

लघात लघान्तराः ।

Transforming Kids To Calculators

Through

Vedic Math

Level-1

For Standard - 6th

$$\begin{matrix} 0 \\ \cdot 1 \\ \cdot \frac{1}{2} \\ \left\{ \frac{1}{2} \right\} \end{matrix}$$

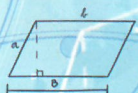
$$R = \left\{ \frac{1}{2} \right\}$$



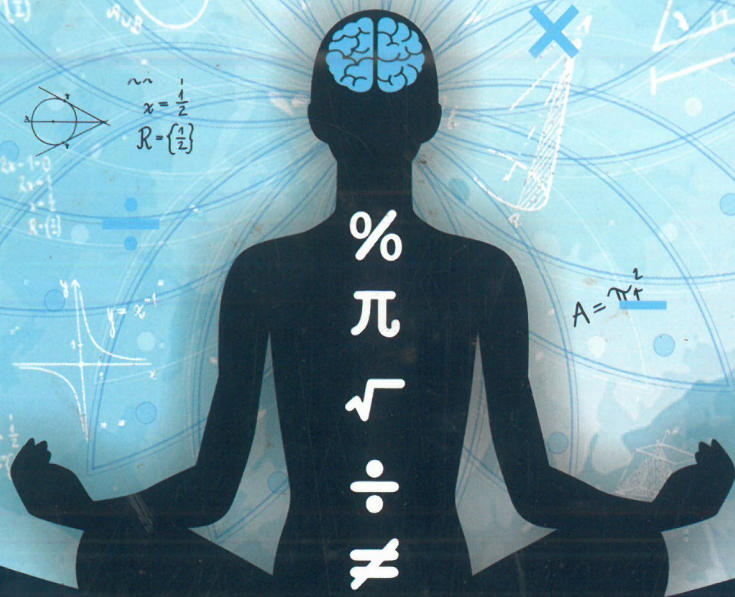
$$\begin{matrix} \sim \\ x = \frac{1}{2} \\ R = \left\{ \frac{1}{2} \right\} \end{matrix}$$



$$\begin{matrix} x = \frac{1}{2} \\ R = \frac{1}{2} \end{matrix}$$



$$A = \pi r^2$$



PARIDHI TRIVEDI PARIKH



ल॒थे ल॒न्त्रा : ।

*Transforming Kids To Calculators
through
Vedic Math*

Level – 1
For Standard – 6th

PARIDHI TRIVEDI PARIKH



Sarva Vidyalaya Kelavani Mandal
Kadi – Gandhinagar

Math Mantra : 1

Transforming kids to calculators through Vedic Math!

Level – 1 For Standard – 6th

by Ms. Paridhi Trivedi Parikh

Published by Vallabhabhai M. Patel, Chairman, Sarva Vidyalaya
Kelavani Mandal, Kadi, Opp. Railway Station, Kadi, Dist. Mehsana,
Gujarat.

© Ms. Paridhi Trivedi Parikh

Price : Rs.15/-

Publisher

Vallabhabhai M. Patel

Chairman

Sarva Vidyalaya Kelavani Mandal, Kadi,

Opp. Railway Station, Kadi-382715

Dist. Mehsana, Gujarat.

Printed by

Balaram Offset

1-J&K Block, Ravi Estate, Dudheshwar,

Ahmedabad – 380004, Gujarat, India.

Foreword

Children of today are intelligent and enthusiastic to know newer things. All subjects taught during their study become very important in developing their life. However, most children face difficulties in understanding Mathematics and we at Sarva Vidyalaya Kelavani Mandal have commenced classes of Vedic Mathematics for students of standard 6 to 9.

In this context, I am delighted that two books - Math Mantra : 1 and Math Mantra : 2 - are being published by Kadi Sarva Vishwavidyalaya. These books are written by Ms. Paridhi Trivedi Parikh keeping in mind the young kids and their transformation of learning mathematics in a different way.

I hope that these two books would be of immense help to the children of standard 6 to 9 and help them enhance their mathematical skills and perfect the subject so as to go forward in life.

I congratulate Ms. Paridhi Trivedi Parikh for her efforts in bringing out these books.

Vallabhabhai M Patel

**Chairman, Sarva Vidyalaya Kelvani Mandal, Kadi & Gandhinagar
President, Kadi Sarva Vishwavidyalaya, Gandhinagar**

A Tribute
To



Swāmī Bhāratī Krishna Tīrthaji Maharaj
(Father of the Vedic Mathematics)

Acknowledgements

I feel immense pleasure to have written this book, especially for the students. However, the tricks and techniques mentioned in the book are extremely useful for the grown-ups as well.

The idea of writing this book was coined by *my husband – Hardik*. His faith in my abilities makes me do the impossible, possible. His unflinching support has made me take new and undiscovered initiatives in my life. He has made me realize my shortcomings and at the same time has poured amazing confidence in me to take the life further with full confidence. Had Hardik not been around, I feel this book would not have seen the light of the day. A simple “thank you” would not be enough, but, for him I know, it is more than enough. Thank you, my mitochondria, my powerhouse! Thank you for everything!

I am very much thankful to my parents - *Pulak Papa* and *Arati Mommy*. It is because of them that today I stand on my own. I visualize, I actualize. At every single step in life, they have improved me and even today do so. Thanks for making me understand the importance of ‘Vision in Life’!

If my parents gave me wings, my in-laws let me ‘fly’! I am extremely thankful to my in-laws *Kirit Papa* and *Rekha Mommy* for showering all their love and nurturing my dreams. All my efforts would have been brought to a naught, sans their support. Thanks for letting me try all the non-conventional things that *Hardik* and I plan for!

One of the most important persons who made this book possible is *Revered Sardar Sir*. He is not only the Chairman of SVKM for me, but a much-respected figure. His generosity towards his students makes him distinct. From being a part of this organization as a student to working under his guidance today, I realize my respect and faith in him and the organization has only multiplied manifold. A special note of thanks for Shri Manibhai Prajapati who gave the most immaculate guidance from his vast experience to give a perfect shape to this book. I would also like to thank the entire team of Principals, Teachers and Staff members to have supported me wholeheartedly, today and forever.

This acknowledgement would be incomplete without my supporting pillars, *Jinal Di and Keval*. Your unconditional love and care make me the luckiest sister in the world! I would also like to thank each and every person who has, directly or indirectly, helped me in writing this book. Thank you.

Above all, I thank *God* to have provided me with such a beautiful opportunity that I could contribute a little for the students' fraternity. I seek *His* support and blessings, forever.

Stay Blessed!

- Paridhi Trivedi Parikh

Dedicated to
My raison d'être
Mr. Hardik K. Parikh
who inspired me to write this book

: Contents:

1. Introduction to Vedic Math	9
2. Be the 'Human-Calculator'	20
3. Multiplication Tables till 100: in just 3 seconds!	27
4. ' <i>Nikhilam</i> ': An Extremely Important Vedic Method	36
5. ' <i>Moolank</i> ': A Vedic Evaluation tool	49
6. ' <i>Moolank</i> ' Applied	59
7. SMART Summation	71
8. SMART Subtraction	84
9. ' <i>Veshtanam</i> ': Divisibility Tests	94
10. Fractions to Percentage Conversions	104
11. Twist N' Turn – A Rubik's Cube Guide	110
12. Math-Mantra : i	122

1

Introduction to 'Vedic Math'

Know and respect the Indian intellect

Glimpse of this chapter : This chapter gives an introduction to vedas, origin of vedic math, importance of vedic math in foundation years of a child, effect of vedic math on a young brain, a list of vedic sutras and sub-sutras. Go ahead and explore!

Vedas and Vedic Math:

The word Veda is derived from the Sanskrit word 'Vid' which means 'Knowledge'. Vedas are the invincible ancient Indian literature. They are the oldest-ever texts to make implicit and explicit use of mathematics. Vedas are the earliest Indian scriptures. We have four Vedas which when put-together is called 'Ved-Samhita'. 'Samhita' (Sanskrit: संहिता) literally means 'put together'.

'Ved Samhita' consists of:

- Rig-Veda
- Sama-Veda
- Yajur-Veda
- Atharva-Veda

Vedas were formed to codify the ideas and practices of Vedic religion and to lay down the basis of classical Hinduism. Each Veda is associated with a particular aspect of ritual. They are enlisted below:

- Rig-Veda (Wisdom of the Verses)
- Sama-Veda (Wisdom of the Chants)
- Yajur-Veda (Wisdom of the Sacrificial Formulas)
- Atharva-Veda (Wisdom of the Atharvan Priests)

The Veda Samhita is the collection of hymns offered to various deities. These hymns basically reflect all forms of knowledge. This framework offers the basis for interpretation of these oldest-ever Indian texts in multiple contexts like geometrical, astronomical,

spiritual, mathematical, terrestrial etc. All hymns that are formed reflect all of the above contexts. The knowledge of mathematics and geometry both are considered extremely important formulations for mantra.

Remember, Vedas are not the texts which talk about math, but they mention many concepts of Math. When Vedas were written, 'Math' was not defined as a subject. In spite of that, mathematical concepts like 'progressions', 'infinity' and 'zero' were mentioned in our Vedas. This led us to think over all these as a defined form of science. Vedic Math is indirect, quick and quite logical to apply. It is so because Vedas have come down as an oral tradition and are quite practical in approach.

Ved Samhita is the zenith of Vedic Math knowledge. This Vedic Math knowledge is distributed in all four Vedas as follows: Rig Veda gives an idea of Geometry, Error Correction & Detection Codes. Very first usage of Pi is in Rig-veda. Yajur-veda and Atharva-veda focus on the concept of infinity. Atharva-veda also plays an important role to make us explore the concept of 'Shunya' (Zero). Vedas thus laid strong foundation for the earliest idea and application of math. Vedic Math is derived from the 'Shulba Sutra' of the 'Atharva-veda'.

Impact of Vedic Math on a growing brain:

Research is being conducted to measure the effects of learning Vedic mathematics on the brain of a child. It suggests that Vedic Math develops the *logical aspect* of a child's brain. It provides a

child the freedom to create his/her own method to reach to the correct answer of the given question. Vedic Mathematics provides quick and fast one-line formulae which speeds up mental calculation. It helps any person to solve complex problems quite quickly. This can be done without pen and paper, right in the brain. It also improves concentration. Math can never be learnt without working upon our concentration. Vedic Math improves upon it in process which is an added advantage. But remember this can happen only if we practice it regularly and religiously. Vedic mathematics differs from school text-book Math. It is more of 'Practical Math'. You are learning same things with a different, fast and powerful approach from our ancient Indian texts - Vedas!

Importance of Vedic Math:

To take an initiative of making students study 'Vedic Math' is actually in favour of students' bright future. 'Vedic Math' is the strong foundation of Indian math which is not much in practice. 'Vedic Math' is generally is not being taught in schools as a part of its curriculum. If your school is making you study 'Vedic Math' by taking an extra step, you are lucky enough!

This powerful method of math enables the students to calculate as fast as a calculator, if not faster. A student can become a 'Human Calculator' with the practice of Vedic Math. While practicing Vedic Math on regular basis, fear of math is removed from the mind of students. They start developing a liking for math

which clearly means that their math becomes strong. Logical thinking gets developed. Brain becomes very much active.

Math is essential for a good career. May your aim be to become a scientist or an engineer, an MBA from IIM etc. or a professional from IIT or NLU, to get into a Government job or the Corporate sector, Vedic Math is helpful! You need to go for an entrance exam after completing your 12th standard if you really wish to get a seat in the best colleges! And, all these examinations have an average weightage of 30% to 50% of the total marks of the examination given to math. Knowledge of Vedic Math helps to enhance our speed in solving math questions and clears our concepts too!

Vedic Sutra:

‘Sutra’ and ‘Sub-Sutra’ are a peculiar form of mathematical write-ups derived from ancient knowledge of Math. These sutras or sub-sutras are not literally written in Vedas but they are derived from the vedic knowledge. They are derived from ‘*Shulba Sutra*’ of Atharva-veda. These were formed by selfless efforts of Shri Bharati Krishna Tirthaji Maharaj.

There are sixteen ‘Sutras’ and thirteen ‘Sub-Sutras’ defined in the genre of Vedic Mathematics. The entire list is given on the following pages.

Sutras:

1. Ekadhikena-Purvena
(एकाधिकेनपूर्वेण)
2. Nikhilam-Navatash-Charamam-Dasatah
(निखिलम्वतश्चरमंदशतः)
3. Urdhva-tiryag-bhyam
(ऊर्ध्वतिर्यग्भ्याम्)
4. Paravartya-Yojayet
(परावर्त्ययोजयेत्)
5. Shunyam-Samya-Samuchchaye
(शून्यं साम्यं समुच्चये)
6. Anurupye-Shunyamanyat
(आनुरूप्ये शून्यमन्यत्)
7. Sankalana – Vyavakalanabhyam
(संकलन-व्यवकलनाभ्याम्)
8. Purana-Purana-Bhyam
(पूरणापूरणाभ्याम्)
9. Chalana - Kalanabhyam
(चलन-कलनाभ्याम्)
10. Yavadunam
(यावदूनम्)
11. Vyashtisamashtih
(व्यष्टिसमष्टिः)
12. Sheshanyakena-charamena
(शेषाण्यङ्केनचरमेण)
13. Sopantyadvavamantyam
(सोपान्त्यद्वमन्त्यम्)

14. Ekanyunena-Purvena
(एकन्यूनेनपूर्वेण)
15. Gunitasamuchayah
(गुणितसमुच्चयः)
16. Gunakasamuchayah
(गुणकसमुच्चयः)

Sub-Sutras:

1. Anurupyena
(आनुरूप्येण)
2. Shishyate-Sheshasangnah
(शिष्यतेशेषसंज्ञः)
3. Adyamadyen –Antyamantyena
(आद्यमाद्येनअन्त्यमन्त्येन)
4. Kevalaihsaptakam-Gunyat
(केवलैःसप्तकंगुण्यात्)
5. Veshtanam
(वेष्टनम्)
6. YavadunamTavadunam
(यावदूनमतावदूनम्)
7. Yavadunam-Tavadunikrutya-Vargacha-Yojayet
(यावदूनमतावदूनीकृत्यवर्गचयोजयेत्)
8. Antyayor-Dasake'pi
(अन्त्ययोर्दशकेऽपि)
9. Samuchayagunitah
(समुच्चयगुणितः)

10. Lopana-Sthapanabhyam
(लोपनस्थापनाभयाम्)
11. Vilokanam
(विलोकनम्)
12. Gunita-Samuccayah-Samuccaya-Gunitah
(गुणितसमुच्चयःसमुच्चयगुणितः)
13. Dhvajank
(ध्वजांकः):

Mega Practice Task # 1:

- Q1: Write a short note on 'Ved-samhita' in 4-5 lines.
- Q2: State if the given statement is true or false and justify:
Vedic Math Sutras are written in Vedas.
- Q3: Each Veda is associated with a particular aspect of ritual.
Specify the rituals related to each Veda.
- Q4: How does Vedic Math impact a young brain?
- Q5: Write a note on Sutras and Sub-sutras of Vedic Math.
- Q6: Write a short note: Importance of Vedic Math.

Answers:

Q1: Write a short note on 'Ved-Samhita' in 4-5 lines.

- ❖ Vedas are the earliest body of Indian scripture.
- ❖ Samhita (Sanskrit : संहिता) literally means 'put together'.
- ❖ We have four Vedas which when put-together is called as 'Ved-Samhita'.

- ❖ Ved Samhita consists of Rig-Veda, Sama-Veda, Yajur-Veda and Atharva –Veda.
- ❖ The Veda Samhita is the collection of hymns offered to various deities. These hymns basically reflect all from of knowledge.

Q2: State if the given statement is true or false and justify:
“Vedic Math Sutras are written in Vedas”.

- ❖ The given statement is ‘FALSE’.
- ❖ Vedas are not the texts which talks about math, but they mention many concepts of Math.
- ❖ When Vedas were written, ‘Math’ was not defined as a subject.
- ❖ In spite of that, mathematical concepts like ‘progressions’, ‘infinity’ and ‘zero’ were mentioned in Vedas.
- ❖ Vedic Sutras and Sub-sutras are not literally written in Vedas but they are derived from Vedic knowledge.

Q3: Each Veda is associated with a particular aspect of ritual. Specify the rituals related to each Veda.

- ❖ Each Veda is associated with a particular aspect of ritual.
 1. Rig-Veda (Wisdom of the Verses)
 2. Sama-Veda (Wisdom of the Chants)
 3. Yajur-Veda (Wisdom of the Sacrificial Formulas)
 4. Atharva-Veda (Wisdom of the Atharvan Priests).

Q4: How does Vedic Math impact a young brain?

- ❖ Vedic Math develops the logical aspect of a child brain.
- ❖ It provides a child the freedom to create their own method to reach to the correct answer of the given question.
- ❖ Vedic mathematics provides quick and fast formulae which speeds up mental calculation.
- ❖ It improves concentration.
- ❖ This powerful method of math enables the students to calculate as fast as calculator, if not faster.
- ❖ A student can become a 'Human Calculator'.
- ❖ Fear of math is removed.
- ❖ They start developing a liking for math.
- ❖ Math becomes strong.
- ❖ Logical thinking gets developed.
- ❖ Brain becomes very much active.

Q5: Write a note on Sutras and Sub-sutras of Vedic Math.

- ❖ Sutras and Sub-sutras are a particular form of mathematical write ups derived from ancient knowledge of Math.
- ❖ These Vedic Sutras and Sub-sutras are not literally written in Vedas but they are derived from Vedic knowledge.
- ❖ Derived from 'Shulba Sutra' of 'Atharva-Veda'
- ❖ We have 16 Sutras i.e. Ekadhikena purvena, Urdhva-tiryagbhyam etc.
- ❖ We have 13 Sub-sutras i.e. Anurupyena, Vestanam etc.

Q6: Short Note: Importance of Vedic Math.

- ❖ Vedic Math develops the logical aspect of a child brain. It provides a child the freedom to create his/her own method to reach to the correct answer of the given question.
- ❖ Vedic mathematics provides quick and fast formulae which speeds up mental calculation.
- ❖ It improves concentration.
- ❖ This powerful method of math enables the students to calculate as fast as a calculator, if not faster.
- ❖ A student can become a 'Human Calculator'.
- ❖ Fear of math is removed. They start developing a liking for math. Math becomes strong.
- ❖ Logical thinking gets developed. Brain becomes very much active.

2

Be the 'Human-Calculator'

How to use this book most effectively?

Glimpse of this chapter: In this chapter, we are going to guide you about the methodology that you have to follow to make the most of this book. We are going to discuss the concept of this book and how it can help you in absence of a mentor. Go ahead and explore!

20 | Page

लath लान्त्रा : ।

Transforming Kids To Calculators!
Level-1 For Standard - 6th

Be the 'Human-Calculator':

Numbers talk! We need to have an ear to listen what do they say. Numbers have logic! We need to understand that logic, if we want to understand the numbers and do operations on them as fast as calculator. Calculator is made by humans. So, if we can create something, we can definitely be better than that thing. So, are you ready to become a 'human calculator'?

Important points to remember to make the most of this book:

1. Start reading from the first chapter only.
2. Don't read haphazardly. Follow a systematic pattern. First read explanation, situations etc. Then solve examples.
3. Revise the entire chapter before you go onto the next.
4. Don't forget 'Mega Practice Task'. Solve it with a lot of sincerity.
5. Try to follow the SMART TRICKS in your mind without pen and paper.
6. Apply all these new learnings into your daily life.
7. Use these techniques while solving your textbook sums/questions.

Pre-requisites to make your math strong:

If you want to be strong and comfortable with math, you must be good at the following:

1. Multiplication Tables (1 to 30)
2. Squares (1 to 30)
3. Cubes (1 to 15)

Multiplication tables:

1 X 1 = 1	2 X 1 = 2	3 X 1 = 3
1 X 2 = 2	2 X 2 = 4	3 X 2 = 6
1 X 3 = 3	2 X 3 = 6	3 X 3 = 9
1 X 4 = 4	2 X 4 = 8	3 X 4 = 12
1 X 5 = 5	2 X 5 = 10	3 X 5 = 15
1 X 6 = 6	2 X 6 = 12	3 X 6 = 18
1 X 7 = 7	2 X 7 = 14	3 X 7 = 21
1 X 8 = 8	2 X 8 = 16	3 X 8 = 24
1 X 9 = 9	2 X 9 = 18	3 X 9 = 27
1 X 10 = 10	2 X 10 = 20	3 X 10 = 30

4 X 1 = 4	5 X 1 = 5	6 X 1 = 6
4 X 2 = 8	5 X 2 = 10	6 X 2 = 12
4 X 3 = 12	5 X 3 = 15	6 X 3 = 18
4 X 4 = 16	5 X 4 = 20	6 X 4 = 24
4 X 5 = 20	5 X 5 = 25	6 X 5 = 30
4 X 6 = 24	5 X 6 = 30	6 X 6 = 36
4 X 7 = 28	5 X 7 = 35	6 X 7 = 42
4 X 8 = 32	5 X 8 = 40	6 X 8 = 48
4 X 9 = 36	5 X 9 = 45	6 X 9 = 54
4 X 10 = 40	5 X 10 = 50	6 X 10 = 60

7 X 1 = 7	8 X 1 = 8	9 X 1 = 9
7 X 2 = 14	8 X 2 = 16	9 X 2 = 18
7 X 3 = 21	8 X 3 = 24	9 X 3 = 27
7 X 4 = 28	8 X 4 = 32	9 X 4 = 36
7 X 5 = 35	8 X 5 = 40	9 X 5 = 45
7 X 6 = 42	8 X 6 = 48	9 X 6 = 54
7 X 7 = 49	8 X 7 = 56	9 X 7 = 63
7 X 8 = 56	8 X 8 = 64	9 X 8 = 72
7 X 9 = 63	8 X 9 = 72	9 X 9 = 81
7 X 10 = 70	8 X 10 = 80	9 X 10 = 90

10 X 1 = 10	11 X 1 = 11	12 X 1 = 12
10 X 2 = 20	11 X 2 = 22	12 X 2 = 24
10 X 3 = 30	11 X 3 = 33	12 X 3 = 36
10 X 4 = 40	11 X 4 = 44	12 X 4 = 48
10 X 5 = 50	11 X 5 = 55	12 X 5 = 60
10 X 6 = 60	11 X 6 = 66	12 X 6 = 72
10 X 7 = 70	11 X 7 = 77	12 X 7 = 84
10 X 8 = 80	11 X 8 = 88	12 X 8 = 96
10 X 9 = 90	11 X 9 = 99	12 X 9 = 108
10 X 10 = 100	11 X 10 = 110	12 X 10 = 120

13 X 1 = 13	14 X 1 = 14	15 X 1 = 15
13 X 2 = 26	14 X 2 = 28	15 X 2 = 30
13 X 3 = 39	14 X 3 = 42	15 X 3 = 45
13 X 4 = 52	14 X 4 = 56	15 X 4 = 60
13 X 5 = 65	14 X 5 = 70	15 X 5 = 75
13 X 6 = 78	14 X 6 = 84	15 X 6 = 90
13 X 7 = 91	14 X 7 = 98	15 X 7 = 105
13 X 8 = 104	14 X 8 = 112	15 X 8 = 120
13 X 9 = 117	14 X 9 = 126	15 X 9 = 135
13 X 10 = 130	14 X 10 = 140	15 X 10 = 150

16 X 1 = 16	17 X 1 = 17	18 X 1 = 18
16 X 2 = 32	17 X 2 = 34	18 X 2 = 36
16 X 3 = 48	17 X 3 = 51	18 X 3 = 54
16 X 4 = 64	17 X 4 = 68	18 X 4 = 72
16 X 5 = 80	17 X 5 = 85	18 X 5 = 90
16 X 6 = 96	17 X 6 = 102	18 X 6 = 108
16 X 7 = 112	17 X 7 = 119	18 X 7 = 126
16 X 8 = 128	17 X 8 = 136	18 X 8 = 144
16 X 9 = 144	17 X 9 = 153	18 X 9 = 162
16 X 10 = 160	17 X 10 = 170	18 X 10 = 180

लath लantra : i

Transforming Kids To Calculators!
Level-1 For Standard - 6th

19 X 1 = 19	20 X 1 = 20	21 X 1 = 21
19 X 2 = 38	20 X 2 = 40	21 X 2 = 42
19 X 3 = 57	20 X 3 = 60	21 X 3 = 63
19 X 4 = 76	20 X 4 = 80	21 X 4 = 84
19 X 5 = 95	20 X 5 = 100	21 X 5 = 105
19 X 6 = 114	20 X 6 = 120	21 X 6 = 126
19 X 7 = 133	20 X 7 = 140	21 X 7 = 147
19 X 8 = 152	20 X 8 = 160	21 X 8 = 168
19 X 9 = 171	20 X 9 = 180	21 X 9 = 189
19 X 10 = 190	20 X 10 = 200	21 X 10 = 210

22 X 1 = 22	23 X 1 = 23	24 X 1 = 24
22 X 2 = 44	23 X 2 = 46	24 X 2 = 48
22 X 3 = 66	23 X 3 = 69	24 X 3 = 72
22 X 4 = 88	23 X 4 = 92	24 X 4 = 96
22 X 5 = 110	23 X 5 = 115	24 X 5 = 120
22 X 6 = 132	23 X 6 = 138	24 X 6 = 144
22 X 7 = 154	23 X 7 = 161	24 X 7 = 168
22 X 8 = 176	23 X 8 = 184	24 X 8 = 192
22 X 9 = 198	23 X 9 = 207	24 X 9 = 216
22 X 10 = 220	23 X 10 = 230	24 X 10 = 240

25 X 1 = 25	26 X 1 = 26	27 X 1 = 27
25 X 2 = 50	26 X 2 = 52	27 X 2 = 54
25 X 3 = 75	26 X 3 = 78	27 X 3 = 81
25 X 4 = 100	26 X 4 = 104	27 X 4 = 108
25 X 5 = 125	26 X 5 = 130	27 X 5 = 135
25 X 6 = 150	26 X 6 = 156	27 X 6 = 162
25 X 7 = 175	26 X 7 = 182	27 X 7 = 189
25 X 8 = 200	26 X 8 = 208	27 X 8 = 216
25 X 9 = 225	26 X 9 = 234	27 X 9 = 243
25 X 10 = 250	26 X 10 = 260	27 X 10 = 270

28 X 1 = 28	29 X 1 = 29	30 X 1 = 30
28 X 2 = 56	29 X 2 = 58	30 X 2 = 60
28 X 3 = 84	29 X 3 = 87	30 X 3 = 90
28 X 4 = 112	29 X 4 = 116	30 X 4 = 120
28 X 5 = 140	29 X 5 = 145	30 X 5 = 150
28 X 6 = 168	29 X 6 = 174	30 X 6 = 180
28 X 7 = 196	29 X 7 = 203	30 X 7 = 210
28 X 8 = 224	29 X 8 = 232	30 X 8 = 240
28 X 9 = 252	29 X 9 = 261	30 X 9 = 270
28 X 10 = 280	29 X 10 = 290	30 X 10 = 300

Perfect Squares: (1 to 30)

X	X ²	X	X ²	X	X ²
1 = 1		11 = 121		21 = 441	
2 = 4		12 = 144		22 = 484	
3 = 9		13 = 169		23 = 529	
4 = 16		14 = 196		24 = 576	
5 = 25		15 = 225		25 = 625	
6 = 36		16 = 256		26 = 676	
7 = 49		17 = 289		27 = 729	
8 = 64		18 = 324		28 = 784	
9 = 81		19 = 361		29 = 841	
10 = 100		20 = 400		30 = 900	

Perfect Cubes: (1 to 15)

X	X ³	X	X ³	X	X ³
1 =	1	6 =	216	11 =	1331
2 =	8	7 =	343	12 =	1728
3 =	27	8 =	512	13 =	2197
4 =	64	9 =	729	14 =	2744
5 =	125	10 =	1000	15 =	3375

Mega Practice Task # 2:

1. Write down the multiplication tables: 1 to 30.
2. Write down squares: 1 to 30
3. Write down cubes: 1 to 15



3

Multiplication Tables till 100

in just 3 seconds!

Glimpse of this chapter : Learn the tricks to answer multiplication tables from 1 to 100 in just 3 seconds, that too without a pen or paper. This method enables us to get answers of multiplication of any two-digit number with any one-digit number mentally in just 3 seconds! Go ahead and explore!

Introduction:

It must have been a little tough task for you to remember all the multiplication tables. But, if you know multiplication tables of 1 to 10, then your work is done. You can multiply any two-digit number with any number from 1 to 10 very easily in just 3 seconds, at the max. It also clearly means, you can easily go for multiplication tables of 1 to 100.

We can see the multiplication table in some different way. In this chapter, two SMART TRICKS are given which will open your eyes to some quick method of multiplying any two-digit number with one-digit number.

SMART TRICK # 1:

Make unit digit – ‘Zero’ (Multiplication tables till 100)

Q1: 69×9

Step1: $(70 - 1) \times 9$

{Write a two-digit number in $(a+b)$ or $(a-b)$ format. Where ‘a’ is a number whose unit digit is zero. Let’s assume the one-digit number i.e. ‘c’. So, it would be $(a+b) \times c$ or $(a-b) \times c$ format.}

Step2: $(70 \times 9) - (1 \times 9)$

{Using distributive property: $(axc) - (bxc)$ }

Step3: $630 - 9$ {Calculate in mind}

Step4: 621 {Answer}

SMART TRICK # 2:

Carry Forward Method (Multiplication tables till 100)

Q2. 69×9

First number: 69

Second number: 9

Step1:

LHS: $(6 \times 9) = 54$

{10's digit of the first number x second number}

Step 2:

RHS: $(9 \times 9) = 81$

{unit's digit of the first number x second number}

Step 3:

{Combine both the numbers and keep in mind.}

54 81

Step 4:

{If RHS is a one-digit number, put as it is. If it is a two-digit number, keep the unit digit as it is and carry the ten's digit forward.}

8
54 1

= 621 {Answer}

Both the methods are very powerful and quick. They enable you to do multiplication of any two-digit number with a one-digit number in just 3 seconds!

Practice Examples:

Q3: 48 X 7 (Solve with the help of SMART TRICK # 1)

$$\begin{aligned} &= (50 - 2) \times 7 \\ &= (50 \times 7) - (2 \times 7) \\ &= 350 - 14 = 336 \end{aligned}$$

Q4: 48 X 7 (Solve with the help of SMART TRICK # 2)

$$\begin{aligned} &= (4 \times 7) \text{ and } (8 \times 7) \\ &= 28 \text{ and } 56 \\ &\quad 5 \\ &= 28 \quad 6 \\ &= 336 \end{aligned}$$

Q5: 98 X 6 (Solve with the help of SMART TRICK # 1)

$$\begin{aligned} &= (100 - 2) \times 6 \\ &= (100 \times 6) - (2 \times 6) \\ &= 600 - 12 = 588 \end{aligned}$$

Q6: 98 X 6 (Solve with the help of SMART TRICK # 2)

$$\begin{aligned} &= (9 \times 6) \text{ and } (8 \times 6) \\ &= 54 \text{ and } 48 \\ &\quad 4 \\ &= 54 \quad 8 \\ &= 588 \end{aligned}$$

Q7: 67×3 (Solve with the help of SMART TRICK # 1)

$$= (70 - 3) \times 3$$

$$= (70 \times 3) - (3 \times 3)$$

$$= 210 - 9$$

$$= 201$$

Q8: 67×3 (Solve with the help of SMART TRICK # 2)

$$= (6 \times 3) \text{ and } (7 \times 3)$$

$$= 18 \text{ and } 21$$

$$\begin{array}{r} 2 \\ = 18 \quad 1 \end{array}$$

$$= 201$$

Q9: 42×8 (Solve with the help of SMART TRICK # 1)

$$= (40 + 2) \times 8$$

$$= (40 \times 8) + (2 \times 8)$$

$$= 320 + 16$$

$$= 336$$

Q10: 42×8 (Solve with the help of SMART TRICK # 2)

$$= (4 \times 8) \text{ and } (2 \times 8)$$

$$= 32 \text{ and } 16$$

$$\begin{array}{r} 1 \\ = 32 \quad 6 \end{array}$$

$$= 336$$

Q11: 53×4 (Solve with the help of SMART TRICK # 1)

$$= (50 + 3) \times 4$$

$$= (50 \times 4) + (3 \times 4)$$

$$= 200 + 12$$

$$= 212$$

Q12: 53×4 (Solve with the help of SMART TRICK # 2)

$$= (5 \times 4) \text{ and } (3 \times 4)$$

$$= 20 \text{ and } 12$$

1

$$= 202 = 212$$

Mega Practice Task # 3:

(A) Speed Enhancer Practice Questions:

Find out answers of the following questions as per the SMART TRICKS explained in this chapter.

Ideal time limit: 3 seconds / question

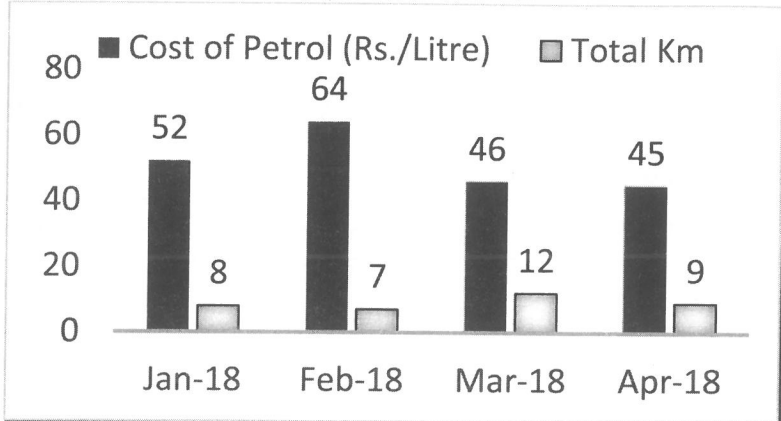
- | | | |
|-------------------|-------------------|-------------------|
| 1) 12×5 | 12) 15×9 | 23) 25×5 |
| 2) 13×7 | 13) 13×9 | 24) 24×7 |
| 3) 14×8 | 14) 19×5 | 25) 23×9 |
| 4) 15×6 | 15) 14×8 | 26) 22×9 |
| 5) 17×8 | 16) 12×7 | 27) 20×6 |
| 6) 13×6 | 17) 16×9 | 28) 25×7 |
| 7) 18×8 | 18) 18×8 | 29) 24×8 |
| 8) 11×7 | 19) 19×4 | 30) 16×5 |
| 9) 19×9 | 20) 21×5 | 31) 18×6 |
| 10) 16×8 | 21) 23×3 | 32) 14×4 |
| 11) 17×7 | 22) 22×8 | 33) 24×5 |

- | | | |
|--------------------|--------------------|---------------------|
| 34) 23×7 | 43) 21×16 | 53) 147×5 |
| 35) 21×8 | 44) 15×16 | 54) 169×8 |
| 36) 22×5 | 45) 14×12 | 55) 247×6 |
| 37) 13×12 | 46) 17×17 | 56) 188×15 |
| 38) 15×12 | 47) 234×6 | 57) 171×17 |
| 39) 14×16 | 48) 135×7 | 58) 158×15 |
| 40) 23×12 | 49) 246×3 | 59) 134×17 |
| 41) 19×14 | 50) 199×4 | 60) 146×21 |
| 42) 25×11 | 51) 256×5 | |
| | 52) 168×4 | |

(B) Application based questions:

- Length of a square classroom is 8 m. Find the cost of fixing coloured tiles on the floor of the classroom at the rate of Rs. 5 per square meter.
(Hint: Area = 8×8 Cost = 64×5)
- A builder has 84 houses. Out of these, 75 % houses sold out, then find the number of houses sold.
(Hint: $84 \times \frac{3}{4} = 21 \times 3$)
- If Sudharshan buys 7 goggles costing Rs. 43 each, what would be his total cost?
- Sanjay has a bike which he uses for his travelling. Every month the price of petrol changes. Sanjay's bike roams varying kilometers every month. The details are given in the chart on

the following page. Find out his total expenses for all the months from Jan-18 to Apr-18.



Hint:

Jan-18: 52×8

Feb-18: 64×7

Mar-18: $46 \times 12 = 46 \times 12 = 92 \times 6$

Apr-18: $45 \times 13 = 45 \times 9$

Answers: (A)

1) 60

5) 136

9) 171

2) 91

6) 78

10) 128

3) 112

7) 144

11) 119

4) 90

8) 77

12) 135

- | | | |
|---------|---------|----------|
| 13) 117 | 28) 175 | 44) 240 |
| 14) 95 | 29) 192 | 45) 148 |
| 15) 112 | 30) 80 | 46) 289 |
| 16) 84 | 31) 108 | 47) 1404 |
| 17) 144 | 32) 56 | 48) 945 |
| 18) 144 | 33) 120 | 49) 738 |
| 19) 76 | 34) 161 | 50) 796 |
| 20) 105 | 35) 168 | 51) 1280 |
| 21) 69 | 36) 110 | 52) 672 |
| 22) 176 | 37) 156 | 53) 735 |
| 23) 125 | 38) 180 | 54) 1352 |
| 24) 168 | 39) 224 | 55) 1482 |
| 25) 207 | 40) 276 | 56) 2820 |
| 26) 198 | 41) 266 | 57) 2907 |
| 27) 120 | 42) 275 | 58) 2370 |
| | 43) 336 | 59) 2278 |
| | | 60) 3066 |

(B)

1)Rs.320

2) 63

3)Rs.301

4) 416, 448, 552, 405

4

'Nikhilam'

An Extremely Important Vedic Method

Glimpse of this chapter : *'Nikhilam'* is an extremely important vedic method to be able to do calculations mentally. We would try to learn the meaning, approach and application of the powerful Vedic Sutra *'Nikhilam'* and would begin our studies of Vedic Math Tricks and Techniques focusing *'Nikhilam-Navatsh-Charamam-Dashatah'* and its applications in various mathematical operations. Go ahead and explore!

36 | Page

લઘ્વે લઘ્વે : ૪

Transforming Kids To Calculators!
Level-1 For Standard - 6th

Introduction:

Finding out *Nikhil*:

- ❖ A process known as '*Nikhilam*' is an extremely important process in the curriculum of 'Vedic Math'.
- ❖ It is a widely used process in various types of Vedic calculations.

Definition: When two numbers have their sum 10 or in the powers of 10, then they both are '*Nikhil*' numbers of each other.

Q1: What is *Nikhilam* of 4?

$$4 + X = 10$$

$$X = 10 - 4$$

$$X = 6$$

Nikhil of 4 is 6. *Nikhil* of 6 is 4. And $6+4=10$. 10 is the '*Nikhilesh*' of both the numbers i.e. 4 and 6.

Definition of '*Nikhilesh*':

The sum of the both *Nikhil* numbers is called *nikhilesh*. (as explained above).

$$(X) + (\text{Nikhil of } X) = \text{Nikhilesh of } (X) = \text{Nikhilesh of } (\text{Nikhil of } X)$$

$$(\text{Nikhil of } X) = \text{Nikhilesh} - X$$

Applying the above to find *Nikhil* of 4. As the number given is of one digit (i.e. 4) so *nikhilesh* of 4 contains only one zero. First digit is always 1 in *nikhilesh*. So, *nikhilesh* of 4 becomes 10.

$(\text{Nikhil of } 4) = (\text{Nikhilesh of } 4) - 4 = 10 - 4 = 6$

Thus, *Nikhil* of 4 = 6

Peculiarities of '*Nikhilesh*':

1. It is always in the power of 10 i.e. 10, 100, 1000, 10000, etc.
2. Its first digit would be 1.
3. All of its digits other than the first would be zero only.

Q2: What is *Nikhilam* of 90?

$$90 + X = 100$$

$$X = 100 - 90$$

$$X = 10$$

$$\text{Nikhil of } 90 = 10$$

$$\text{Nikhilesh of both } 90 \text{ and } 10 = 100$$

Q3: What is *Nikhilam* of 600?

$$600 + x = 1000$$

$$X = 1000 - 600$$

$$X = 400$$

$$\text{Nikhil of } 600 = 400$$

$$\text{Nikhilesh of both } 600 \text{ and } 400 = 1000$$

Q4: What is *Nikhilam* of 9000?

$$9000 + X = 10000$$

$$X = 10000 - 9000$$

$$X = 1000$$

$$\text{Nikhil of } 9000 = 1000$$

$$\text{Nikhilesh of both } 9000 \text{ and } 1000 = 10000$$

Ultimately, when we need to find *Nikhil* of any number, we need to subtract the given number from the *nikhilesh* of the given number and it is very easy to find out *nikhilesh* of any number i.e. put 1 and that follows the same number of zeros as many digits a number has.

If we observe carefully, to find out *Nikhil* of any number, we need to subtract the number from its *nikhilesh* means we need to subtract the last digit of the number from ten and rest all digits from 9. (you can try to understand it practically).

And, the understanding that we have just now created makes an important deduction for Vedic Math System i.e. '*Nikhilam-Navatsh-Charamam-Dashatah*' (निखिलम् नवतश्चरमं दशतः)

Meaning of the Sutra:

'*Nikhilam-Navatsh-Charamam-Dashatah*'

निखिलम्: When two numbers have their sum 10 or in the powers of 10, Then they both are *Nikhil* numbers of each other.

नवतः : From nine (9)

चरमं : Right most last non-zero digit

दशतः : From ten (10)

So, the complete meaning of निखिलम् नवतश्चरमं दशतः 'To get *Nikhil* of any number, subtract all the digits from 9 and the last right most digit by 10.'

SMART TRICK # 3:

Finding out '*Nikhil*' ('*Nikhilam*')

Q5: Find the *Nikhil* of 3058.

$$9 - 3 = 6$$

$$9 - 0 = 9$$

$$9 - 5 = 4$$

$$10 - 8 = 2$$

So, the answer is 6942.

Q6: Find out *Nikhil* of 786534

$$9 - 7 = 2$$

$$9 - 8 = 1$$

$$9 - 6 = 3$$

$$9 - 5 = 4$$

$$9 - 3 = 6$$

$$10 - 4 = 6$$

So, the answer thus becomes 213466.

SMART TRICK # 4:

Finding out '*Nikhilesh*'

$$(X) + (\text{Nikhil of } X) = \text{Nikhilesh of } (X) = \text{Nikhilesh of } (\text{Nikhil of } X)$$

Q7: Find the *Nikhilesh* of 8013.

Nikhilesh contains as many zeros as the digits of the given number and '1' before that. So, here 4 digits so 4 zeros and 1 ahead of it. So, the *Nikhilesh* is 10000.

Practice Task: 4.1

Find out the *Nikhil* and the *Nikhilesh* of the given numbers.

- | | | |
|-----------|--------------|-----------|
| 1) 758 | 4) 938465828 | 7) 1298 |
| 2) 987 | 5) 763292 | 8) 198731 |
| 3) 678903 | 6) 98367289 | 9) 9821 |

SMART TRICK # 5:

Finding out *Nikhil* of decimal numbers:

We need to follow the same pattern i.e. to subtract the unit digit from 10 and rest all the digits from 9. The only thing that we need to focus is, here we need to put decimal after same number of digits to be counted from units' place. We would understand this more through examples.

Q7: Find out *Nikhil* of 234.786

$$9 - 2 = 7$$

$$9 - 3 = 6$$

$$9 - 4 = 5$$

$$9 - 7 = 2$$

$$9 - 8 = 1$$

$$10 - 6 = 4$$

So, it comes to 765214.

Here in the number given in the question, it has three decimals so as we need to put three decimals in answer too. So, the final answer thus comes to **765.214**

Q8: Find out Nikhil of 67.8

$$9 - 6 = 3$$

$$9 - 7 = 2$$

$$10 - 8 = 2$$

It comes to 322. The final answer is **32.2** as there is only one decimal in the number given in the question.

Practice Task: 4.2

Find out the Nikhil and the Nikhilesh of the given numbers.

1) 581.23

4) 96.5828

7) 929.8

2) 9.987

5) 0.763292

8) 999.76

3) 890.3

6) 67.232

9) 98987.82

SMART TRICK # 6:

Application of Nikhilam sutra into subtraction:

(Vedic Sutra: Ekanyunenpurvena - एकन्यूनेन पूर्वेण)

It makes the process of subtraction quite fast and accurate. It becomes even more effective when a number from which another number is to be subtracted contains some zeros at the end. Rest we can understand with examples.

Q9: 7000 – 4567

Here we would subtract 1 from 7 so as it becomes 6.

$$6 - 4 = 2$$

$$9 - 5 = 4$$

$$9 - 6 = 3$$

$$10 - 7 = 3$$

Thus, answer becomes 2433.

Q10: 70 – 45.67

Here, we need to subtract 45.67 from 70.00

Here we would subtract 1 from 7 so as it becomes 6.

$$6 - 4 = 2$$

$$9 - 5 = 4$$

$$9 - 6 = 3$$

$$10 - 7 = 3$$

It comes to 2433. As question has two decimals, the answer would also contain two decimals. Thus, answer becomes 24.33.

If we closely observe it, here we use another method of Vedic Sutra i.e. 'Eknyun' which means 'one less'. Here, we always decrease one from the first digit of a number from which the other number is to be subtracted.

Practice Task: 4.3

Find out the answers of the following questions based on the SMART TRICK #6.

1) $700 - 654.98$

2) $12 - 9.987$

3) $140 - 123.98$

4) $110 - 96.58$

5) $3 - 0.763292$

6) $80 - 67.232$

7) $3000 - 929.8$

8) $4000 - 999.76$

9) $3000 - 1987.8$

Mega Practice Task # 4:

(A) Speed Enhancer Practice Questions:

Find out '*Nikhilam*' and '*Nikhilesh*' of the following numbers as per the SMART TRICKS explained in this chapter.

Ideal time limit: 5 – 10 seconds / question

- | | |
|------------|------------|
| 1) 978 | 19) 2452 |
| 2) 84242 | 20) 2343 |
| 3) 56788 | 21) 8786 |
| 4) 4645 | 22) 756 |
| 5) 343 | 23) 7.5 |
| 6) 24523 | 24) 3636 |
| 7) 535 | 25) 6464 |
| 8) 9978 | 26) 4645 |
| 9) 888 | 27) 645 |
| 10) 78 | 28) 0.64 |
| 11) 2376 | 29) 12376 |
| 12) 6464 | 30) 6.46 |
| 13) 8754 | 31) 453453 |
| 14) 784242 | 32) 8686 |
| 15) 3256 | 33) 68665 |
| 16) 4242 | 34) 5656 |
| 17) 35 | 35) 7565 |
| 18) 63 | 36) 64564 |

37)	3245	63)	2343
38)	2345	64)	8786
39)	692384	65)	756
40)	84847	66)	0.075
41)	48484	67)	3636
42)	49274	68)	6494
43)	9859	69)	3645
44)	9835	70)	64.5
45)	876	71)	6.4
46)	48484	72)	565
47)	0.6565	73)	1535
48)	9565	74)	5254
49)	98794	75)	224
50)	75.65	76)	4241
51)	7756.5	77)	692384
52)	75.65	78)	84847
53)	96759	79)	48484
54)	686	80)	49274
55)	967.59	81)	9859
56)	686	82)	76572
57)	784.242	83)	7568
58)	42	84)	12484
59)	42.42	85)	7565
60)	35	86)	956.5
61)	63	87)	98794
62)	2452	88)	7965

lath lantra : i

Transforming Kids To Calculators!
Level-1 For Standard - 6th

89) 84847

90) 48484

91) 49274

92) 9.859

93) 76572

94) 7565

95) 48484

96) 756.5

97) 1756

98) 24.24

99) 6464

100) 2424

(B) Application based Questions:

Give answers without writing or using pen/paper in 3 seconds with the help of Nikhil concept:

1. $7000 - 2345$

2. $900 - 123$

3. $6000 - 4567$

4. $90,000 - 23456$

5. $800 - 529$

Answers:

(A)

	Nikhil	Nikhilesh
1	22	1000
2	15758	100000
3	43212	100000
4	5355	10000
5	657	1000
6	75477	100000
7	465	1000

8	22	10000
9	112	1000
10	22	100
11	7624	10000
12	3536	10000
13	1246	10000
14	215758	1000000
15	6744	10000

16	5758	10000
17	65	100
18	37	100
19	7548	10000
20	7657	10000
21	1214	10000
22	244	1000
23	2.5	10
24	6364	10000
25	3536	10000
26	5355	10000
27	355	1000
28	0.36	1
29	87624	100000
30	3.54	10
31	546547	1000000
32	1314	10000
33	31335	100000
34	4344	10000
35	2435	10000
36	35436	100000
37	6755	10000
38	7655	10000
39	307616	1000000
40	15153	100000
41	51516	100000
42	50726	100000

43	141	10000
44	165	10000
45	124	1000
46	51516	100000
47	0.3435	1
48	435	10000
49	1206	100000
50	24.35	100
51	2243.5	10000
52	24.35	100
53	3241	100000
54	314	1000
55	32.41	1000
56	314	1000
57	215.758	1000
58	58	100
59	57.58	100
60	65	100
61	37	100
62	7548	10000
63	7657	10000
64	1214	10000
65	244	1000
66	0.925	1
67	6364	10000
68	3506	10000
69	6355	10000

70	35.5	100
71	3.6	10
72	435	1000
73	8465	10000
74	4746	10000
75	776	1000
76	5759	10000
77	307616	1000000
78	15153	100000
79	51516	100000
80	50726	100000
81	141	10000
82	23428	100000
83	2432	10000
84	87516	100000
85	2435	10000

86	43.5	1000
87	1206	100000
88	2035	10000
89	15153	100000
90	51516	100000
91	50726	100000
92	0.141	10
93	23428	100000
94	2435	10000
95	51516	100000
96	243.5	1000
97	8244	10000
98	75.76	100
99	3536	10000
100	7576	10000

(B)

- 1) 4655
- 2) 777
- 3) 1433
- 4) 66544
- 5) 271

5

'Moolank'

A Vedic Evaluation Tool

Glimpse of this chapter : 'Moolank' is an extremely important vedic process using which we can do calculations mentally. It is an evaluation tool with which we can check the correctness of the answers found in the processes like summation, subtraction, multiplication, division, square, cube, square-root and cube-root. For this, we have two types of 'Moolank'. (i)Yog Moolank (ii)Viyog Moolank. Let's have complete idea about it in this chapter. Go ahead and explore!

49 | Page

लघात लघान्तरा : ।

Transforming Kids To Calculators!
Level-1 For Standard - 6th

SMART TRICK # 7:

Finding out 'Yog Moolank' of a number:

- ❖ 'Yog Moolank' is also known as 'Moolank'.
- ❖ 'Yog' means 'summation'. 'Moolank' means 'one-digit'.
- ❖ We can know this method as 'one-digit method'.
- ❖ We need to convert entire number into one digit by summing up all the digits of a number.

- ❖ For an example:

To find the 'Yog Moolank' of 67292, we need to add all the digits of 67292 i.e. $6 + 7 + 2 + 9 + 2 = 26$. Now 26 has to further be reduced in one digit i.e. $2 + 6 = 8$.

Thus, 'Yog Moolank' of 67292 is 8.

- ❖ Basically, 'Yog Moolank' is the remainder got when a number is divided by 9. So, if we add 9 in a number, 'Yog Moolank' would not change. And, if the summation of digits is 9, then we can avoid that.

For an example:

Let's take the same number 67292.

$$= 6 + 7 + 2 + 9 + 2 = 6 + (7 + 2) + (9) + 2$$

Here, brackets suggest those numbers which are either 9's or their total is 9. Such numbers can be avoided.

$$= 6 + 2 = 8$$

Thus, 'Yog Moolank' of 67292 is 8.

- ❖ Remember, if summation goes beyond 9, you can convert it into one digit and then go forward.

Practice Task: 5.1

Find out the 'Yog Moolank' of the following and convert them into one digit.

1) 6758

4) 938465828

7) 71298

2) 987

5) 763292

8) 198731

3) 678903

6) 98367289

9) 9821

SMART TRICK # 8:

Finding out 'Viyog Moolank' of a number:

- ❖ Make sum of the digits at odd places of given number starting from unit's place. Let's call it 'X'.
- ❖ Make sum of the digits at even places of given number starting from ten's place. Let's call it 'Y'.
- ❖ Now take difference between the defined 'X' and 'Y'.
- ❖ This 'X - Y' means 'Viyog Moolank'

- ❖ For an example,
Find out Viyog Moolak of 2741.

$$X = 1 + 7 = 8$$

$$Y = 2 + 4 = 6$$

Now, $X - Y$

$$= (1 + 7) - (2 + 4)$$

$$= (8) - (6)$$

$$= 2$$

So, Viyog Moolank of 2741 is 2.

SMART TRICK # 9:

What if *Viyog Moolank* is a negative number?

- ❖ In such a case, we need to add 11 in the negative number got this way. Whatever final answer we get is called the *Viyog Moolank*.
- ❖ Basically, '*Viyog Moolank*' is the remainder got when a number is divided by 11. So, if we add or subtract 11 in a number, '*Viyog Moolank*' would not change.
- ❖ For an example:
Find out *Viyog Moolank* of 7214.
$$= (4 + 2) - (1 + 7)$$
$$= (6) - (8)$$
$$= (-2)$$

Now as the result is a negative number. We need to add 11 here.

$$= (-2) + 11$$
$$= 9.$$

So *Viyog Moolank* of 7214 is 9.

- ❖ If we understand that carefully, *Viyog Moolank* is basically the remainder got when a number is divided by 11. Hence, we added 11 when we got a value in negative.

SMART TRICK # 10:

What if the value of *Viyog Moolank* comes to a number which is more than 11?

- ❖ In such a case, we need to subtract 11 from the respective number. As simple as that.

For an example:

Find out *Viyog Moolak* of 271836.

$$= (6 + 8 + 7) - (3 + 1 + 2)$$

$$= (21) - (6) = 15$$

15 is greater than 11 so subtract 11.

$$= 15 - 11 \text{ \{or 15 reflects } (5 - 1 = 4)\}$$

$$= 4$$

Thus, *Viyog Moolank* of 271836 is 4.

- ❖ Ultimately in *Viyog Moolank* if we add or subtract 11 from the value of *Viyog Moolank*, it does not make any difference.
- ❖ To be fast enough to calculate *Viyog Moolank*, we can avoid the digits whose sum results into 11 while summing up.
- ❖ For an example,
Viyog Moolank 426811952.
$$= [(2 + 9) + (1 + 6 + 4)] - [(2 + 8 + 1) + (5)]$$
$$= (0) - (5)$$
$$= (-5)$$
$$= (-5) + 11$$
$$= 6$$

Viyog Moolank in such a case is 6 as discussed above.

Practice Task: 5.2

Find out the 'Viyog Moolank' of the following and convert them into one digit.

1) 581872

4) 96828

7) 9298

2) 9987

5) 763292

8) 976763

3) 8903

6) 67232

9) 98987821

Mega Practice Task # 5:

(A) Speed Enhancer Practice Test:

Find out 'Yog Moolank' and 'Viyog Moolank' of the following numbers as per the SMART TRICKS explained in this chapter.

Ideal time limit: 5 – 10 seconds / question

1	978
2	84242
3	56788
4	4645
5	343
6	24523
7	535
8	9978
9	888
10	78
11	2376
12	6464
13	8754
14	784242

15	3256
16	4242
17	35
18	63
19	2452
20	2343
21	8786
22	756
23	75
24	3636
25	6464
26	4645
27	645
28	64

29	12376
30	646
31	453453
32	8686
33	68665
34	5656
35	7565
36	64564
37	3245
38	2345
39	692384
40	84847
41	48484
42	49274

43	9859
44	9835
45	876
46	48484
47	6565
48	9565
49	98794
50	7565
51	77565
52	7565
53	96759
54	686
55	96759
56	686
57	784242
58	42
59	4242
60	35
61	63
62	2452

63	2343
64	8786
65	756
66	75
67	3636
68	6494
69	3645
70	645
71	64
72	565
73	1535
74	5254
75	224
76	4241
77	692384
78	84847
79	48484
80	49274
81	9859
82	76572

83	7568
84	12484
85	7565
86	9565
87	98794
88	7965
89	84847
90	48484
91	49274
92	9859
93	76572
94	7565
95	48484
96	7565
97	1756
98	2424
99	6464
100	2424

(B) Application based question:

Amit's father gave him Rs.3459 and told him to purchase clothes. Amit returned from market and gave Rs.1488 back to his father. Amit said to his father that he purchased a pair of jeans costing Rs.859, a T-shirt of Rs. 348, a trouser at MRP of Rs. 764 and a shirt

costing Rs. 534. As soon as his Amit said so, his father quickly suggested that there was some error in money paid to the shopkeeper in the market. When they both calculated later, they identified that the shopkeeper has not deducted the money of a shirt. His father then sent Amit back to the market to repay the remaining amount to the shopkeeper. How did his father so quickly identify the error?

Answers:

(A)

	Question	Yog Moolank	Viyog Moolank
1	978	6	10
2	84242	2	4
3	56788	7	6
4	4645	1	3
5	343	1	2
6	24523	7	4
7	535	4	7
8	9978	6	1
9	888	6	8
10	78	6	1

11	2376	9	0
12	6464	2	7
13	8754	6	9
14	784242	9	8
15	3256	7	0
16	4242	3	7
17	35	8	2
18	63	9	8
19	2452	4	10
20	2343	3	0
21	8786	2	8
22	756	9	8
23	75	3	9
24	3636	9	6
25	6464	2	7
26	4645	1	3

27	645	6	7
28	64	1	9
29	12376	1	1
30	646	7	8
31	453453	6	0
32	8686	1	7
33	68665	4	3
34	5656	4	2
35	7565	5	8
36	64564	7	5
37	3245	5	0
38	2345	5	2
39	692384	5	0
40	84847	4	4
41	48484	1	7
42	49274	8	5
43	9859	4	3
44	9835	7	1
45	876	3	7
46	48484	1	7
47	6565	4	9
48	9565	7	6
49	98794	1	3
50	7565	5	8
51	77565	3	4
52	7565	5	8
53	96759	9	3

54	686	2	4
55	96759	9	3
56	686	2	4
57	784242	9	8
58	42	6	9
59	4242	3	7
60	35	8	2
61	63	9	8
62	2452	4	10
63	2343	3	0
64	8786	2	8
65	756	9	8
66	75	3	9
67	3636	9	6
68	6494	5	4
69	3645	9	4
70	645	6	7
71	64	1	9
72	565	7	4
73	1535	5	6
74	5254	7	7
75	224	8	4
76	4241	2	6
77	692384	5	0
78	84847	4	4
79	48484	1	7
80	49274	8	5

lath lantra : i

Transforming Kids To Calculators!
Level-1 For Standard - 6th

81	9859	4	3
82	76572	9	1
83	7568	8	0
84	12484	1	10
85	7565	5	8
86	9565	7	6
87	98794	1	3
88	7965	9	1
89	84847	4	4
90	48484	1	7

91	49274	8	5
92	9859	4	3
93	76572	9	1
94	7565	5	8
95	48484	1	7
96	7565	5	8
97	1756	1	7
98	2424	3	4
99	6464	2	8
100	2424	3	4

(B)

Can solve with the help of the concept of 'Vedic Evaluation Tool – Moolank' (Hint: $3459 = 859 + 348 + 764 + 534 + 1488$) ('Moolank' of LHS $\neq$ 'Moolank' of RHS)

6

'Moolank' Applied

Learn using the Vedic evaluation tool

Glimpse of this chapter: Here we have tried to make students learn the application of moolank in various mathematical operations like simplification, multiplication, summation, subtractions, square, square root, cube and cuberoot. Go ahead and explore!

SMART TRICK # 11:

Evaluation of Summation by 'Yog Moolank':

- ❖ If summation of the 'Yog Moolank' of all given numbers is equal to the 'Yog Moolank' of the answer got after summation is same, then the summation is right.
- ❖ For an example:
 $2345 + 7648 + 1352 + 1239 = 12584$
Yog Moolank of 2345 = 5
Yog Moolank of 7648 = 7
Yog Moolank of 1352 = 2
Yog Moolank of 1239 = 6
LHS = $2345 + 7648 + 1352 + 1239$
Yog Moolank of LHS = $5 + 7 + 2 + 6 = 20 = 2 + 0 = 2$
RHS = 12584
Yog Moolank of RHS = $1 + 2 + 5 + 8 + 4 = 20 = 2 + 0 = 2$
Yog Moolank of LHS = Yog Moolank of RHS
- ❖ This is a very important concept and it helps us in checking the accuracy and correctness of our calculation.

Practice Task: 6.1

Evaluate the following summations with *Yog Moolank Method*.

- 1) $4384 + 8492 + 7438 + 4030 = 24344$
- 2) $3480 + 3217 + 3842 + 4893 = 15432$
- 3) $4309 + 2439 + 4932 + 9847 = 21527$
- 4) $1342 + 2340 + 2400 + 4380 = 10462$
- 5) $4032 + 3408 + 3470 + 3872 = 14782$

SMART TRICK # 12:

Evaluation of summation by 'Viyog Moolank'

- ❖ If summation of the 'Viyog Moolank' of all given numbers is equal to the 'Viyog Moolank' of the answer got after summation is same, then the summation is right.

- ❖ For an example:

$$2345 + 7648 + 1352 + 1239 = 12584$$

$$\text{Viyog Moolank of } 2345 = (5+3) - (4+2) = (8) - (6) = 2$$

$$\text{Viyog Moolank of } 7648 = (8+6) - (7+4) = (14) - (11) = 3$$

$$\begin{aligned}\text{Viyog Moolank of } 1352 &= (2+3) - (5+1) = (5) - (6) = (-1) \\ &= (-1) + 11 = (10)\end{aligned}$$

$$\text{Viyog Moolank of } 1239 = (9+2) - (3+1) = (11) - (4) = 7$$

$$\text{LHS} = 2345 + 7648 + 1352 + 1239$$

$$\text{Viyog Moolank of LHS} = 2 + 3 + 10 + 7 = 22 = 2 - 2 = 0$$

$$\begin{aligned}\text{Viyog Moolank of RHS} &= (4 + 5 + 1) - (8 + 2) \\ &= (10) - (10) = 0\end{aligned}$$

$$\text{Viyog Moolank of LHS} = \text{Viyog Moolank of RHS}$$

Practice Task: 6.2

Evaluate the summations with *Viyog Moolank Method*:

1)	4384	+	8492	+	7438	+	4030	=	24344
2)	3480	+	3217	+	3842	+	4893	=	15432
3)	4309	+	2439	+	4932	+	9847	=	21527
4)	1342	+	2340	+	2400	+	4380	=	10462
5)	4032	+	3408	+	3470	+	3872	=	14782

SMART TRICK # 13:

Evaluation of subtraction by 'Yog Moolank'

- ❖ First, we need to change the side of a number to be subtracted. Let's assume X, Y and Z are the distinct numbers of any number of digits.

$X - Y = Z$ can be written as,

$$Z + Y = X$$

Then, as we know,

If summation of the 'Yog Moolank' of all given numbers is equal to the 'Yog Moolank' of the answer got after summation is same then the sum is right.

Which clearly means,

$$\text{Yog Moolank of } Z + \text{Yog Moolank of } Y = \text{Yog Moolank of } X$$

- ❖ For an example:

$$2345 - 1239 = 1106$$

$$1106 + 1239 = 2345$$

Now the above question is of summation.

(Yog Moolank of 1106 + Yog Moolank of 1239) has to be equal to Yog Moolank of 2345.

$$\text{Yog Moolank of } 1106 + \text{Yog Moolank of } 1239$$

$$= (1+1+0+6) + (1+2+3+9)$$

$$= (8) + (15)$$

$$= (23)$$

$$= 2+3 = 5$$

Yog Moolank of 2345

$$= 2+3+4+5$$

$$= 14$$

$$= 1+4$$

$$= 5$$

Thus, it is correct.

Practice Task: 6.3

Evaluate the subtraction with *Yog Moolank* Method:

- | | | | | | |
|----|------|---|------|---|------|
| 1) | 4384 | - | 4030 | = | 354 |
| 2) | 3480 | - | 1893 | = | 1587 |
| 3) | 4309 | - | 847 | = | 3462 |
| 4) | 9342 | - | 4380 | = | 4962 |
| 5) | 4032 | - | 3872 | = | 1260 |

SMART TRICK # 14:

Evaluation of subtraction by '*Viyog Moolank*':

- ❖ First, we need to change the side of a number to be subtracted. Let's assume X, Y and Z are the distinct numbers of any number of digits.

$X - Y = Z$ can be written as,

$$Z + Y = X$$

- ❖ If summation of the '*Viyog Moolank*' of all given numbers is equal to the '*Viyog Moolank*' of the answer got after summation is same then the sum is right.

Which clearly means,

Viyog Moolank of Z + Viyog Moolank of Y = Viyog Moolank of X

❖ For an example:

$$2345 - 1239 = 1106$$

$$1106 + 1239 = 2345$$

Now the above question is of summation.

(*Viyog Moolank of 1106 + Viyog Moolank of 1239*) is equal to *Viyog Moolank of 2345*

Viyog Moolank of 1106 + Viyog Moolank of 1239

$$= [(6+1) - (0+1)] + [(9+2) - (3+1)]$$

$$= [(7) - (1)] + [(11) - (4)]$$

$$= [6] + [7]$$

$$= 13$$

$$= 3 - 1$$

$$= 2$$

Viyog Moolank of 2345

$$= (5 + 3) - (4 + 2)$$

$$= (8) - (6)$$

$$= 2$$

Thus, it is correct.

Practice Task: 6.4

Evaluate the subtraction with *Viyog Moolank Method*:

1)	4384	-	4030	=	354
2)	3480	-	1893	=	1587
3)	4309	-	847	=	3462
4)	9342	-	4380	=	4962
5)	4032	-	3872	=	1260

SMART TRICK # 15:

Evaluation of multiplication by 'Yog Moolank':

- ❖ If multiplication of the 'Yog Moolank' of all given numbers is equal to the 'Yog Moolank' of the answer got after multiplication is same then the answer is right.

- ❖ For an example:

$$2345 \times 7648 = 17934560$$

$$\text{Yog Moolank of } 2345 = 5$$

$$\text{Yog Moolank of } 7648 = 7$$

$$(\text{Yog Moolank of } 2345) \times (\text{Yog Moolank of } 7648)$$

$$= 5 \times 7$$

$$= 35$$

$$= 3 + 5 \text{ (converting in to one digit)}$$

$$= 8$$

$$\text{Yog Moolank of } 17934560$$

$$= 1 + 7 + 9 + 3 + 4 + 5 + 6 + 0$$

$$= 35 = 3 + 5 = 8$$

Hence, the answer is correct.

Practice Task: 6.5

Evaluate the multiplication with Yog Moolank Method:

1) $345 \times 6752 = 2329440$

2) $743 \times 4534 = 3368762$

3) $6352 \times 637 = 4046224$

4) $5237 \times 765 = 4006305$

5) $856 \times 7615 = 6518440$

SMART TRICK # 16:

Evaluation of multiplication by 'Viyog Moolank'

- ❖ If multiplication of the 'Viyog moolank' of all given numbers is equal to the 'Viyog moolank' of the answer got after multiplication is same, then the answer is right.
- ❖ For an example:

$$2345 \times 7648 = 17934560$$

$$\text{Viyog Moolank of } 2345 = (5+3) - (4+2) = 8 - 6 = 2$$

$$\text{Viyog Moolank of } 7648 = (8+6) - (4+7) = 14 - 11 = 3$$

$$(\text{Viyog Moolank of } 2345) \times (\text{Viyog Moolank of } 7648)$$

$$= 3 \times 2$$

$$= 6$$

$$\text{Viyog Moolank of } 17934560$$

$$= (0+5+3+7) - (6+4+9+1)$$

$$= 15 - 20$$

$$= (-5) \text{ \{because it is negative, we need to add 11 to it\}}$$

$$= (-5) + 11$$

$$= 6$$

Hence, the answer is correct.

Practice Task: 6.6

Evaluate the multiplication with *Yog Moolank* / *Viyog Moolank*

Method:

1) $345 \times 6752 = 2329440$

2) $743 \times 4534 = 3368762$

3) $6352 \times 637 = 4046224$

4) $5237 \times 765 = 4006305$

5) $856 \times 7615 = 6518440$

SMART TRICK # 17:

Evaluation of squares/cubes by 'Yog Moolank':

- ❖ If the square of a 'Yog Moolank' of given number is equal to the 'Yog Moolank' of the squared number, then the answer is right.

- ❖ For an example:

$$(67)^2 = 4489$$

Yog Moolank of 67

$$= 6+7$$

$$= 13 = 1+3 = 4$$

Square of the Yog Moolank thus got = $(4)^2 = 16 = 1+6 = 7$

Yog Moolank of $(67)^2 = 7$

Yog Moolank of a squared number 4489 is,

$$= 4 + 4 + 8 + 9$$

$$= 25$$

$$= 2 + 5$$

$$= 7$$

Hence the answer is correct.

Practice Task: 6.7

Evaluate the squares/cubes with Yog Moolank Method:

1) $(345)^2 = 119025$

2) $(1237)^3 = 1530169$

3) $(23)^3 = 8529$

4) $(876)^2 = 767276$

5) $(2345)^2 = 5499025$

SMART TRICK # 18:

Evaluation of squares/cubes by 'Viyog Moolank'

- ❖ If square of the 'Viyog moolank' of given number is equal to the 'Viyog moolank' of the answer got after squaring operation, then the answer is right.

- ❖ For an example:

$$(67)^2 = 4489$$

$$\text{Viyog Moolank of } 67 = 7 - 6 = 1$$

$$\text{Square of the Viyog moolank thus got} = (1)^2 = 1$$

$$\text{Viyog Moolank of } (67)^2 = 1$$

$$\text{Viyog Moolank of a squared number 4489 is,}$$

$$= (9+4) - (8+4)$$

$$= (13) - (12) = 1$$

Hence the answer is correct.

- ❖ $(47)^3 = 4489$

$$\text{Viyog Moolank of } 47 = 7 - 4 = 3$$

$$\text{cube of the Viyog moolank thus got} = (3)^3 = 27 = 7 - 2 = 5$$

$$\text{Viyog Moolank of } (47)^3 = 5$$

$$\text{Viyog Moolank of squared number 4489 is,}$$

$$= (9+4) - (8+4) = (13) - (12) = 1$$

Hence the answer is incorrect

Practice Task: 6.8

Evaluate the squares/cubes with Viyog Moolank Method:

$$1) (345)^2 = 119025$$

$$2) (1237)^2 = 1530169$$

$$3) (27)^3 = 15299$$

$$4) (876)^2 = 767276$$

$$5) (2345)^2 = 5499025$$

Mega Practice Task # 6:

(A) Speed Enhancer Practice Task:

Evaluate the following equalities based on the SMART TRICKS explained in this chapter.

Ideal time limit: 5 – 10 seconds / question

- 1) $4032 + 3408 + 3470 + 3872 = 14782$
- 2) $9473 + 7908 + 9234 + 8723 = 35328$
- 3) $6573 + 9823 + 8673 + 3622 = 28691$
- 4) $7832 + 3726 + 4783 + 8743 = 25084$
- 5) $3984 + 8434 + 3840 + 8437 = 24685$
- 6) $(23)^2 = 529$
- 7) $(234)^2 = 54756$
- 8) $(345)^2 = 119025$
- 9) $(1546)^2 = 2390116$
- 10) $(23.6)^2 = 546.96$
- 11) $9873 \times 2134 = 21168982$
- 12) $3422 \times 2311 = 7908242$
- 13) $9873 \times 9723 = 95995179$
- 14) $234 \times 239 = 55926$
- 15) $243 \times 544 = 132192$
- 16) $(33)^3 = 35927$
- 17) $(134)^3 = 2406104$
- 18) $(65)^3 = 274625$
- 19) $(43)^3 = 79507$
- 20) $(216)^3 = 10077696$

(B) Application Based Question:

Instructions for Q1 and Q2: A book store had a sale of the books in Primary, secondary, higher secondary and novels sections as given below. Answer the questions based on the information given here.

Month	Primary	Secondary	Higher Secondary	Novels
May-18	3456	8790	2341	3452

1. What is the total number of books sold?
a) 18039 b) 12345 c) 123456 d) 18093
2. What do you get when you multiply the number of books sold under Primary with that of Secondary?
a) 30278240 b) 30378240 c) 30456798 d) 23456784

Answers: (A)

- | | | |
|---------|---------|---------|
| 1) Yes | 2) No | 3) Yes |
| 4) Yes | 5) No | 6) Yes |
| 7) Yes | 8) Yes | 9) Yes |
| 10) No | 11) No | 12) Yes |
| 13) Yes | 14) Yes | 15) Yes |
| 16) No | 17) Yes | 18) Yes |
| 19) Yes | 20) Yes | |

(B)

1. A) 18039 2. B) 30378240

7

SMART Summation

Be as fast as a calculator!

Glimpse of this chapter : The entire chapter explains you about fast calculations concentrating on the area of summation. We have been taught to calculate from the unit digit till now. This is the time to change our methodology to calculate. You need to calculate any number from the left side and not from the right end or unit digit. That's the key to be fast. Go ahead and explore!

Introduction:

In this chapter, we would study how to do summations and subtractions quickly as well as accurately. This chapter would show you a non-conventional method of solving summations through Vedic methods. Calculate $2345 + 6789 + 23456 + 987$. Can we answer it without the calculator and may be even faster than a calculator? Probably your answer would be a big 'NO'. But, this chapter would teach you a method today that would help you to actualize the same.

SMART TRICK # 19:

'SMART Summation based on Place Value'

Q1: $26 + 71$

- ❖ Generally, we add unit digits first i.e. 6 and 1. $6+1=7$. 7 would be the last digit of my answer. Then $2+7=9$. So, answer is 97. But this is a conventional method of summation.
- ❖ We can be more accurate and faster if we use a method with understanding.
- ❖ An Indian Mathematician, Aryabhatta founded 'ZERO' and that was a very big leap in the field of Math. Concept of place value was very first given by him only. Because of the concept of zero, place value of a digit came into the picture.
- ❖ Place values are like unit's place, 10's place, 100's place and so on.

- ❖ E.g.: 2345 is a number where in 2 has its place-value 2000. 3 has its place-value 300. 4 has its place value 40. 5 has its place-value 5.

Number	ABCD	2345
1000's place	(A) x (1000)	2000
100's place	(B) x (100)	300
10's place	(C) x (10)	40
unit's place	(D) x (1)	5

This way, $2000 + 300 + 40 + 5 = 2345$

Now, $26 + 71$

Numbers	10's place	unit's place	
26	2	6	
71	7	1	
	$2 + 7$	$6 + 1$	
	9	7	This is the answer: 97

Q2: $234 + 456$

Numbers	100's place	10's place	unit's place	
234	2	3	4	
456	4	5	6	
	6	8	10	Only one digit has to be there. Otherwise, carry forward.
	6	8+1	0	
	6	9	0	This is the answer: 690

Q3: $2345 + 6578 + 4569 + 3453 + 2345$

Numbers	1000's place	100's place	10's place	unit's place	
2345	2	3	4	5	
6578	6	5	7	8	
4569	4	5	6	9	
3453	3	4	5	3	

2345	2	3	4	5	
	17	20	26	30	Only one digit has to be there. Otherwise, carry forward.
	17	20	$26 + 3$	0	
	17	20	29	0	
	17	$20 + 2$	9	0	
	17	22	9	0	
	$17 + 2$	2	9	0	
	19	2	9	0	This is the answer: 19290

We can use this method and calculate quickly without writing, that too, right in our brain! Let's try it out.

Q4: $4562 + 9876 + 2349 + 1341$

❖ Let's add 1000's places:

$$4 + 9 + 2 + 1 = 16$$

$$\text{Or else, } 4 + 9 = 13 + 2 = 15 + 1 = 16$$

So, first two digits of my answer are 16.

❖ Let's add 100's places:

$$5 + 8 + 3 + 3 = 19$$

So, the first two digits of the answer were 16 and in place of third digit, it came 19, so we need to carry '1' forward

and add into 16 so as it becomes 17 and the third digit becomes 9. Thus, first three digits of the answer are now 179.

- ❖ Let's add 10's places:

$$6 + 7 + 4 + 4 = 21$$

So, first three digits of the answer were 179 and in place of fourth digit, it came 21, so I need to carry '2' forward and add into 179. It becomes 181 and the fourth digit becomes 1. Thus, first four digits of the answer are now 1811.

- ❖ Let's add units' places:

$$2 + 6 + 9 + 1 = 18$$

So, first four digits of my answer was 1811 and in place of fifth digit, it came 18, so I need to carry 1 forward and add into 1811 so it becomes 1812 and the fourth digit becomes 8. Thus, the final answer would be 18128.

Remember, this entire process would not take more than 10 seconds to calculate this big sum right in your brain without usage of a pen or a paper. Isn't it as fast as a calculator?

This method is based on a vedic sutra ***Ekadhikēnpurvēna***. 'Ek' means one. 'Adhiken' means more. 'Purvēna' means the previous one. So *Ek-Adhiken-Purvēna* (*Ekadhikēnapurvēna*) means 'One more than the previous one'

SMART TRICK # 20:

SMART Summation based on Vedic Sutra - *Ekadhikenpurvena* :

(एकाधिकेन पूर्वेण): The more you read this book, the more you will learn about these 'sutras'.

Q5: 4562 + 9876 + 2349 + 1341

Numbers		1000's place	100's place	10's place	unit's place	
4562		4	5	6	2	
9876		9	8	7	6	
	*	*	*			These '*' signs represent 1 carry forward.
2349		2	3	4	9	
				*		
1341		1	3	4	1	
			*			
1st Step		6	9	1	8	
2nd Step	1	7	1	2	8	
		*				
Final Step	1	8	1	2	8	This is the final answer: 18128

Q6: $673 + 9875 + 1238 + 54$

Addition of 1000's places: $9 + 1 = 10$

(First two digits of Answer: 10)

Addition of 100's places: $6 + 8 + 2 = 16$

(First three digits of Answer: 116)

Addition of 10's places: $7 + 7 + 3 + 5 = 22$

(First four digits of Answer: 1182)

Addition of units' places: $3 + 5 + 8 + 4 = 20$

(Final Answer: 11840)

Thus, the answer is **11840**.

Q7: $673 + 9875 + 1238 + 54$

By using the application of '*Ekadhikenapurvena*' Sutra:

Numbers		1000's place	100's place	10's place	unit's place	
673		0	6	7	3	
9875		9	8	7	5	
		*	*			This '*' sign represents 1 carry forward.
1238		1	2	3	8	
	*			*		
54		0	0	5	4	

			*	*		
1st Step		0	6	2	0	
2nd Step	1	1	8	4	0	
Final Step	1	1	8	4	0	This is the final answer: 11840

Practice Task: 7.1

Answer the following questions based on SMART TRICK #20:

- 1) $23 + 98$ 2) $45 + 98$ 3) $876 + 456$
 4) $87 + 459$ 5) $786 + 48$

Mega Practice Task # 7:

(A) Speed Enhancer Practice Test:

Solve the following questions based on the SMART TRICKS explained in this chapter.

Ideal time limit: 5 – 10 seconds / question

- 1) $978 + 77565 + 424 + 48484$
- 2) $84242 + 7565 + 692384 + 7565$
- 3) $7475 + 96759 + 84847 + 9565$
- 4) $4645 + 686 + 48484 + 98794$
- 5) $343 + 96759 + 49274 + 7565$
- 6) $24523 + 686 + 9859 + 84847$
- 7) $535 + 784242 + 76572 + 48484$
- 8) $5254 + 42 + 7565 + 49274$
- 9) $224 + 4242 + 48484 + 9859$
- 10) $78 + 35 + 7565 + 78$

11)	2424	+	63	+	9565	+	2424
12)	6464	+	2452	+	98794	+	6464
13)	2424	+	2343	+	7565	+	2424
14)	784242	+	8786	+	84847	+	784242
15)	42	+	756	+	48484	+	342
16)	4242	+	75	+	49274	+	4242
17)	335	+	3636	+	9859	+	846
18)	63	+	6464	+	76572	+	963
19)	2452	+	4645	+	7565	+	2452
20)	2343	+	645	+	48484	+	2343
21)	8786	+	64	+	7565	+	8786
22)	756	+	565	+	7565	+	756
23)	75	+	535	+	2424	+	75
24)	3636	+	5254	+	6464	+	3636
25)	6464	+	224	+	2424	+	6464
26)	4645	+	78	+	784242	+	4645
27)	645	+	2424	+	42	+	645
28)	64	+	6464	+	645	+	35
29)	565	+	2424	+	57	+	565
30)	646	+	784242	+	565	+	646
31)	453453	+	42	+	646	+	453453
32)	8686	+	645	+	784242	+	8686
33)	68665	+	64	+	42	+	68665
34)	5656	+	565	+	4242	+	5656
35)	7565	+	646	+	35	+	7565
36)	64564	+	453453	+	63	+	64564

लathे लान्त्रा : ।

Transforming Kids To Calculators!
Level-1 For Standard - 6th

- 37) 232 + 8686 + 2452 + 232
 38) 424 + 68665 + 2343 + 424
 39) 692384 + 5656 + 8786 + 692384
 40) 84847 + 7565 + 756 + 84847
 41) 48484 + 64564 + 75 + 692384
 42) 49274 + 232 + 3636 + 692384
 43) 9859 + 424 + 6464 + 84847
 44) 76572 + 692384 + 4645 + 48484
 45) 7565 + 692384 + 8786 + 49274
 46) 48484 + 84847 + 756 + 9859
 47) 7565 + 48484 + 3275 + 8786
 48) 9565 + 49274 + 3636 + 756
 49) 98794 + 9859 + 6464 + 75
 50) 7565 + 76572 + 4645 + 3636

(B) Application Based Questions:

Ideal time limit: 5 – 10 seconds / question

Instructions for Q1 to Q3: Study the following table and answer the questions given below:

year	Export of the commodity (Metric Tonnes)				
	A	B	C	D	E
1998	657	875	786	456	298
1999	673	764	564	235	126
2000	874	345	276	987	345
2001	582	492	519	369	231

1. Find out total export of all the commodities together in the year 2000.
2. Find out total exports of commodity A from 1998 to 2001
3. Find out total exports of all the commodities together from 1998 to 2001.
4. Find the sum:

$$5 + 16 + 27 + 38 + 49 + 60 + 71 + \dots + 126$$

Hint:

When difference is same between two terms, the formula to be used for finding sum is:

$$\text{Sum} = \frac{n}{2} (\text{First term} + \text{last term}), n = \text{total terms}$$

$$\text{Total terms} = \frac{(\text{Last term} - \text{First term})}{\text{difference between two terms}} + 1$$

$$\text{Here, Total terms (n)} = \frac{(126-5)}{11} + 1$$

Answers:

(A)

- | | | |
|-----------|-------------|-----------|
| 1) 127451 | 8) 62135 | 15) 49624 |
| 2) 791756 | 9) 62809 | 16) 57833 |
| 3) 198646 | 10) 7756 | 17) 14676 |
| 4) 152609 | 11) 14476 | 18) 84062 |
| 5) 153941 | 12) 114174 | 19) 17114 |
| 6) 119915 | 13) 14756 | 20) 53815 |
| 7) 909833 | 14) 1662117 | 21) 25201 |

- | | | |
|------------|-------------|------------|
| 22) 9642 | 32) 802259 | 42) 745526 |
| 23) 3109 | 33) 137436 | 43) 101594 |
| 24) 18990 | 34) 16119 | 44) 822085 |
| 25) 15576 | 35) 15811 | 45) 758009 |
| 26) 793610 | 36) 582644 | 46) 143946 |
| 27) 3756 | 37) 11602 | 47) 68110 |
| 28) 7208 | 38) 71856 | 48) 63231 |
| 29) 3611 | 39) 1399210 | 49) 115192 |
| 30) 786099 | 40) 178015 | 50) 92418 |
| 31) 907594 | 41) 805507 | |

(B)

- 1) 2827
- 2) 2786
- 3) 10454
- 4) 786



SMART Subtraction

Be as fast as a calculator!

Glimpse of this chapter : The entire chapter explains you about fast calculations concentrating on the area of subtraction. We have been taught to calculate from the unit digit till now. This is the time to change our methodology to calculate. You need to calculate any number from the left hand side and not from the right hand side. That's the key to be fast. Go ahead and explore!

SMART TRICK #21:

SMART Subtraction based on 'Place-value':

Q1: $149 - 137$

- ❖ 100's digit of 1st number – 100's digit of 2nd number
 $= 1 - 1 = 0$
- ❖ 10's digit of 1st number – 10's digit of 2nd number
 $= 4 - 3 = 1$
- ❖ Unit's digit of 1st number – Unit's digit of 2nd number
 $= 9 - 7 = 2$
- ❖ Thus, answer becomes 012. So, Our Answer is 12.

SMART TRICK # 22:

SMART Subtraction based on 'Ekadhikena Purvena' (एकाधिकेन पूर्वणे) Sutra:

Q2: $68 - 49$

- ❖ Unit digit of the first number is smaller than the unit digit of the second number. So, here we can use 'Ekadhikena Purvena'.
- ❖ Here we need to subtract 9 from 8 so we need to increase 10's place of second number i.e. 4 by 1. This process is called 'Ekadhik' i.e. increase by one.
- ❖ That means we need to read 59 instead of 49. And so, we need to subtract $4+1=5$ out of 6.
 $(6 - 5) = 1$. Which is my LHS part of the answer.
- ❖ We need to take Nikhil of 9 which is 1. This Nikhil '1' has to be added in unit's digit of first number i.e. 8. $1+8=9$ and, this '9' makes RHS part of my answer.
- ❖ Thus, final answer is 19.

Q3: 746 – 419

- ❖ Add Nikhil of 9 i.e. 1 into 6 and we will get 7.
- ❖ $4 - (1+1) = 2$ (Ekadik step)
- ❖ $7 - 4 = 3$
- ❖ So, the answer is 327.

Practice Task: 8.1

Answer the following questions based on the SMART TRICK #21 and #22:

1) $2345 - 465$

2) $9879 - 4567$

3) $987 - 598$

4) $765 - 498$

5) $438 - 234$

SMART TRICK # 23:

Subtraction by 'Shunyant' Number.

- ❖ 'Shunyant' means a number that ends in zero.

Q4: 37 – 29

$$= (30+7) - (20+9)$$

$$= 30 + 7 - 20 - 9$$

$$= (30 - 20) + (7 - 9) = (10) + (-2)$$

$$= 8$$

Q5: 5048 – 3819

$$= (5000 + 0 + 40 + 8) - (3000 + 800 + 10 + 9)$$

$$= (5000 - 3000) + (0 - 800) + (40 - 10) + (8 - 9)$$

$$= (2000) + (-800) + (30) + (-1)$$

$$= (2000 - 800) + 30 - 1$$

$$= 1200 + 30 - 1 = 1230 - 1$$

$$= 1229$$

Practice Task: 8.2

Answer the following questions based on SMART TRICK #23:

- | | |
|---------------|----------------|
| 1) 345 – 65 | 2) 7979 – 5667 |
| 3) 1987 – 598 | 4) 75 – 48 |
| 5) 1938 – 994 | |

SMART TRICK # 24:

Application of the Vedic Sutra '*Eknyunenpurvena*' (एकन्यूनेन पूर्वण) for Subtraction:

- ❖ Here, we need to put '*' to represent '*Eknyun*'.
- ❖ '*Eknyun*' means 'one less'
- ❖ '*Purvena*' means 'the previous one'
- ❖ We would use '*Eknyunenpurvena*' Sutra. Which means, 'One less than the previous one'
- ❖ Moreover, we use '*Nikhilesh*' concept.
- ❖ We would study the entire SMART TRICK by examples only.
- ❖ In this method, '*' sign represents '*Ekanyun*' which means 'One Less'

Q6: 325 – 268

- ❖ We know the quick method of finding *Nikhil*. Here we need to find *Nikhil* of the number to be subtracted.
- ❖ *Nikhil* of 268 is 732.
(As per *Nikhilam Navatshcharamam Dashtah* Sutra.)
- ❖ Required subtraction, 325 – 268
- ❖ We would read it as, 325 + *Nikhil* of 268

❖ 57 is the required answer.

❖ We need to take *Nikhil* of 283, which is 717

❖ 6475 is the required answer.

- ❖ We need to take Nikhil of 2349, which is 7651

❖ **1078** is the required answer.

❖ Remember! All of this, we can calculate without pen! Right in our brain and that too quickly.

Q9: 93427 – 1349

❖ We need to take *Nikhil* of 1349, which is 8651

$$\begin{array}{r}
 \begin{array}{ccccc}
 9 & 3 & 4 & 2 & 7 \\
 + & & 8 & 6 & 5 & 1 \\
 \hline
 *9 & *1 & 0 & 7 & 8 \\
 \hline
 10 & 2 & 0 & 7 & 8 \\
 \hline
 9 & 2 & 0 & 7 & 8
 \end{array}
 \end{array}
 \text{ (Eknyun)}$$

❖ **92078** is the required answer.

Practice Task: 8.3

Answer the following questions based on SMART TRICK #24:

- | | | |
|-------------|---------------|--------------|
| 1) 123 – 98 | 2) 5451 – 987 | 3) 876 – 459 |
| 4) 87 – 59 | 5) 786 – 487 | |

Mega Practice Task # 8:

(A)Speed Enhancer Practice Tests:

Solve the following questions based on the SMART TRICKS explained in this chapter.

Ideal time limit: 5 – 10 seconds / question

- | | | |
|-----------|---|-------|
| 1) 77565 | - | 48484 |
| 2) 75651 | - | 17565 |
| 3) 96759 | - | 9565 |
| 4) 456686 | - | 98794 |
| 5) 96759 | - | 7565 |
| 6) 98686 | - | 84847 |

7)	784242	-	48484
8)	65742	-	49274
9)	4242	-	9859
10)	354	-	78
11)	6334	-	2424
12)	2452	-	6464
13)	2343	-	2424
14)	8786	-	784242
15)	756	-	423
16)	7534	-	4242
17)	3636	-	352
18)	6464	-	6323
19)	4645	-	2452
20)	6451	-	2343
21)	11264	-	8786
22)	565	-	756
23)	1535	-	752
24)	5254	-	3636
25)	224	-	6464
26)	4645	-	789
27)	645	-	2424
28)	23464	-	6464
29)	8565	-	2424
30)	876462	-	784242
31)	453453	-	3442

Math Mantra : i

Transforming Kids To Calculators!
Level-1 For Standard - 6th

32)	8686	-	645
33)	68665	-	6419
34)	5656	-	565
35)	7565	-	6461
36)	64564	-	453453
37)	67232	-	8686
38)	69424	-	68665
39)	692384	-	5656
40)	84847	-	7565
41)	48484	-	64564
42)	49274	-	2332
43)	9859	-	5424
44)	76572	-	6384
45)	67565	-	692384
46)	48484	-	84847
47)	72565	-	48484
48)	92565	-	49274
49)	98794	-	9859
50)	17565	-	76572

(B) Application based questions:

1. Sunil had Rs. 4563 along with him, he purchased a table of Rs. 2132. Now, what amount of money is left with him?

2. Rina had 456 sketch pens. She gave 193 sketch pens to Seema. Now, how-many sketch pens does Rina have?

3. Ritu had 7689 shares of Reliance Industries Ltd. She sold 5983 shares. How many shares are remaining with her now?

4. What is the difference between the perimeter of the square having side 57 cm and a rectangle having length 23cm and breadth 45cm?

Answers:

(A)

- | | | | |
|-----|---------|-----|--------|
| 1) | 29081 | 17) | 3284 |
| 2) | 58086 | 18) | 141 |
| 3) | 87194 | 19) | 2193 |
| 4) | 357892 | 20) | 4108 |
| 5) | 89194 | 21) | 2478 |
| 6) | 13839 | 22) | -191 |
| 7) | 735758 | 23) | 783 |
| 8) | 16468 | 24) | 1618 |
| 9) | -5617 | 25) | -6240 |
| 10) | 276 | 26) | 3856 |
| 11) | 3910 | 27) | -1779 |
| 12) | -4012 | 28) | 17000 |
| 13) | -81 | 29) | 6141 |
| 14) | -775456 | 30) | 92220 |
| 15) | 333 | 31) | 450011 |
| 16) | 3292 | 32) | 8041 |

33) 62246

34) 5091

35) 1104

36) -388889

37) 58546

38) 759

39) 686728

40) 77282

41) -16080

42) 46942

43) 4435

44) 70188

45) -624819

46) -36363

47) 24081

48) 43291

49) 88935

50) -59007

(B)

1)Rs. 2431

2)263

3)1706

4)92cm

9

'Veshtanam'

Divisibility Tests

Glimpse of this chapter : The entire chapter explains you about fast calculations concentrating on the area of divisibility of a number. The use of '*Veshtanam*' Vedic Sub-sutra gives us a new and quicker way to check the divisibility of a number. This Vedic method not only helps to calculate faster but also enables us to make our calculations without pen and paper. Go ahead and explore!

94 | Page

लath लान्त्रा : i

Transforming Kids To Calculators!
Level-1 For Standard - 6th

Introduction:

How can we distribute 23 pens equally amongst five students without having any leftover pens? '23' is not divisible by 5 and hence it is not possible to distribute 23 pens amongst 5 students. This question gives us idea about divisibility. We have some observational understanding for small numbers for divisibility. Vedic Mathematics gives us an interesting method to check the divisibility based on the Vedic Sub-Sutra 'Veshtanam' (वेष्टनम्) or Osculator. It not only helps to check divisibility faster but also makes us do calculations mentally without use of pen and paper.

SMART TRICK # 25:

Divisibility Tests based on observational understanding 'Vilokanam':

- 2: A number is divisible by 2 when its unit digit is an even number i.e. 2, 4, 6, 8 or 0.
- 3: A number is divisible by 3 when the sum of its digits is divisible by 3.
- 9: A number is divisible by 9 when the sum of its digits is divisible by 9.
- 4: A number is divisible by 4 when the number formed by the last two right – hand digits is divisible by 4, or the last two digits are 0's.

- 8: A number is divisible by 8 when the number formed by the last three right – hand digits is divisible by 8, or when the last three digits are 0.
- 5: A number is divisible by 5 when its unit digit is 5 or 0.
- 10: A number is divisible by 10 when its unit digit is 0.
- 6: A number is divisible by 6 when it is divisible by both 2 and 3.
- 12: A number is divisible by 12 when it is divisible by both 3 and 4.
- 7: Let's assume a number 'abcdefgh'. Divide it in a group of three digits each starting from RHS. ab/cde/fgh. Make sum of odd groups and even groups. $(ab+fgh) = X$ and $cde=Y$. Take their difference ie $X - Y = Z$. If Z is 0, 7 or multiple of 7 or divisible by 7, then the entire number 'abcdefgh' can be divisible by 7.
- 11: Let's assume a number 'abcdefgh'. Divide it in a group of three digits each starting from RHS. ab/cde/fgh. Make sum of odd groups and even groups. $(ab+fgh) = X$ and $cde=Y$. Take their difference ie $X - Y = Z$. If Z is 0, 11 or multiple of 11 or divisible by 11, then the entire number 'abcdefgh' can be divisible by 11.

- 13: Let's assume a number 'abcdefgh'. Divide it in a group of three digits each starting from RHS. $ab/cde/fgh$. Make sum of odd groups and even groups. $(ab+fgh) = X$ and $cde=Y$. Take their difference i.e. $X - Y = Z$. If Z is 0, 13 or multiple of 13 or divisible by 13, then the entire number 'abcdefgh' can be divisible by 13.

Another method for checking divisibility by 11:

Let's assume a number 'abcdefgh'. Make sum of all odd places from RHS. Let's say it is X. $X = h + f + d + b$. Then make a sum of all even places from RHS ie $Y = g + e + c + a$. Take the difference of X and Y. $X - Y = Z$. If Z is 0, 11 or multiple of 11, then the entire number 'abcdefgh' is divisible by 11.

SMART TRICK # 26:

'Veshtanam' (वेष्टनम्) or 'Osculator' or 'Seed Number':

- ❖ Vedic Mathematics gives us an interesting method to check the divisibility based on the Vedic Sub-Sutra 'Veshtanam' (वेष्टनम्) or Osculator.
- ❖ There are two kinds of 'Osculator' or 'Seed number':
 - (1) Positive Seed Number or Positive Osculator
 - (2) Negative Seed Number or Negative Osculator
- ❖ If number is n, k is any integer and if $nk + 1 = 10p$, then positive osculator of n is p. $(p - n)$ is a negative osculator.
E.g. If the number is 17 then,
 $17 \times 7 = 119$. $119 + 1 = 120$. $120 = 12 \times 10$.
 12 is a positive osculator of 17.
 $(12 - 17) = -5$ which is a negative osculator.

- ❖ $(PO) + (NO) = (\text{Number itself})$
 $PO = (\text{Positive Osculator})$
 $NO = (\text{Negative Osculator})$

Use of a 'Positive Osculator':

Let's understand it by an example:

Q1: Is 169234 divisible by 43?

- ❖ Positive osculator of 43 = $43 \times 3 = 129$
- ❖ $129 + 1 = 130 = 10 \times 13$
- ❖ So, Positive Osculator of 43 = 13
- ❖ Remove the last digit of the number, multiply it with the positive osculator and add it in the remaining number. Repeat the process till you get a number less than the divisor or zero.

$$= 16923 + (4 \times 13) = 16923 + 52 = 16975$$

$$= 1697 + (5 \times 13) = 1697 + 65 = 1762$$

$$= 176 + (2 \times 13) = 176 + 26 = 202$$

$$= 20 + (2 \times 13) = 20 + 26 = 46$$

$$= 4 + (6 \times 13) = 4 + 78 = 82$$

We must stop here. '82' is not divisible by '43'. So, the entire number is not divisible by 43.

Q2: Is 169205 divisible by 43?

- ❖ Positive osculator of 43 = $43 \times 3 = 129$
- ❖ $129 + 1 = 130 = 10 \times 13$
- ❖ So, positive osculator of 43 = 13
- ❖ Remove the last digit of the number, multiply it with the positive osculator and add it in the remaining number.

Repeat the process till you get a number less than the divisor or zero.

$$= 16920 + (5 \times 13) = 16920 + 65 = 16985$$

$$= 1698 + (5 \times 13) = 1698 + 65 = 1763$$

$$= 176 + (3 \times 13) = 176 + 39 = 215$$

$$= 21 + (5 \times 13) = 21 + 65 = 86$$

We must stop here as '86' is divisible by '43'. So, the entire number is divisible by 43.

Q3: Is 12036 divisible by 51?

❖ Positive osculator of 51 = $51 \times 9 = 459$

❖ $459 + 1 = 460 = 46 \times 10$

❖ So, 46 is the positive osculator.

$$= 1203 + (6 \times 46) = 1203 + 276 = 1479$$

$$= 147 + (9 \times 46) = 147 + 414 = 561$$

$$= 56 + (1 \times 46) = 56 + 46 = 102$$

$$= 10 + (2 \times 46) = 10 + 92 = 102$$

We must stop here as '102' is divisible by '51'. So, the entire number is divisible by 51.

Some More Questions:

Q4: Is 122364 divisible by 99?

❖ 99 has two co-prime factors 11 and 9 as $11 \times 9 = 99$.

❖ So, the given number 122364 has to be divisible by 11 and 9 both.

❖ Let's check the divisibility test of 9 for the given number:

$1 + 2 + 2 + 3 + 6 + 4 = 18 = 1 + 8 = 9$. Thus, sum of the digits is divisible by 9. So, the number **122364** is divisible by 9.

- ❖ Let's check the divisibility test of 11 for the given number:
Sum of all odd placed numbers: $4+3+2 = 9$.
Sum of all even placed numbers: $6+2+1 = 9$
Thus, the sum of the digits at odd places equals to the sum of the digits at even place. So, the number **122364** is divisible by 11.
- ❖ As the given number 122364 is divisible by both 11 and 9, the number is divisible by 99.
- ❖ So, 122364 passes the divisibility test of 99.

Q5: What comes in the place of 'x' in the given number 315x8 if the given number is divisible by 4?

- ❖ When a number is divisible by 4, last two digits have to be divisible by 4.
- ❖ 'x8', if is multiple of 4 represents '28', '48', '68', '88' or '08'.
- ❖ So, if the number is divisible by 4, x can take up values as suggested above i.e. either of '2', '4', '6', '8', or '0'.
- ❖ So, the number can be '31528', '31548', '31568', '31588' or '31508'.

Q6: What comes in the place of 'x' in the given number 315x8 if the given number is divisible by 52?

- ❖ 52 has two co-prime factors 13 and 4 as $13 \times 4 = 52$.
- ❖ So, the given number has to be divisible by 13 and 4 both.
- ❖ When a number is divisible by 4, last two digits has to be divisible by 4. 'x8', if is multiple of 4 represents '28', '48', '68', '88' or '08'. So, if the number is divisible by 4, x can take up values as suggested above i.e. either '2', '4', '6',

'8', or '0'. So, the number can be '31528', '31548', '31568', '31588' or '31508'.

- ❖ Let's assume, the number is '31508'. Apply the divisibility rule of '13' and check whether the number is divisible by 13 or not. $508 - 31 = 477$. Is 477 divisible by 13 completely? No. So, 31508 is not the required number. So, x cannot be '0'.
- ❖ Let's assume, the number is '31528'. Apply the divisibility rule of '13' and check whether the number is divisible by 13 or not. $528 - 31 = 497$. Is 497 divisible by 13 completely? No. So, 31528 is not the required number. So, x cannot be '2'.
- ❖ Similarly '31548', '31568' and '31588' are also not divisible by 13. So, they can't be divisible by 52 as well.
- ❖ No such value of x is possible.

Q7: Is 122359 divisible by 37?

- ❖ Positive osculator of 37 = $37 \times 7 = 259$
- ❖ $259 + 1 = 260 = 26 \times 10$
- ❖ So, 26 is the positive osculator.
 $= 12235 + (9 \times 26) = 12235 + 234 = 12469$
 $= 1246 + (9 \times 26) = 1246 + 234 = 1480$
 $= 148 + (0 \times 26) = 148 + 0 = 148$

We must stop here as '148' is divisible by '37'. So, the entire number is divisible by 37.

Q8: Is 2448 divisible by 51?

- ❖ 51 has two co-prime factors 17 and 3 as $17 \times 3 = 51$

- ❖ So, the given number 2448 has to be divisible by 17 and 3 both.
- ❖ Let's check the divisibility test of 3 for the given number:
 $2+4+4+8 = 18$. Thus, sum of the digits is divisible by 3. So, the number **2448** is divisible by 3.
- ❖ Let's check the divisibility test of 17 for the given number by 'Veshtanam' (वेष्टनम्) or Osculator.
- ❖ Positive osculator for 17 is $17 \times 7 = 119$
- ❖ $119 + 1 = 120 = 12 \times 10$
- ❖ So, 12 is the positive osculator.
 $= 244 + (8 \times 12) = 244 + 96 = 340$
 We must stop here as '340' is divisible by '17'. So, the entire number is divisible by 17.
- ❖ As the given number 2448 is divisible by both 17 and 3, the number is divisible by 51. So, 2448 passes the divisibility test of 51.

Q9: Is 195988 divisible by 13?

- ❖ Positive osculator of 13 = $13 \times 3 = 39$
- ❖ $39 + 1 = 40 = 4 \times 10$
- ❖ So, 4 is the positive osculator.
 $= 19598 + (8 \times 4) = 19598 + 32 = 19630$
 $= 1963 + (0 \times 4) = 1963 + 0 = 1963$
 $= 196 + (3 \times 4) = 196 + 12 = 208$
 $= 20 + (8 \times 4) = 20 + 32 = 52$
 We must stop here as '52' is divisible by '13'. So, the entire number is divisible by 13.

Mega Practice Task # 9:

(A) Speed Enhancer Practice Task:

Answer the following questions based on the SMART TRICKS explained in this chapter.

Ideal time limit: 10 – 15 seconds / question

1. Is 355257 divisible by 63?
2. Is 116235 divisible by 315?
3. Is 1228769 divisible by 37?
4. Is 79704 divisible by 216?
5. Is 45678 divisible by 103?

(B) Application based question:

1. Mr. Rich has Rs.480805 in the denomination of one-rupee coins. He wanted to make pile of 13 coins each. Is it possible for him to do so such that no extra coins are left at the end? (Hint: Apply the knowledge of divisibility test or Vedic Sutra 'Veshtanam')

Answers:

(A)

- | | | |
|--------|--------|-------|
| 1) Yes | 2) Yes | 3) No |
| 4) Yes | 5) No | |

(B)

- 1) Yes

10

Fractions to Percentage Conversions

Glimpse of this chapter : The entire chapter explains you about fast calculations concentrating on the area of 'Percentage'. Fractions are required to be fast enough in various types of questions concentrating the areas like profit-loss, simple interest, compound interest, ratio etc. It enables you to be as fast as calculators if not faster! Go ahead and explore!

Introduction:

Fractions are the base of the chapter called 'Percentage' and other chapters relating to the 'Percentage' concept i.e. profit-loss, simple interest, compound interest, ratio, mixtures etc. If we harness our skills related to fractions to percentage conversions, we can solve most of the questions concentrating on these areas in our mind only.

SMART TRICK # 27:

We have to remember the percentage values of the following fractions.

$$1 = 100\%$$

$$\frac{1}{7} = 14.28\%$$

$$\frac{1}{2} = 50\%$$

$$\frac{1}{8} = 12.5\%$$

$$\frac{1}{3} = 33.33\%$$

$$\frac{1}{9} = 11.11\%$$

$$\frac{1}{4} = 25\%$$

$$\frac{1}{10} = 10\%$$

$$\frac{1}{5} = 20\%$$

$$\frac{1}{11} = 9.09\%$$

$$\frac{1}{6} = 16.67\%$$

$$\frac{1}{12} = 8.33\%$$

Applications of Fraction to Percentage Conversions:

Q1: What is the percentage value of $\frac{1}{2}$?

$$= 1 \times \frac{1}{2}$$

$$= 100\% \times \frac{1}{2}$$

$$= 50\%$$

Q2: What is the percentage value of $\frac{3}{2}$?

$$= 3 \times \frac{1}{2}$$

$$= 3 \times 50\%$$

$$= 150\%$$

Q3: What is the percentage value of $\frac{4}{2}$?

$$= 4 \times \frac{1}{2}$$

$$= 4 \times 50\%$$

$$= 200\%$$

Q4: What is the percentage value of $\frac{4}{3}$?

$$= 4 \times \frac{1}{3}$$

$$= 4 \times 33.33\%$$

$$= 133.33\%$$

Q5: What is the percentage value of $\frac{8}{3}$?

$$= 8 \times \frac{1}{3}$$

$$= 8 \times 33.33\% = 266.66\%$$

Q6: What is the percentage value of $\frac{9}{4}$?

$$\begin{aligned} &= 9 \times \frac{1}{4} \\ &= 9 \times 25\% \\ &= 225\% \end{aligned}$$

Q7: What is the percentage value of $\frac{6}{5}$?

$$\begin{aligned} &= 6 \times \frac{1}{5} \\ &= 6 \times 20\% \\ &= 120\% \end{aligned}$$

Q8: What is the percentage value of $\frac{5}{7}$?

$$\begin{aligned} &= \frac{7}{7} - \frac{2}{7} \\ &= 100\% - 28.56\% \\ &= 71.44\% \end{aligned}$$

Q9: What is the percentage value of $\frac{13}{7}$?

$$\begin{aligned} &= \frac{14}{7} - \frac{1}{7} \\ &= 200\% - 14.28\% \\ &= 185.72\% \end{aligned}$$

Q10: What is the percentage value of $\frac{1}{28}$?

$$\begin{aligned} &= \frac{1}{7} \times \frac{1}{4} \\ &= 14.28\% \times \frac{1}{4} \\ &= 3.57\% \end{aligned}$$

Q11: What is the percentage value of $\frac{1}{33}$?

$$= 1 \times \frac{1}{33}$$

$$= 100\% \times \frac{1}{33}$$

$$= 3\% \text{ (Approximately)}$$

Q12: What is the percentage value of $\frac{4}{25}$?

$$= 4 \times \frac{1}{25}$$

$$= 4 \times 4\%$$

$$= 16\%$$

Mega Practice Task # 10:

(A) Speed Enhancer Practice Task:

Answer the following questions based on the SMART TRICKS explained in this chapter.

Ideal time limit: 2 - 3 seconds / question

(a) Find out the percentage value of the following:

1. $\frac{4}{7}$

3. $\frac{5}{12}$

5. $\frac{3}{24}$

2. $\frac{3}{8}$

4. $\frac{1}{20}$

6. $\frac{8}{5}$

(b) Find out the fraction for the given percentage value:

1. 125%

3. 28.56%

5. 3.125%

2. 62.5%

4. 12.5%

6. 112.5%

(B) Application based questions:

1. Nisha divided her birthday cake into six equal pieces. She gave two pieces to Nitin. What percentage of the entire cake has Nitin eaten?
2. A roadside balloon seller had 343 balloons. He sold 49 balloons on one day. What percentage of the balloons is he left with?
3. I have invested Rs.32000 at simple interest for one year at 25% per annum. What amount would I get at the end of one year as simple interest (SI)?

Answers:

(A) (a)

- | | | |
|-----------|----------|-----------|
| 1) 57.14% | 2) 37.5% | 3) 41.66% |
| 4) 5% | 5) 12.5% | 6) 160% |

(A) (b)

- | | | |
|------------------|-------------------|------------------|
| 1) $\frac{5}{4}$ | 2) $\frac{5}{8}$ | 3) $\frac{2}{7}$ |
| 4) $\frac{1}{8}$ | 5) $\frac{1}{32}$ | 6) $\frac{9}{8}$ |

(B)

- | | | |
|-----------|-----------|------------|
| 1) 33.33% | 2) 85.72% | 3) Rs.8000 |
|-----------|-----------|------------|

11

Twist N' Turn

A Rubik's Cube Guide
Fun While You Learn

110 | Page

लathे लान्त्रा : ।

Transforming Kids To Calculators!
Level-1 For Standard - 6th

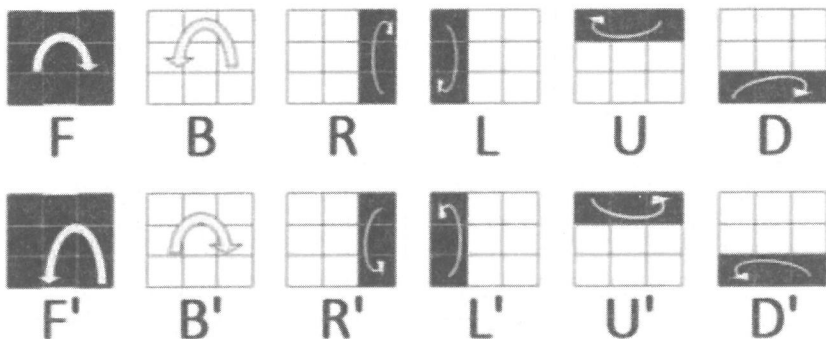
Introduction:

- ❖ Rubik's cube is a puzzle which is made up of twenty-six smaller cubes (in a cube of 3×3). This cube has six different colours on its six faces namely white, yellow, red, orange, blue and green. The cube is jumbled and we need to twist and turn the smaller cubes to make them arrange in a way that each side has a one colour.
- ❖ There is no specific method by which we can solve Rubik's cube. There are many ways to solve the Rubik's cube.
- ❖ Here, we are using a method in which we would solve all the three layers of the cube one by one.
- ❖ There are seven steps to follow in the process of solving the Rubik's cube.

Terminology:

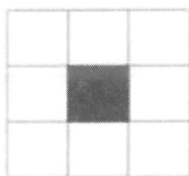
- ❖ We must know how to read the terminology of the Rubik's cube:
 - F: front
 - B: Back
 - R: right
 - L: left
 - U: up
 - D: down.

Clockwise rotations (CW)	: F B R L U D
Anti-clockwise rotations (ACW)	: F' B' R' L' U' D'

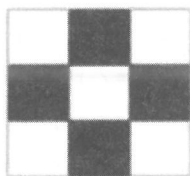


Remember:

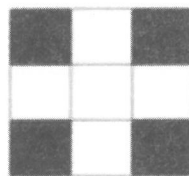
- ❖ There are three types of pieces:



Centre Piece
Has one colour



Edge pieces
Has two colours



Corner pieces
Has three colours

- ❖ Centre piece maintains its position with the respect to the opposite centre piece.
- ❖ No matter how many times you jumble the layers or various pieces of the Rubik's cube, the following centre pieces would be opposite to each other:

1. White – Yellow
2. Red – Orange
3. Blue – Green

- ❖ So, the best idea is to bring same coloured edge pieces and corner pieces matching with respective centre piece.
- ❖ There are total 26 pieces on the Rubik's cube:

1. Centre piece : 6
2. Edge pieces : 12
3. Corner pieces : 8
4. Total : $6 + 12 + 8 = 26$

The steps:

Step 1:

Make a 'White PLUS'

Step 2:

1st Layer Solved

Step 3:

2nd Layer Solved

Step 4:

Yellow 'PLUS' State

Step 5:

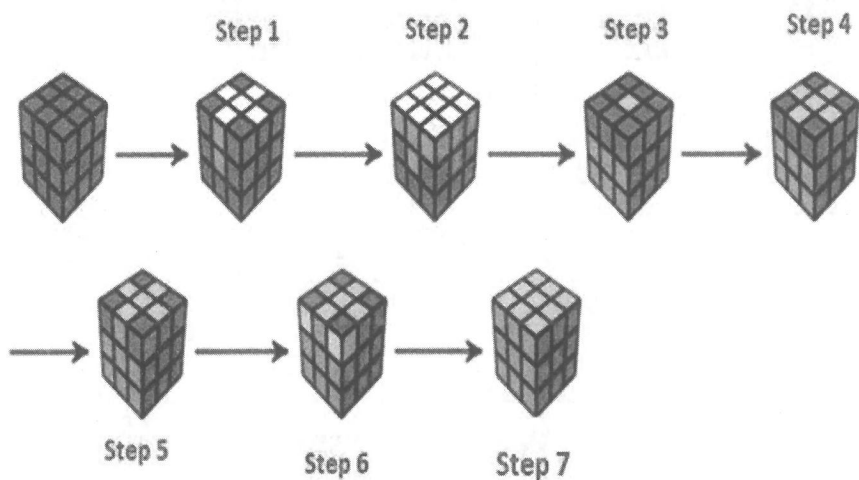
Matching of the other colour of the edge piece of the 'PLUS' State with the same coloured face

Step 6:

Making correct position of the corners of the third layer

Step 7:

Completing the 3rd layer



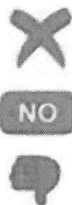
Step 1: Make a 'White PLUS'

- ❖ Begin with the white face.
- ❖ First, we have to make a white cross while paying attention to the color of the side center pieces.
- ❖ Logic is very important in this step.
- ❖ You have to move the white edges to their places, not messing up the ones already fixed.
- ❖ Observational method helps out here.
- ❖ Practice is the key.
- ❖ Once you understand the pattern, it is easy to make.

Sides matching
with centre peice

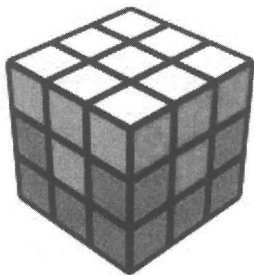


Sides not matching
with centre peice



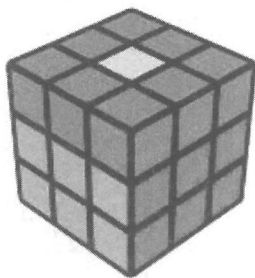
Step 2: 1st Layer Solved

- ❖ In this step we have to arrange all the white corner pieces to finish the first face.
- ❖ Logical step once again.
- ❖ You have to twist the bottom layer so that one of the white corners is directly under the spot where it's supposed to go on the top layer, then twist accordingly.



Step 3: 2nd Layer Solved

- ❖ Focus on face opposite to the white face. It is yellow.
- ❖ Find out an edge piece in bottom layer where colour doesn't match with the edge colour i.e. yellow. Any piece which has both the colours other than yellow is in focus right now.
- ❖ Look at the colour of that edge piece which matches with any of the side faces that is blue, red, orange or green. Shift it in that position.
- ❖ Focus on the other colour of the targeted edge piece.
- ❖ If the same coloured face is on the right, follow the following steps:
 1. Bottom ACW
 2. Right ACW
 3. Bottom CW
 4. Right CW
 5. Then adjust the corner piece of white face which has got replaced.
- ❖ If the same coloured face is on the left, follow the following steps:
 1. Bottom CW
 2. Left CW
 3. Bottom ACW
 4. Left ACW
 5. Then adjust the corner piece of white face which has got replaced.

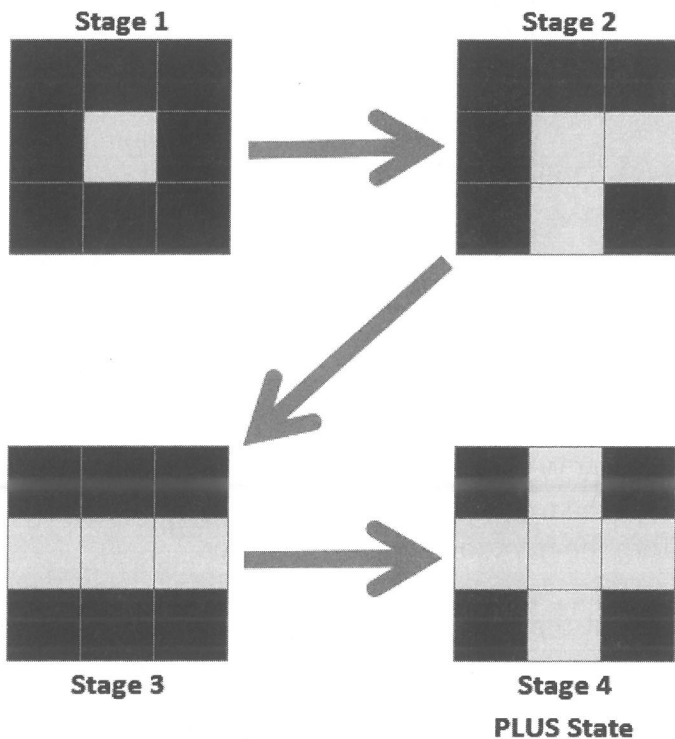


Step 4: Yellow 'PLUS' State:

1. Turn the front CW (Right)
2. Right CW (up)
3. Top CW (Left)
4. Right ACW (Down)
5. Turn the top ACW (Back to the original position)
6. Turn the front to the original position

- ❖ Repeat the above process till you get the 'PLUS' sign in yellow coloured face.
- ❖ One thing we need to take care here is the way we hold the cube in a way that the front face is 'yellow' and we can see the design in one of the ways given on the following page.

The transition would be as follows:



Step 5: Matching of the other colour of the edge piece of the 'PLUS' State with the same coloured face:

- ❖ Always remember, any two out of the four edge pieces would definitely be in correct positions.

- ❖ You must hold the cube in such a way that one of the correctly placed edge pieces at the bottom is on the back face and the other one is at your left.
- ❖ After taking above position, follow the steps given below:
 1. Right CW
 2. Top Twice CW
 3. Right ACW
 4. Top ACW
 5. Right CW
 6. Top ACW
 7. Right ACW

Step 6: Making correct position of the corners of the third layer:

- ❖ If there is any correctly positioned corner piece, put it on the top right corner and follow the steps below:
 1. Left ACW
 2. Top CW
 3. Right CW
 4. Top ACW
 5. Left CW
 6. Top CW
 7. Right ACW
 8. Top ACW

Step 7: Completing the 3rd layer:

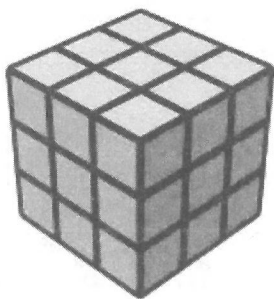
- ❖ Placing the corner correctly is one thing and turning them to match all the colours correctly is the other.
- ❖ Place the correctly turned corner on the left-hand side.
- ❖ This step helps to complete the entire Rubik's cube correctly.

1. Right CW (up)
2. Top CW twice
3. Right ACW (down)
4. Top ACW
5. Right CW (up)
6. Top ACW
7. Right ACW (down)

- ❖ After the above steps, if still it is not made then follow the next set of steps given below:

1. Left ACW (up)
2. Top CW twice
3. Left CW (down)
4. Top CW
5. Left ACW (up)
6. Top CW
7. Left CW (down)

Many Congratulations! You are now done with your Rubik's cube solution!



If you follow this procedure meticulously, it is almost certain that you can get all the six colours of the Rubik's cube solved.

Though everything is explained quite in detail, then too, it would not be easy to learn it in one go.

You need to practice a lot and try to get it done quickly.

Ideal time limit to solve it would be 1 minute. If you can solve it within 2 to 3 minutes as well, it would not be a bad start. Practice and you will improve.

All the very best!

12

lath-lantra : i

Test Yourself!

122 | Page

lath lantra : i

Transforming Kids To Calculators!
Level-1 For Standard - 6th

Find out answers of the following questions based on the knowledge of SMART TRICKS explained in math-mantra :

Ideal time limit: 15 – 30 seconds / question

1. $745 \times 181 = ?$

A) 134643

B) 134845

C) 134646

D) 134642

E) None of These

2. $321 \times 116 - 18734$

A) 18502

B) 18509

C) 18506

D) 18507

E) None of These

3. $82671 + 91729 = x - 433745$

A) 611148

B) 611149

C) 611141

D) 608145

E) None of These

4. $(45)^2 + (65)^2 + (49)^2$

A) 8651

B) 8653

C) 8654

D) 8655

E) None of These

5. $67 \times 34 + (54)^2$

A) 5195

B) 5194

C) 5196

D) 5198

E) None of These

6. 86×84

A) 5624

B) 7274

C) 5674

D) 7224

E) None of these

7. I have a square shaped choco-truffle cake. I divide it into 20 equal pieces. I eat 4 pieces of them. What percentage of the cake is remaining?

- A) 20% B) 25% C) 75%
D) 80% E) None of these

8. 9999×4356

- A) 43555644 B) 43565644 C) 43555643
D) 43565643 E) None of these

9. 20% of a number is 40 less than 25% of the same number. What is the 55% of that number?

- A) 435 B) 440 C) 935
D) 800 E) None of these

10. $568 \times 167 \times 63$

- A) 5102196 B) 5975928 C) 6201096
D) 6012298 E) None of these

11. What is 14.28% of 735.49?

- A) 105.07 B) 106.57 C) 105.57
D) 106.07 E) None of these

12. $66606 + 40998 = (A) - 24848$. Find the value of (A).

- A) 132452 B) 122451 C) 22035
D) 44321 E) None of these

13. I invested Rs.2000 in an investment scheme which provides me 15% return annually. What amount of simple interest would I get after 2 years?

- A) 600 B) 300 C) 2300
D) 2600 E) None of these

14. $445 \times 98 - 2365$

- A) 416054 B) 32571 C) 41245
D) 32110 E) None of these

15. Cost price of 5 articles is same as selling price of 3 articles. What would be my percentage gain/loss?

- A) 66.66% gain B) 40% gain C) 66.66% loss
D) 40% loss E) None of these

16. 2401, 2304, 2209, 2116, ?

- A) 2015 B) 2025 C) 3136
D) 3035 E) None of these

17. A rectangular wooden piece having length 40 cm and breadth 30 cm, then find its perimeter.

- A) 70 B) 140 C) 280
D) 35 E) None of these

18. 11, 13, 17, 19, 23, ?, 31, 37, 41

- A) 25 B) 27 C) 29
D) 31 E) 46

19. 25% of 7000

A) 1750

B) 1570

C) 1850

D) 1960

E) None of these

20. 35, 36, 40, 49, 65, ?

A) 100

B) 90

C) 76

D) 75

E) None of these

21. 62.5% of 848 + 75% Of 284 =?

A) 525

B) 863

C) 858

D) 743

E) None of these

22. Which of the following set of fractions has the fractions in descending order?

A) $\frac{2}{7}$, $\frac{3}{8}$, $\frac{1}{3}$, $\frac{4}{7}$

B) $\frac{1}{3}$, $\frac{2}{7}$, $\frac{3}{8}$, $\frac{4}{7}$

C) $\frac{2}{7}$, $\frac{1}{3}$, $\frac{3}{8}$, $\frac{4}{7}$

D) $\frac{4}{7}$, $\frac{3}{8}$, $\frac{1}{3}$, $\frac{2}{7}$

E) None of these

23. In an election of 'Gram panchayat', 87.5 % voting is done out of 3200 people, then how many people did give vote?

A) 2800

B) 3000

C) 2700

D) 2600

E) None of these

24. In a book-fair, there was a discount of 12.5 % on a book of Rs.800. What was the amount of discount in Rupees?

A) Rs.80

B) Rs.100

C) Rs.120

D) Rs.150

E) None of these

25. Out of 12000 students, 10% students are good at English language skills. Find the number of the students who are not good at English?

- A) 10200 B) 10600 C) 10800
D) 11000 E) None of these

26. In a field of 6300 sq m area, a farmer goes for apple farming in 4500 sq m area. Then how much percentage of field is utilized for apple farming?

- A) 14.28% B) 28.56% C) 43.13%
D) 71.42% E) None of these

27. The average age of three friends is 33 years. If age of fourth friend is added their average comes to 32 years. What is age of fourth friend?

- A) 32 years B) 28 years C) 29 years
D) 26 years E) None of these

28. The cost price of an article is 75% of its selling price. What is gain or loss percent on that item?

- A) 25% B) 75% C) 33.33%
D) 62.5% E) None of these

29. Find the number of years in which a sum of Rs. 20000 is doubled at a simple interest of 10%?

- A) 5 years B) 10 years C) 15 years
D) 20 years E) None of these

30. A tree increases annually by one fifth of its height. How much will it increase after 2 years, if it stands today at 60 cm height?

A) 72cm

B) 86.4cm

C) 100cm

D) None of these

E) None of these

Answers:

1. B) 134845

2. A) 18502

3. D) 608145

4. A) 8651

5. B) 5194

6. D) 7224

7. D) 80%

8. A) 43555644

9. B) 440

10. B) 5975928

11. A) 105.07

12. A) 132452

13. A) 600

14. C) 41245

15. A) 66.66% gain

16. B) 2025

17. B) 140 m

18. C) 29

19. A) 1750

20. B) 90

21. D) 743

22. D) $4/7, 3/8, 1/3, 2/7$

23. A) 2800

24. B) Rs.100

25. C) 10800

26. D) 71.42%

27. C) 29 years

28. C) 33.33%

29. B) 10 years

30. B) 86.4cm

| About The Book

'math-mantra : 1' aims at simplifying the learning and understanding of math, especially for the kids. The book is based on the understanding of the Indian Mathematics. It uses a very simple and easy to understand language and methodology to train and enable the students learn mathematics. This book is full of examples and practice tasks which help students to have a quick and thorough understanding of the topics learnt. The entire book covers total 27 SMART TRICKS. SMART TRICKS are the simplified Vedic Sutras explained easy manner in the format of tricks. These tricks and techniques enable the students to calculate as fast as a calculator, if not faster. This book will not only benefit the students but it will also be helpful to the grown-ups in understanding math much easily.

'math-mantra : 2' is a book containing level-2 concepts and more SMART TRICKS. Readers are advised to go through **'math-mantra : 2'** after completing **'math-mantra : 1'**.

Happy learning, the Vedic way!

| About The Author



Paridhi Trivedi Parikh

Ms. Paridhi Trivedi Parikh is an acclaimed expert in Mathematics. Her deep understanding of Vedic Maths stems from her strong roots and keen interest in Mathematics right from her childhood. She has enabled tens of thousands of students by teaching and guiding them through the concept of Vedic Mathematics. She also has a deep understanding of students' psychology and hence has inculcated those concepts in her teaching, training and writing too. She is also an avid reader and an educationist par excellence.

♦ Connect with the Author ♦

[/c/paridhitrivediparikh](https://www.youtube.com/channel/UCp8dHtrivediparikh) [/paridhitrivediparikh](https://www.instagram.com/paridhitrivediparikh) [/paridhitrivediparikh](https://www.facebook.com/paridhitrivediparikh) [/in/paridhitrivediparikh](https://www.linkedin.com/company/paridhitrivediparikh) [/paridhispeaks](https://www.tiktok.com/@paridhispeaks)



Sarva Vidyalaya Kelavani Mandal, Kadi.