe the apparent motions of the heavens to the Earth's rotation. In the case of Mercury and Venus, they move around the Earth at the same mean speed as the Sun. p. 46. In Thomas Hockey; et al. They were discussed extensively in ancient Vedic text Sulba Sutras, whose more ancient parts might date to 800 BCE. ^ Cooke (1997). "Online Etymology Dictionary". Aryabhata himself (one of at least two mathematicians bearing that name) lived in the late 5th and the early 6th centuries at Kusumapura (Pataliutra, a village near the city of Patna) and wrote a book called Aryabhatiya. ^ "Get ready for solar eclipse" (PDF). ^ Menon (2009). Aryabhata created a system of phonemic number notation in which numbers were represented by consonant-vowel monosyllables. Aryabhata gave the correct rule for the area of a triangle and an incorrect rule for the volume of a pyramid. M.E. Sharpe. "Āryabhaṭa I". pp. 112–. Retrieved 24 January 2022. (March 2017) (Learn how and when to remove this template message) Aryabhata's work was of great influence in the Indian astronomical tradition and influenced several neighbouring cultures through translations. ^ "Aryabhata | Achievements, Biography, & Facts | Britannica". Different Types of History. The Hindu. ISBN 0-471-18082-3. V.1: Critically edited text with English translation and notes. His disciple Bhaskara I calls it Ashmakatantra (or the treatise from the Ashmaka). Archived from the original on 13 July 2007. ISBN 978-81-7319-432-0.: "Seven cardinal points are then defined on the equator, one of them called Laṅkā, at the intersection of the equator with the meridional line through Ujjaini. 111. London: British Museum Press. p. 88. Orient Blackswan. "The Mathematics of the Hindus". ^ Britannica Educational Publishing (15 August 2010). In Helaine Selin (ed.). Mathematical Achievements of Pre-modern Indian Mathematicians. National Council of Science Museums, Ministry of Culture, Government of India. His model also gave corrections (the śīgra anomaly) for the speeds of the planets in the sky in terms of the mean speed of the Sun. Archived from the original on 17 October 2007. www.britannica.com. It also contained a description of several astronomical instruments: the gnomon (shanku-yantra), a shadow instrument (chhAyA-yantra), possibly angle-measuring devices, semicircular and circular (dhanur-yantra / chakra-yantra), a cylindrical stick yasti-yantra, an umbrella-shaped device called the chhatra-yantra, and water clocks of at least two types, bow-shaped and cylindrical. [12] A third text, which may have survived in the Arabic translation, is Al ntf or Al-nanf. ^ B.L. van der Waerden, "The Heliocentric System in Greek, Persian and Hindu Astronomy", in David A. ^ Amartya K Dutta, "Diophantine equations: The Kuttaka" Archived 2 November 2014 at the Wayback Machine, Resonance, October 2002. Retrieved 10 June

2007. Archived from the original (PDF) on 21 July 2011. ^ Otto Neugebauer, "The Transmission of Planetary Theories in Ancient and Medieval Astronomy," Scripta Mathematica, 22 (1956), pp. The Mathematics of India: Concepts, Methods, Connections. Mathematics in India. It is written in the very terse style typical of sutra literature, in which each line is an aid to memory for a complex system. Balachandra Rao (1998) [First published 1994]. O'Connor and E. Shukla . Retrieved 9 December 2009. p. 70. p. 111. Along with the trigonometric tables, they came to be widely used in the Islamic world and used to compute many Arabic astronomical tables (zijes). Bibcode:1977BASI....5...10A. Aryabhata's method of solving such problems, elaborated by Bhaskara in 621 CE, is called the kuṭṭaka (□□□□□□) method. A History of Mathematics (Second ed.). Archived (PDF) from the original on 18 March 2009. New Delhi: Indian National Science Academy, 1976. This Laṅkā is, of course, a fanciful name and has nothing to do with the island of Sri Laṅkā."*Ernst Wilhelm. John Wiley & Sons, Inc. ^ Hugh Thurston (1996). pp. 97–. S. SAMSKRITA BHARATI. Some of his later writings on astronomy, which apparently proposed a second model (or ardha-rAtrikA, midnight) are lost but can be partly reconstructed from the discussion in Brahmagupta's Khandakhadyaka. 178–189. By this rule the circumference of a circle with a diameter of 20,000 can be approached."[20] This implies that for a circle whose diameter is 20000, the circumference will be 62832 i.e., π {\displaystyle \pi } = 62832 20000 {\displaystyle 62832 \over 20000} = 3.1416 {\displaystyle 3.1416} , which is accurate to three decimal places.[21] It is speculated that Aryabhata used the word āsanna (approaching), to mean that not only is this an approximation but that the value is incommensurable (or irrational). Satpathy (2003). In general, diophantine equations, such as this, can be notoriously difficult. V.3 with the commentary of Sūryadeva, by K. Aryabhata: Indian Mathematician and Astronomer. Indian mathematician-astronomer For other uses, see Aryabhata (disambiguation). This work appears to be based on the older Surya Siddhanta and uses the midnight-day reckoning, as opposed to sunrise in Aryabhatiya. In addition, some versions cite a few colophons added at the end, extolling the virtues of the work, etc. When Arabic writers translated his works from Sanskrit into Arabic, they referred it as jiba. ISBN 978-0-7923-4066-9. (He claimed that the volume was half the height times the area of the base.) ^ Howard Eves (1990). ISBN 978-81-317-1818-6. His pure mathematics discusses topics such as determination of square and cube roots, geometrical figures with their properties and mensuration, arithmetric progression problems on the shadow of the gnomon, quadratic equations, linear and indeterminate equations. New York: W.H. Freeman and Company. 13, Table 1 ^ Aryabhatiya Marathi: □□□□□□□□, Mohan Apte, Pune, India, Rajhans Publications, 2009, p.25, ISBN 978-81-7434-480-9 ^ The concept of Indian heliocentrism has been advocated by B. Journal of the Royal Asiatic Society of Great Britain and Ireland. The History of Mathematics: A Brief Course. O'Connor, John J.; Robertson, Edmund F., "Aryabhata", MacTutor History of Mathematics archive, University of St Andrews Achar, Narahari (2007). 4 "Archived copy" (PDF). In fact, modern names "sine" and "cosine" are mistranscriptions of the words jya and kojya as introduced by Aryabhata. ISBN 978-0-387-31022-0. Later writers substituted it with jaib, meaning "pocket" or "fold (in a garment)". University of Chicago Press; reprint: Kessinger Publishing (2006). ^ a b c d e f K. The square of the sum of the series is the sum of the cubes. p. 200. CE 425), the motions of the planets are each governed by two epicycles, a smaller manda (slow) and a larger śīghra (fast). (PDF version) "Aryabhata and Diophantus' son", Hindustan Times Storytelling Science column, November 2004 Surya Siddhanta translations Portals:BiographyMathematicsAstronomyStarsOuter spaceIndia Retrieved from " ISBN 0-387-94822-8 ^ R.C.Gupta (31 July 1997). Most historians of astronomy consider that this two-epicycle model reflects elements of pre-Ptolemaic Greek astronomy.[32] Another element in Aryabhata's model, the śīghrocca, the basic planetary period in relation to the Sun, is seen by some historians as a sign of an underlying heliocentric model.[33] Eclipses Solar and lunar eclipses were scientifically explained by Aryabhata. (1994). His definitions of sine (jya), cosine (kojya), versine (utkrama-jya), and inverse sine (otkram jya) influenced the birth of trigonometry. The Columbia Encyclopedia (6 ed.). Later Indian astronomers improved on the calculations, but Aryabhata's methods provided the core. The text consists of the 108 verses and 13 introductory verses, and is divided into four pādas or chapters: Gitikapada: (13 verses): large units of time—kalpa, manvantra, and yuga—which present a cosmology different from earlier texts such as Lagadha's Vedanga Jyotisha (c. ^ "New Microorganisms Discovered in Earth's Stratosphere". ^ Puttaswamy, T. Archived from the original on 11 July 2015. Kala Occult Publishers. Continuing the Sanskritic tradition from Vedic times, he used letters of the alphabet to denote numbers, expressing quantities, such as the table of sines in a mnemonic form.[19] Approximation of π Aryabhata worked on the approximation for pi (π), and may have come to the conclusion that π is irrational. Unsourced material may be challenged and removed. P. Shukla and K.V. Sarma, K. Newnes. p. 207. A Universal History of Numbers: From Prehistory to the Invention of the Computer. He gave more elegant rules for the sum of the squares and cubes of an initial segment of the positive integers. ^ Dutta, Bibhutibhushan; Singh, Avadhesh Narayan (1962). Ancient Indian Leaps into Mathematics. F. Naturforschenden Gesellschaft in Zürich. He flourished in the Gupta Era and produced works such as the Āryabhaṭīya (which mentions that in 3600 Kali Yuga, 499 CE, he was 23 years old)[6] and the Arya-siddhanta. Encyclopaedia of the history of science, technology, and medicine in non-western cultures. (eds.). pp. 392–406. If this is true, it is quite a sophisticated insight because the irrationality of pi (π) was proved in Europe only in 1761 by Lambert.[22] After Aryabhatiya was translated into Arabic (c. (This is not the Lanka that is now known as Sri Lanka; Aryabhata is very clear in stating that Lanka is 23 degrees south of Ujjain.)"*R.M. Pujari; Pradeep Kolhe; N. [31] The order of the planets in terms of distance from earth is taken as: the Moon, Mercury, Venus, the Sun, Mars, Jupiter, Saturn, and the asterisms."[12] The positions and periods of the planets was calculated relative to uniformly moving points. The dates of the Jalali calendar are based on actual solar transit, as in Aryabhata and earlier Siddhanta calendars. He may have believed that the planet's orbits as elliptical rather than circular.[27][28] Motions of the solar system Aryabhata correctly insisted that the earth rotates about its axis daily, and that the apparent movement of the stars is a relative motion caused by the rotation of the earth, contrary to the then-prevailing view, that the sky rotated.[21] This is indicated in the first chapter of the Aryabhatiya, where he gives the number of rotations of the earth in a yuga,[29] and made more explicit in his gola chapter:[30] In the same way that someone in a boat going forward sees an unmoving [object] going backward, so [someone] on the equator sees the unmoving stars going uniformly westward. hdl:2248/502. – golapAda.9–10]. Similarly, his value for the length of the sidereal year at 365 days, 6 hours, 12 minutes, and 30 seconds (365.25858 days)[35] is an error of 3 minutes and 20 seconds over the length of a year (365.25636 days).[36] Heliocentrism As mentioned, Aryabhata advocated an astronomical model in which the Earth turns on its own axis. V.2: with the commentary of Bhāskara I and Someśvara, by K. Archived from the original on 1 April 2018. History of Hindu Mathematics. Āryabhaṭīya of Āryabhaṭa, New Delhi: Indian National Science Academy, 1976. Asia Publishing House, Bombay. In Walker, Christopher (ed.). ^ Divakaran, P. R. 1st century BCE). ^ a b How Aryabhata got the earth's circumference right Archived 15 January 2017 at the Wayback Machine ^ S. (2003). ^ "Maths can be fun". The Aryabhatiya presented a number of innovations in mathematics and astronomy in verse form, which were influential for many centuries. He was also the first to specify sine and versine (1 − cos x) tables, in 3.75° intervals from 0° to 90°, to an accuracy of 4 decimal places. The extreme brevity of the text was elaborated in commentaries by his disciple Bhaskara I (Bhashya, c. In this model, which is also found in the Paitāmahasiddhānta (c. Wiley-Interscience. ISBN 978-0-12-397913-1. ^ Kim Plofker (2009). King and George Saliba, ed., From Deferent to Equant: A Volume of Studies in the History of Science in the Ancient and Medieval Near East in Honor of E. The Biographical Encyclopedia of Astronomers. "Add four to 100, multiply by eight, and then add 62,000. Alpha Science Int'l Ltd. Chandra Hari has argued for the Kerala hypothesis on the basis of astronomical evidence.[14] Aryabhata mentions "Lanka" on several occasions in the Aryabhatiya, but his "Lanka" is an abstraction, standing for a point on the equator at the same longitude as his Ujjayini.[15] Education It is fairly certain that, at some point, he went to Kusumapura for advanced studies and lived there for some time.[16] Both Hindu and Buddhist tradition, as well as Bhāskara I (CE 629), identify Kusumapura as Pāṭaliputra, modern Patna.[11] A verse mentions that Aryabhata was the head of an institution (kulapa) at Kusumapura, and, because the university of Nalanda was near Pataliputra at the time and had an astronomical observatory, it is speculated that Aryabhata might have been the head of the Nalanda university as well.[11] Aryabhata is also reputed to have set up an observatory at the Sun temple in Taregana, Bihar.[17] Works Aryabhata is the author of several treatises on mathematics and astronomy, some of which are lost. An Introduction to the History of Mathematics (6 ed.). (19 September 2018). (18 April 2013). Aryabhata also noted that the luminosity of the Moon and other planets is due to reflected sunlight.[10] Biography Name While there is a tendency to misspell his name as "Aryabhatta" by analogy with other names having the "bhatta" suffix, his name is properly spelled Aryabhata: every astronomical text spells his name thus,[11] including Brahmagupta's references to him "in more than a hundred places by name".[1] Furthermore, in most instances "Aryabhatta" would not fit the metre either.[11] Time and place of birth Aryabhata mentions in the Aryabhatiya that he was 23 years old 3,600 years into the Kali Yuga, but this is not to mean that the text was composed at that time. p. 63. ^ "ISRO Press Release 16 March 2009". pp. 95–. ^ "Omar Khayyam". An Introduction to the History and Philosophy of Science. In particular, the astronomical tables in the work of the Arabic Spain scientist Al-Zarqali (11th century) were translated into Latin as the Tables of Toledo (12th century) and remained the most accurate ephemeris used in Europe for centuries. It is also occasionally referred to as Arya-shatas-aShTa (literally, Aryabhata's 108) because there are 108 verses in the text. ĀryabhaṭaStatue of Aryabhata at the IUCAA, Pune (although there is no historical record of his appearance).Born476 CEKusumapura (Pataliputra), Gupta Empire (modern-day Patna, India)[1]Died550 CE[2]Pataliputra, Gupta Empire (modern-day Patna, India)Academic backgroundInfluencesSurya SiddhantaAcademic workEraGupta eraMain interestsMathematics, astronomyNotable worksĀryabhaṭīya, Arya-siddhantaNotable ideasExplanation of lunar eclipse and solar eclipse, rotation of Earth on its axis, reflection of light by moon, sinusoidal functions, solution of single variable quadratic equation, value of π correct to 4 decimal places, diameter of Earth, calculation of the length of sidereal yearInfluencedLalla, Bhaskara I, Brahmagupta, Varahamihira, Kerala school of astronomy and mathematics, Islamic Astronomy and Mathematics Aryabhata (Sanskrit: □□□□□, ISO: Āryabhaṭa) or Aryabhata I[3][4] (476–550 CE)[2][5] was an Indian mathematician and astronomer of the classical age of Indian mathematics and Indian astronomy. New York: Springer. Retrieved 6 July 2007. Pearson Education India. www-history.mcs.st-andrews.ac.uk. ^ Douglas Harper (2001). ^ [achalAni bhAni samapashchimagAni ... Springer Science & Business Media. The Rosen Publishing Group. Zürich:Kommissionsverlag Leeman AG, 1970. 18 March 2009. ^ Pingree, David (1996). ISBN 81-7371-205-0. Later commentators such as Brahmagupta divide his work into Ganita ("Mathematics"), Kalakriya ("Calculations on Time") and Golapada ("Spherical Astronomy"). "Brief Notes on the Age and Authenticity of the Works of Aryabhata, Varahamihira, Brahmagupta, Bhattotpala, and Bhaskaracharya". He states that the Moon and planets shine by reflected sunlight. Ifrah (1998). Retrieved 18 July 2012. 529–534. Early Astronomy. Yadav (28 October 2010). Sarma (2001). The Āryabhaṭīya of Āryabhaṭa: An Ancient Indian Work on Mathematics and Astronomy. ^ Ansari, p. ^ Boyer, Carl B. ^ J. 129–156. Motilal Banarsidass Publ. The duration of the planetary revolutions during a mahayuga is given as 4.32 million years. ISBN 0-387-94107-X. For simplicity, people started calling it jya. V. Be the first one to write a review. 36 (4): 105–115. Classical Muhurta. p. 72. Thus, the lunar eclipse occurs when the Moon enters into the Earth's shadow (verse gola.37). ISBN 0-7141-1746-3. His major work, Aryabhatiya, a compendium of mathematics and astronomy, was extensively referred to in the Indian mathematical literature and has survived to modern times. ^ Rashed, R. The name "Aryabhatiya" is due to later commentators. (This problem was also studied in ancient Chinese mathematics, and its solution is usually referred to as the Chinese remainder theorem.) This is an example from Bhāskara's commentary on Aryabhatiya: Find the number which gives 5 as the remainder when divided by 8, 4 as the remainder when divided by 9, and 1 as the remainder when divided by 7 That is, find N = 8x+5 = 9y+4 = 7z+1. Wikiquote has quotations related to: Aryabhata 1930 English translation of The Aryabhatiya in various formats at the Internet Archive. 5 (1): 10–18. p. 52. This mentioned year corresponds to 499 CE, and implies that he was born in 476.[5] Aryabhata called himself a native of Kusumapura or Pataliputra (present day Patna, Bihar).[1] Other hypothesis Bhāskara I describes Aryabhata as āśmakīya, "one belonging to the Aśmaka country." During the Buddha's time, a branch of the Aśmaka people settled in the region between the Narmada and Godavari rivers in central India.[11][12] It has been claimed that the aśmaka (Sanskrit for "stone") where Aryabhata originated may be the present day Kodungallur which was the historical capital city of Thiruvanchikkulam of ancient Kerala.[13] This is based on the belief that Koṭuṅṅallūr was earlier known as Koṭum-Kal-l-ūr ("city of hard stones"); however, old records show that the city was actually Koṭum-kol-ūr ("city of strict governance"). Works cited Cooke, Roger (1997). (10 September 2012). Sarma. May 2001. Indian Astronomy: An Introduction. Mathematics Place value system and zero The place-value system, first seen in the 3rd-century Bakhshali Manuscript, was clearly in place in his work. ^ O'Connor, J J; Robertson, E F. Indian Mathematics and Astronomy: Some Landmarks. ^ Jacobs, Harold R. As mentioned, they were translated as jiba and kojiba in Arabic and then misunderstood by Gerard of Cremona while translating an Arabic geometry text to Latin. ^ Roger Cooke (1997). 1150).[44] Aryabhata's astronomical calculation methods were also very influential. p. 237. ScienceDaily. 127–9. Thurston, H. Similarly, the fact that several commentaries on the Aryabhatiya have come from Kerala has been used to suggest that it was Aryabhata's main place of life and activity; however, many commentaries have come from outside Kerala, and the Aryasiddhanta was completely unknown in Kerala.[11] K. p. 204. The university is governed by Bihar State University Act 2008. L. ISBN 978-0-8176-4694-3. Teaching World History: A Resource Book. Retrieved 14 July 2007. Shukla, Kripa Shankar. Robertson, Aryabhata the Elder Archived 19 October 2012 at the Wayback Machine, MacTutor History of Mathematics archive: "He believes that the Moon and planets shine by reflected sunlight, incredibly he believes that the orbits of the planets are ellipses." ^ Hayashi (2008), Aryabhata I ^ Aryabhatiya 1.3ab, see Plofker 2009, p. Balachandra Rao (2000). ISBN 0-7167-4361-2. Retrieved 8 February 2016.{{cite web}}: CS1 maint: archived copy as title (link). ^ a b c d e f Ansari, S.M.R. (March 1977). Aryabhata himself may not have given it a name. He assumed that jiba was the Arabic word jaib, which means "fold in a garment", L. ISBN 978-81-7371-205-0.: "In Indian astronomy, the prime meridian is the great circle of the Earth passing through the north and south poles, Ujjayinī and Laṅkā, where Laṅkā was assumed to be on the Earth's equator."*L. This algorithm became the standard method for solving first-order diophantine equations in Indian mathematics, and initially the whole subject of algebra was called kuṭṭaka-gaṇita or simply kuṭṭaka.[25] Algebra In Aryabhatiya, Aryabhata provided elegant results for the summation of series of squares and cubes:[26] 1 2 + 2 2 + ⋯ + n 2 = n (n + 1) (2 n + 1) 6 {\displaystyle 1^{2}+2^{2}+\cdots +n^{2}={n(n+1)(2n+1) \over 6}} and 1 3 + 2 3 + ⋯ + n 3 = (1 + 2 + ⋯ + n) 2 {\displaystyle 1^{3}+2^{3}+\cdots +n^{3}=(1+2+\cdots +n)^{2}} (see squared triangular number) Astronomy Aryabhata's system of astronomy was called the audAyaka system, in which days are reckoned from uday, dawn at lanka or "equator". However, in Arabic writings, vowels are omitted, and it was abbreviated as jb. ^ Dennis Duke, "The Equant in India: The Mathematical Basis of Ancient Indian Planetary Models." Archive for History of Exact Sciences 59 (2005): 563–576, n. ISBN 978-1-56324-420-9. Bulletin of the Astronomical Society of India. Translation from K. Springer-Verlag, New York. Archived from the original on 5 January 2012. 820 CE) this approximation was mentioned in Al-Khwarizmi's book on algebra.[12] Trigonometry In Ganitapada 6, Aryabhata gives the area of a triangle as tribhujasya phalaśarīraṃ samadalakoṭī bhujārdhasaṃvargaḥ that translates to: "for a triangle, the result of a perpendicular with the half-side is the area."[23] Aryabhata discussed the concept of sine in his work by the name of ardha-jya, which literally means "half-chord". An Institute for conducting research in astronomy, astrophysics and atmospheric sciences is the Aryabhatta Research Institute of Observational Sciences (ARIES) near Nainital, India. The Arabic translation during the Islamic Golden Age (c. History of Mathematics: A Brief Course. There is also a table of sines (jya), given in a single verse. "Āryabhaṭa: His name, time and provenance" (PDF). ISBN 978-1-61530-218-5. Kalakriyapada (25 verses): different units of time and a method for determining the positions of planets for a given day, calculations concerning the intercalary month (adhikamAsa), kShaya-tithis, and a seven-day week with names for the days of week. The Arya-siddhanta, a lost work on astronomical computations, is known through the writings of Aryabhata's contemporary, Varahamihira, and later mathematicians and commentators, including Brahmagupta and Bhaskara I. ISBN 0-387-94822-8. ^ Heidi Roupp (1997). The Surya Siddhanta: A Textbook of Hindu Astronomy. The sixth part of the product of three quantities consisting of the number of terms, the number of terms plus one, and twice the number of terms plus one is the sum of the squares. ^ a b Bharati Ray (1 September 2009). The cause of rising and setting [is that] the sphere of the stars together with the planets [apparently?] turns due west at the equator, constantly pushed by the cosmic wind. Golapada (50 verses): Geometric/trigonometric aspects of the celestial sphere, features of the ecliptic, celestial equator, node, shape of the earth, cause of day and night, rising of zodiacal signs on horizon, etc. Probably dating from the 9th century, it is mentioned by the Persian scholar and chronicler of India, Abū Rayhān al-Bīrūnī.[12] Aryabhatiya Main article: Aryabhatiya Direct details of Aryabhata's work are known only from the Aryabhatiya. Thus, it has been suggested that Aryabhata's calculations were based on an underlying heliocentric model, in which the planets orbit the Sun,[37][38][39] though this has been rebutted.[40] It has also been suggested that aspects of Aryabhata's system may have been derived from an earlier, likely pre-Ptolemaic Greek, heliocentric model of which Indian astronomers were unaware,[41] though the evidence is scant.[42] The general consensus is that a synodic anomaly (depending on the position of the Sun) does not imply a physically heliocentric orbit (such corrections being also present in late Babylonian astronomical texts), and that Aryabhata's system was not explicitly heliocentric.[43] Legacy India's first satellite named after Aryabhata This section needs additional citations for verification. Thus, the explication of meaning is due to commentators. Also see earlier overview: Mathematics in Ancient India Archived 2 November 2014 at the Wayback Machine. Archived from the original on 1 October 2007. London: John Wiley & Sons. There are no reviews yet. van der Waerden, Das heliozentrische System in der griechischen, persischen und indischen Astronomie. ISBN 978-0-9709636-2-8.: "The point on the equator that is below the city of Ujjain is known, according to the Siddhantas, as Lanka. (In Arabic, jiba is a meaningless word.) Later in the 12th century, when Gherardo of Cremona translated these writings from Arabic into Latin, he replaced the Arabic jaib with its Latin counterpart, sinus, which means "cove" or "bay"; thence comes the English word sine.[24] Indeterminate equations A problem of great interest to Indian mathematicians since ancient times has been to find integer solutions to Diophantine equations that have the form ax + by = c. ISBN 81-86050-86-8. ^ Noel Swerdlow, "Review: A Lost Monument of Indian Astronomy," Isis, 64 (1973): 239–243. 3 February 2006. He discusses at length the size and extent of the Earth's shadow (verses gola.38–48) and then provides the computation and the size of the eclipsed part during an eclipse. K. Kuṭṭaka means "pulverising" or "breaking into small pieces", and the method involves a recursive algorithm for writing the original factors in smaller numbers. The Development of Arabic Mathematics: Between Arithmetic and Algebra. Kennedy, Annals of the New York Academy of Science, 500 (1987), pp. His computational paradigm was so accurate that 18th-century scientist Guillaume Le Gentil, during a visit to Pondicherry, India, found the Indian computations of the duration of the lunar eclipse of 30 August 1765 to be short by 41 seconds, whereas his charts (by Tobias Mayer, 1752) were long by 68 seconds.[12] Sidereal periods Considered in modern English units of time, Aryabhata calculated the sidereal rotation (the rotation of the earth referencing the fixed stars) as 23 hours, 56 minutes, and 4.1 seconds;[34] the modern value is 23:56:4.091. Pride of India: A Glimpse into India's Scientific Heritage. ^ George. Please help improve this article by adding citations to reliable sources. pp. 123–142. Clark, Walter Eugene (1930). ISBN 0-471-54397-7. Some of his results are cited by Al-Khwarizmi and in the 10th century Al-Biruni stated that Aryabhata's followers believed that the Earth rotated on its axis. "Aryabhata the Elder". Retrieved 24 June 2012. Quoted in Plofker 2009. They in turn revolve around the Earth. Aryabhata calculated the value of pi (π) to the fourth decimal digit and was likely aware that pi (π) is an irrational number, around 1300 years before Lambert proved the same.[7] Aryabhata's sine table and his work on trignometry were extremely influential on the Islamic Golden Age; his works were translated into Arabic and influenced Al-Khwarizmi and Al-Zarqali.[8][9] In his spherical astronomy, he applied plane trigonometry to spherical geometry and gave calculations on solar, lunar eclipses. Bangalore: Jnana Deep Publications. ISBN 0-387-90844-7 ^ Hugh Thurston, Early Astronomy, New York: Springer-Verlag, 1996, pp. sinus (c. ISBN 978-1-4254-8599-3. p. 188. 165–192; reprinted in Otto Neugebauer, Astronomy and History: Selected Essays, New York: Springer-Verlag, 1983, pp. Sarma, Āryabhaṭīya of Āryabhaṭa, Indian National Science Academy, New Delhi 1976. Three volumes. Indian Journal of History of Science. Geometry: Seeing, Doing, Understanding (Third ed.). (1991). ISBN 978-81-208-0612-2. While he did not use a symbol for zero, the French mathematician Georges Ifrah argues that knowledge of zero was implicit in Aryabhata's place-value system as a place holder for the powers of ten with null coefficients.[18] However, Aryabhata did not use the Brahmi numerals. It also contains continued fractions, quadratic equations, sums-of-power series, and a table of sines. This type of calendar requires an ephemeris for calculating dates. Ancient Indian Astronomy. ISBN 978-94-017-3274-1. Although dates were difficult to compute, seasonal errors were less in the Jalali calendar than in the Gregorian calendar. [citation needed] Aryabhatta Knowledge University (AKU), Patna has been established by Government of Bihar for the development and management of educational infrastructure related to technical, medical, management and allied professional education in his honour. Aryabhata described a geocentric model of the solar system, in which the Sun and Moon are each carried by epicycles. Instead of the prevailing cosmogony in which eclipses were caused by Rahu and Ketu (identified as the pseudo-planetary lunar nodes), he explains eclipses in terms of shadows cast by and falling on Earth. 600 CE) and by Nilakantha Somayaji in his Aryabhatiya Bhasya, (1465 CE). pp. ISBN 978-81-87276-27-2.*Ebenezer Burgess; Phanindralal Gangooly (1989). ISRO. ISBN 978-0-691-12067-6. ISBN 978-981-13-1774-3. It turns out that the smallest value for N is 85. Saunders College Publishing House, New York. The Britannica Guide to Numbers and Measurement. External links Wikimedia Commons has media related to Aryabhata. It claims that it is a translation by Aryabhata, but the Sanskrit name of this work is not known. 820 CE), was particularly influential. p. 44. J. K. ^ Though Aristarchus of Samos (3rd century BCE) is credited with holding an heliocentric theory, the version of Greek astronomy known in ancient India as the Paulisa Siddhanta makes no reference to such a theory. "Āryabhaṭa". The inter-school Aryabhatta Maths Competition is also named after him,[46] as is Bacillus aryabhata, a species of bacteria discovered in the stratosphere by ISRO scientists in 2009.[47][48] See also Āryabhaṭa numeration Āryabhaṭa's sine table Indian mathematics List of astronomers § Aryabhata List of Indian mathematicians References ^ a b c Bhau Daji (1865). Ganitapada (33 verses): covering mensuration (kṣetra vyāvahāra), arithmetic and geometric progressions, gnomon / shadows (shanku-chhAyA), simple, quadratic, simultaneous, and indeterminate equations (kuṭṭaka). The mathematical part of the Aryabhatiya covers arithmetic, algebra, plane trigonometry, and spherical trigonometry. Kumar (2006). In the second part of the Aryabhatiyam (gaṇitapāda 10), he writes: caturadhikaṃ śatamaṣṭaguṇaṃ dvāṣaṣṭistathā sahasrāṇām ayutadvayaviṣkambhasyāsanno vṛttapariṇāhaḥ. ^ a b B. Archived from the original (PDF) on 31 March 2010. "Aryabhata I, His Life and His Contributions". Springer. India's first satellite Aryabhata and the lunar crater Aryabhata are both named in his honour, the Aryabhata satellite also featured on the reverse of the Indian 2-rupee note. Astronomy before the Telescope. Princeton, NJ: Princeton University Press.

If the acute angle θ is given, then any right triangles that have an angle of θ are similar to each other. This means that the ratio of any two side lengths depends only on θ.Thus these six ratios define six functions of θ, which are the trigonometric functions.In the following definitions, the hypotenuse is the length of the side opposite the right angle, opposite represents the side ... The Brāhmasphuṭasiddhānta ("Correctly Established Doctrine of Brahma", abbreviated BSS) is the main work of Brahmagupta, written c. 628. This text of mathematical astronomy contains significant mathematical content, including a good understanding of the role of zero, rules for manipulating both negative and positive numbers, a method for computing square roots, ... Free Response Questions (Type I) – 20 Questions of 2 mark each. Free Response Questions (Type II) – 10 Questions of 3 mark each. No working / descriptive answers of any question is to be given. Only the answers are to be written in the space ...