Sanskrit Katapayadi based Shloka (verse) to remember 30 decimal digits of π

Learn. Play. Create. – chooMantra – Its Magical – Rajeev G.Mavinkurve
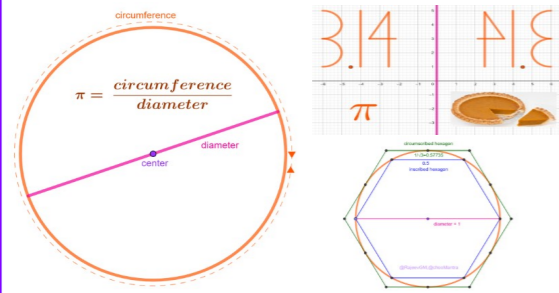
1. About π

π (pi) is a **constant** which is **the ratio of a circle's circumference to its diameter**. The symbol **π (16th** letter of Greek alphabet) was first used by **British** mathematician **William Jones** in **1706** to represent the ratio and was popularized by **Swiss** mathematician **Leonhard Euler**, who adopted it in 1737. "pi" itself was derived from the 1st letter of the **Greek** word *perimetros* (means *circumference*)

Its the famous **irrational number**. In **1761**, **Johann Heinrich Lambert** proved that **π** is irrational: that is, it cannot be expressed as a ratio of integer numbers.

In **1882**, **Ferdinand von Lindemann** proved that **π** is **transcendental** as well. A **transcendental number** is a (possibly complex) number that is not an **algebraic number** - that is, not a root (i.e., solution) of a nonzero polynomial equation with integer coefficients.

The concept of pi has been in use since **2000 BCE.**by **Babylonians, Indians, Chinese, Arabs.** Early in the **20th century**, **Indian mathematician Srinivasa Ramanujan** developed exceptionally efficient ways of calculating pi that were later incorporated into *computer algorithms*.

2. Diagrammatic representation of π

$$\pi = \frac{circumference}{diameter}$$

Reflection of **π** approximation, 3.14 appears like **'PIE'**
Archimedes estimated **π** by calculating perimeter of a regular polygon inscribed within the unit circle and a regular polygon circumscribing the circle.

3. Digits of π

The most accurate value of pi is 50 trillion digits, and was achieved by **Timothy Mullican (US)** of North Alabama Charitable Computing on 29 Jan 2020.

11 decimal digits are accurate enough to estimate the circumference of any circle, that fit inside our earth, with an accuracy of less than 1 mm. **39 digits** can estimate the circumference of any circle within the observable universe with a precision comparable to the radius of a hydrogen atom. **NASA** uses pi rounded to the **15th decimal**. 3.141592653589793

Download this sheet.
A3 and A4 size available for printing

Compiled,Edited & Designed by
Rajeev G.Mavinkurve

Devanagari
गोपीभाग्यमधु व्रात-शृङ्गिशोदधिसन्धिग ।
खलजीवितखाताव गलहालारसं धर ॥

IAST
gopībhāgyamadhuvrāta-śṛṅgiśodadhisandhiga .
Khalajīvitakhātāva galahālārasaṃdhara ..

Roman		Indic Scripts	
Harvard Kyoto	gopIbhAgyamadhuvrAta-zRGgizodadhisandhiga . KhalajIvitakhAtAva galahAlArasaMdhara ..	**Assamese/ Bengali**	গোপীভাগ্যমধুৱ্রাত-শৃঙ্গিশোদধিসন্ধিগ । খলজীৱিতখাতাৱ গলহালাৱসংধৱ ॥
ITRANS	gopIbhAgyamadhuvrAta-shR^i~Ngishodadhisandhiga . KhalajIvitakhAtAva galahAlArasaMdhara ..	**Gujarati**	ગોપીભાગ્યમધુવ્રાત-શૃડિગશોદ્ધિસન્ધિગ. ખલજીવિતખાતાવ ગલહાલારસંધર ..
SLP1	gopIBAgyamaDuvrAta-SfNgiSodaDisanDiga . KalajIvitaKAtAva galahAlArasaMDara ..	**Kannada**	ಗೋಪೀಭಾಗ್ಯಮಧುವ್ರಾತ-ಶೃಂಗಿಶೋದಧಿಸಂಧಿಗ . ಖಲಜೀವಿತಖಾತಾವ ಗಲಹಾಲಾರಸಂಧರ ..
Velthius	gopiibhaagyamadhuvraata-"s.r"ngi"sodadhisandhiga . khalajiivitakhaataava galahaalaarasa.mdhara ..	**Malayalam**	ഗോപീഭാഗ്യമധുവ്രാത-ശൃംഗിശോദധിസന്ധിഗ ഖലജീവിതഖാതാവ ഗലഹാലാരസംധര
WX	gopIBAgyamaXuvrAwa-SqfgiSoxaXisanXiga . KalajIviwaKAwAva galahAlArasaMXara ..	**Meetei Mayak (Manipuri)**	ꯒꯣꯄꯤꯕꯥꯒ꯭ꯌꯃꯗꯨꯋ꯭ꯔꯥꯠ-ꯁ꯭ꯔꯤꯉꯤꯁꯣꯗꯗꯤꯁꯟꯗꯤꯒ ꯭ ꯈꯂꯖꯤꯋꯤꯇꯈꯥꯇꯥꯋ ꯒꯂꯍꯥꯂꯥꯔꯁꯟꯗꯔ ꯫
Burmese (Myanmar)	ဂေါပီဘာဂျမဓုဝြာတ-ၑၒင်္ဂိၑောဒဓိသန္ဓိဂ ၊ ခလဇီဝိတခါတာဝ ဂလဟာလာရသံဓရ ॥	**Oriya**	ଗୋପୀଭାଗ୍ୟମଧୁଵ୍ରାତ-ଶୃଂଗିଶୋଦଧିସନ୍ଧିଗ । ଖଲଜୀଵିତଖାତାଵ ଗଲହାଲାରସଂଧର ॥
Cyrillic (Russian)	гопӣбхāгйамадхуврāта-шр̣н̇гишодадхисандхига . кхаладжӣвитакхāтāва галахāлāрасамдхара ..	**Punjabi (Gurmukhi)**	ਗੋਪੀਭਾਗ੍ਯਮਧੁਵ੍ਰਾਤ-ਸ਼੍ਰੁਿੰਗਿਸ਼ੋਦਧਿਸਨ੍ਧਿਗ । ਖਲਜੀਵਿਤਖਾਤਾਵ ਗਲਹਾਲਾਰਸਂਧਰ ..
Javanese	ꦒꦺꦴꦥꦷꦧꦴꦒꦾꦩꦣꦸꦮꦿꦠꦱꦿꦁꦒꦶꦯꦺꦴꦢꦣꦶꦱꦤ꧀ꦣꦶꦒ ꧉ ꦏ꧀ꦲꦭꦗꦷꦮꦶꦠꦏꦴꦠꦴꦮ ꦒꦭꦲꦴꦭꦴꦫꦱꦩ꧀ꦣꦫ ꧉	**Tamil**	கோபீபாக்யமதுவ்ராத ஷ்ருகிஷோதிஸந்திக காலஜீவிடகாதாவ கலஹாலாரஸம்தர
Sinhala	ගෝපීභාග්‍යමධුව්‍රාත-ශෘඞිගිශෝද්දිසන්දිග ඛලජීවිතඛාතාව ගලහාලාරසංධර ..	**Telugu**	గోపీభాగ్యమధువ్రాత-శృంగిశోదధిసంధిగ . ఖలజీవితఖాతావ గలహాలారసంధర ..
Thai	โคปีภาคฺยมธุวฺราต-ศฺฤงฺคิโศทธิสนฺธิค ฯ ขลชีวิตขาตาว คลหาลารสํธร ฯฯ	**Urdu**	گوپیبھاگ۬یَمدھُوۡراتَ شۡرِنگِشودَدِہِسَنۡدِہِگ۔ کھَلَجِیوِتَکھاتاو گَلَہالاۡرَسَنۡدھَرَ۔۔

FIRST MEANING:-
(Oh Krishna,) the fortune of the Gopis, the detoryer of the demon Madhu, protector of cattle, the one who ventured the ocean-depths, destroyer of evildoers,one with plough on the shoulder and the bearer of nectar, may (you) protect (us)!

SECOND MEANING:-
Benefactor of the downtrodden,Pashupati lord of kailasha,Vishnu's friend destroyer of all evil,one who held poison in his throat,(O Shiva) protect me.

THIRD MEANING:-
This shloka has a mathematical meaning too. It has 30 decimal places of pi encoded. (It is believed to have a self sustained master key to calculate pi upto any number of places)

Katapayadi

The **"ka-Ta-pa-ya"** method (developed and used by **ancient Indian mathematicians, grammarians & musicians**) is a tool to map **Sanskrit Devanagari** letters to numbers and encode numbers in easy to remember verse.

All independent vowels are assigned 0. All independent consonants (without a attached vowel) are ignored. Consonants (with any vowel) are given values as per table on the right.

1	2	3	4	5	6	7	8	9	0	0
क	ख	ग	घ	ङ	च	छ	ज	झ	ञ	अ आ इ ई उ ऊ ऋ ॠ ऌ ॡ ए ऐ ओ औ अं अः
ट	ठ	ड	ढ	ण	त	थ	द	ध	न	
प	फ	ब	भ	म						
य	र	ल	व	श	ष	स	ह			

The shloka decoded using the Katapayadi rules (described above) will give the below 32 digit number

31415926535897932384626433832792

as shown in the table to the right.

Placing the decimal dot after first digit will yield the value of pi correct to 30 decimal digits

3	1	4	1	5	9	2	6	5	3	5	8	9	7	9	3
गो go	पी pī	भा bhā	ग्य gya	म ma	धु dhu	व्रा vrā	त ta	शृ śṛ	ङ्गि ṅgi	शो śo	द da	धि dhi	स sa	न्धि ndhi	ग ga

2	3	8	4	6	2	6	4	3	3	8	3	2	7	9	2
ख Kha	ल la	जी jī	वि vi	त ta	खा khā	ता tā	व va	ग ga	ल la	हा hā	ला lā	र ra	सं saṃ	ध dha	र ra

4. About the Shloka

The **Samskrutam** (Sanskrit) Shloka (verse) at the outset appears to be the praise for **Lord Krishna**. At another level, it is a dedication to **Lord Shiva**. Thus, while offering mantric devotional praise to God, it has also encoding of **pi** value.

kaTapayadi rule will decode the number encoded in the shloka. The details of the rule/method and the process of decoding this shloka using kaTapayadi rule o get the encoded value are done on this poster.

It is said that this shloka has a master key to calculate pi upto any number of places. I have not figured it out yet. When figured out, a new poster will be done to explain the same.

5. π Day

March 14 marks **Pi Day**, an annual celebration of the mathematical sign pi. Founded in 1988 by physicist **Larry Shaw**, March 14 was selected because the numerical date (3.14) represents the first three digits of pi. and it also happens to be **Albert Einstein**'s birthday In 2009, the *United States House of Representatives* supported the designation of Pi Day

6. International Day of Mathematics

UNESCO's 40th General Conference decided Pi Day as the **International Day of Mathematics** in November 2019.

This day is the **birth anniversary** of **Einstein** as well as **Vedic Mathematics** book author **Jagadguru Shankaracharya Swami Bharati Krishna Tirtha**

7. Vedic Mathematics Book

Vedic Mathematics is a book written by the Indian seer **Jagadguru Shankaracharya Swami Bharati Krishna Tirtha**, and was first published in 1965. It contains a list of mathematical techniques, which the author says were retrieved from the **Vedas** and supposedly contained all mathematical knowledge. **This shloka is mentioned in this book** and it contains several amazing mathematics tricks.

8. About Sanskrit

Samskrtutam (Sanskrit) is one of the **oldest languages** of the world and **mother of languages**. It has **vast treasures of knowledge** on various topics including **music**, *art, architecture, maths, economics, literature, life,* **spirituality, yoga, ayurveda, astronomy**, *astrology* to name a few. In fact, Vedas means knowledge. **Sutras** are a distinct type of literary composition, a compilation of short aphoristic statements. Each *sutra is any short rule, like a theorem distilled into few words or syllables, around which teachings of ritual, philosophy, grammar, or any field of knowledge can be woven.* Sanskrit Grammar **Panini's Astaadhyayi** is full of sutras Pāṇini has been considered the "first descriptive linguist" and even labelled as "the father of linguistics. **Disambiguation, mnemonics, aphorisms, encoding schemes and other amazing techniques makes Sanskrit one of the world's most sophisticated languages.**

Give a man a bowl of rice, you feed him for a **day. Teach** him farming, you not only feed him for **life,** but also **empower** him to feed others for **life** – Rajeev G.Mavinkurve