

लathे लान्तरा : ३

Transforming Kids To Calculators

Through

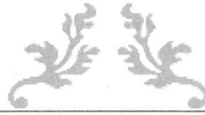
Vedic Math

Level-2

For Standard - 7th / 8th



PARIDHI TRIVEDI PARIKH



लवथे लवन्त्रा ः२

*Transforming Kids To Calculators
through
Vedic Math*

Level – 2
For Standard – 7th/8th

PARIDHI TRIVEDI PARIKH



Sarva Vidyalaya Kelavani Mandal
Kadi – Gandhinagar

Math Mantra : 2

Transforming kids to calculators through Vedic Math!

Level – 2 For Standard – 7th/8th

by Ms. Paridhi Trivedi Parikh

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

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Price : Rs.20/-

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

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Recap

Revision of SMART TRICK # 1 to # 27

Glimpse of this chapter : This chapter helps the students to recall what all they have learnt in '~~lath-lantira~~ : 1'. This is a quick revision of SMART TRICK # 1 to SMART TRICK # 27. It also helps students to revise a few important points of theory too. It is very necessary that you revise level-1 from the first book '~~lath-lantira~~ : 1' before going to level-2.

Revision of Theory:

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)

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. The very first usage of 'Pi' was 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 Sutras and Sub-sutras are derived from Shulba Sutra in Atharva-veda by Shri Bharti Krishna Tirthaji Maharaj during early 20th Century.

Impact of Vedic Math on a growing brain:

Research has been 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 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 in solving 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 also improves upon concentration in the process of learning it 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 in a way that it is more of "Practical Math". You are learning same things with a different, fast, powerful approach from our ancient Indian texts: Vedas!

Importance of Vedic Math:

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.

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. These were formed by selfless efforts of Shri Swāmī Bhāratī Krishna Tīrthaji Maharaj.

Sutras:

1. Ekadhikena-Purvena
(एकाधिकेनपूर्वेण)
2. Nikhilam-Navatash-Charamam-Dasatah
(निखिलम्वतश्चरमंदशतः)
3. Urdhva-tiryag-bhyam
(ऊर्ध्वतिर्यग्भ्याम्)
4. Paravartya-Yojayet
(परावर्त्ययोजयेत्)
5. Shunyam-Samya-Samuchchaye
(शून्यंसाम्यसमुच्चये)
6. Anurupye-Shunyamanyat
(आनुरूप्येशून्यमन्यत्)
7. Sankalana – Vyavakalanabhyam
(संकलन-व्यवकलनाभ्याम्)
8. Purana-Purana-Bhyam
(पूरणापूरणाभ्याम्)
9. Chalana - Kalanabhyam
(चलन-कलनाभ्याम्)
10. Yavadunam
(यावदूनम्)
11. Vyastisamashtih
(व्यष्टिसमष्टिः)

12. Sheshanyakena-charamena
(शेषाण्यङ्केनचरमेण)
13. Sopantyadvamantyam
(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
(यावदूनन्तावदूनम्)
7. Yavadunam-Tavadunikrutya-Vargacha-Yojayet
(यावदूनन्तावदूनीकृत्यवर्गचयोजयेत्)

8. Antyayor-Dasake'pi
(अन्त्ययोर्दशकेऽपि)
9. Samuchayagunitah
(समुच्चयगुणितः)
10. Lopana-Sthapanabhyam
(लोपनस्थापनाभयाम्)
11. Vilokanam
(विलोकनम्)
12. Gunita-Samuccayah-Samuccaya-Gunitah
(गुणितसमुच्चयःसमुच्चयगुणितः)
13. Dhvajank
(ध्वजांकः)

Revision of SMART TRICKS from Level-1:

SMART TRICK # 1:

Make unit digit – 'Zero' (Multiplication tables till 100)

Q1: 62×4

$$\begin{aligned}
 &= (60 + 2) \times 4 \\
 &= 240 + 8 \\
 &= 248
 \end{aligned}$$

Q2: 78×9

$$\begin{aligned}
 &= (80 - 2) \times 9 \\
 &= 720 - 18 \\
 &= 702
 \end{aligned}$$

SMART TRICK # 2:

Carry Forward Method (Multiplication tables till 100)

Q3: 62×4

$$= 24 \ 08$$

0

$$= 248$$

$$= 248$$

Q4: 78×9

$$= 63 \ 72$$

7

$$= 632$$

$$= 702$$

SMART TRICK # 3:

Finding out the 'Nikhil'

(Vedic Sutra: 'Nikhilam-Navatsh-Charamam-Dashatah': निखिलम् नवतश्चरमं दशतः)

Q5: Find the Nikhil of 5068.

$$9 - 5 = 4$$

$$9 - 0 = 9$$

$$9 - 6 = 3$$

$$10 - 8 = 2$$

So, the answer is 4932.

SMART TRICK # 4:

Finding out '*Nikhilesh*'

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

Q6: Find the *Nikhilesh* of 5068.

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.

SMART TRICK # 5:

Finding out the *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 an example.

Q7: Find out the *Nikhil* of 432.86

$$9 - 4 = 5$$

$$9 - 3 = 6$$

$$9 - 2 = 7$$

$$9 - 8 = 1$$

$$10 - 6 = 4$$

So, it comes to 56714.

Here, in the given question, number has two decimals. So, we need to put two decimals in answer too. So, the final answer thus comes to **567.14**

SMART TRICK # 6:

Application of *Nikhilam* sutra into subtraction:

(Vedic Sutra: '*Nikhilam-Navatsh-Charamam-Dashatah*': निखिलम् नवतश्चरमं दशतः / *Eknyunenpurvena* - 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.

Q8: 8000 – 4562

Here we would subtract 1 from 8 so as it comes to 7.

$$7 - 4 = 3$$

$$9 - 5 = 4$$

$$9 - 6 = 3$$

$$10 - 2 = 8$$

Thus, answer becomes 3438.

Q9: 60 – 35.72

Here, we need to subtract 35.72 from 60.00

Here we would subtract 1 from 6 which comes to 5.

$$5 - 3 = 2$$

$$9 - 5 = 4$$

$$9 - 7 = 2$$

$$10 - 2 = 8$$

It comes to 24.28. As the question has two decimals, the answer would also contain two decimals. So, the answer is 24.28.

SMART TRICK # 7:

Finding out 'Yog Moolank' of a number:

Q10: Finding out 'Yog Moolank' of 267292.

$$\begin{aligned} &= 2 + 6 + 7 + 2 + 9 + 2 \\ &= 2 + 6 + (7 + 2) + (9) + 2 \\ &= 10 = (1 + 0) = 1 \end{aligned}$$

SMART TRICK # 8:

Finding out 'Viyog Moolank' of a number:

Q11: Finding out 'Viyog Moolank' of 28729.

$$\begin{aligned} &= (9+7+2) - (2+8) \\ &= 18 - 10 = 8 \end{aligned}$$

SMART TRICK # 9:

What if *Viyog Moolank* is a negative number?

Q12: Finding out 'Viyog Moolank' of 867291.

$$\begin{aligned} &= (1+2+6) - (9+7+8) \\ &= 9 - 24 = (-15) \\ &= (-15) + 11 \\ &= (-4) + 11 = 7 \end{aligned}$$

SMART TRICK # 10:

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

Q13: Finding out 'Viyog Moolank' of 186729.

$$\begin{aligned} &= (9+7+8) - (6+2+1) \\ &= 24 - 9 = 15 \\ &= 15 - 11 = 4 \end{aligned}$$

SMART TRICK # 11:

Evaluation of Summation by 'Yog Moolank':

Q14: $2345 + 7648 + 1352 + 1239 = 12584$

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

Yes, the answer is correct.

SMART TRICK # 12:

Evaluation of summation by 'Viyog Moolank':

Q15: $2345 + 7648 + 1352 + 1239 = 12584$

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

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

Viyog Moolank of 1352 = $(2+3) - (5+1) = (5) - (6)$

$= (-1) = (-1) + 11 = (10)$

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

LHS = $2345 + 7648 + 1352 + 1239$

Viyog Moolank of LHS = $2 + 3 + 10 + 7 = 22 = 2 - 2 = 0$

Viyog Moolank of RHS = $(4 + 5 + 1) - (8 + 2)$

$= (10) - (10) = 0$

Viyog Moolank of LHS = *Viyog Moolank* of RHS

Yes, the answer is correct.

SMART TRICK # 13:

Evaluation of subtraction by 'Yog Moolank':

Q16: $2345 - 1239 = 1106$

$$1106 + 1239 = 2345$$

$$(8) + (15) = 5$$

$$(23) = 5$$

$$2+3 = 5$$

$$5 = 5$$

Yes, the answer is correct.

SMART TRICK # 14:

Evaluation of subtraction by 'Viyog Moolank':

Q17: $2345 - 1239 = 1106$

$$1106 + 1239 = 2345$$

$$6 + 7 = 2$$

$$13 = 2$$

$$13 - 11 = 2$$

$$2 = 2$$

Yes, the answer is correct.

SMART TRICK # 15:

Evaluation of multiplication by 'Yog Moolank':

Q18: $2345 \times 7648 = 17934560$

$$5 \times 7 = 8$$

$$35 = 8$$

$$(3+5) = 8$$

$$8 = 8$$

Yes, the answer is correct.

SMART TRICK # 16:

Evaluation of multiplication by '*Viyog Moolank*':

Q19: $2345 \times 7648 = 17934560$

$$2 \times 3 = (-5)$$

$$6 = (-5) + 11$$

$$6 = 6$$

Yes, the answer is correct.

SMART TRICK # 17:

Evaluation of squares of a given number by '*Yog Moolank*':

Q20: $(67)^2 = 4489$

Yog Moolank of $67 = 6+7 = 13 = 1+3 = 4$

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

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

Yog Moolank of squared number 4489 is,

$$= 4 + 4 + 8 + 9 = 25 = 2 + 5 = 7$$

Yes, the answer is correct.

SMART TRICK # 18:

Evaluation of squares/cubes by '*Viyog Moolank*':

Q21: $(47)^3 = 4489$

Viyog Moolank of LHS $(47)^3 = (7 - 4)^3 = (3)^3 = 27 = 7 - 2 = 5$

Viyog Moolank of cubed number 4489 is,

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

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

$$= 1$$

So, this answer does not match.

SMART TRICK # 19:

'SMART Summation' based on 'Place Value' Concept:

Q22: $673 + 9875 + 1238 + 54$

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**.

SMART TRICK # 20:

SMART Summation based on Vedic Sutra - *Ekadhikenpurvena*

(एकाधिकेन पूर्वेण):

- ❖ This method of summation enables us to calculate such a big summation very quickly, without pen or paper and with full confidence.
- ❖ You will be able to calculate right in your brain.

Q23: 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	
	*	*	*			This " * " sign represents 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

SMART TRICK # 21:

SMART Subtraction based on 'Place-value':

Q24: 349 – 136

$$\begin{aligned} & \diamondsuit \quad 100\text{'s digit of 1st number} - 100\text{'s digit of 2nd number} \\ & \quad = 3 - 1 = 2 \end{aligned}$$

- ❖ 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
= $9 - 6 = 3$
- ❖ Thus, answer comes to 213.

SMART TRICK # 22:

SMART Subtraction based on 'Ekadhikēnapurvēna' (एकाधिकेन पूर्वण) Sutra:

Q25: $68 - 49$

- ❖ When the unit digit of the first number is smaller than the unit digit of the second number, we can use "Ekadhikēnapurvēna".
- ❖ Here we need to subtract 9 from 8 and accordingly we need to increase 10's place of second number i.e. 4 by 1. This process is called "Ekadhik" i.e. increasing by 1.
- ❖ 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 the 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. $8 + 1 = 9$ and, this "9" makes RHS part of my answer.
- ❖ Thus, the final answer is 19.

Q26: $746 - 419$

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

SMART TRICK # 23:

Subtraction by 'Shunyant' Number.

❖ 'Shunyant' means a number which ends with a zero.

Q27: $47 - 29$

$$= (40+7) - (20+9)$$

$$= 40 + 7 - 20 - 9$$

$$= (40 - 20) + (7 - 9) = (20) + (-2) = 18$$

Q28: $5049 - 3819$

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

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

$$= (2000) + (-800) + (30) + (0) = (2000 - 800) + 30 + 0 = 1230$$

SMART TRICK # 24:

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

Q29: $567 - 268$

❖ 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, $567 - 268$

❖ We would read it as, $325 + \text{Nikhil of } 268$

	5	6	7
+	7	3	2
*	2	9	9
<u>1</u>	2	9	9
0	2	9	9

(Eknyun)

❖ 299 is the required answer.

Q30: 4758 – 183

❖ We need to take *Nikhil* of 183, which is 817

	4	7	5	8
+		8	1	7
	*4	5	*6	5
	5	5	7	5
	4	5	7	5

(Eknyun)

❖ 4575 is the required answer.

Q31: 3427 – 2349

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

	3	4	2	7
+	7	6	5	<u>1</u>
	<u>*10</u>	0	7	8
	11	0	7	8
	<u>1</u>	<u>0</u>	<u>7</u>	<u>8</u>

(Eknyun)

❖ 1078 is the required answer.

All these can be calculated without pen, right in our brain and that too quickly!

Q32: 93427 – 1349

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

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

- ❖ 92078 is the required answer.

SMART TRICK # 25:

Divisibility Tests based on observational understanding 'Vilokanam':

Q33: Is 12236454 divisible by 99?

- ❖ 99 has two co-prime factors 11 and 9 as $11 \times 9 = 99$.
- ❖ So, the given number 12236454 has to be divisible by 11 and 9 both.
- ❖ Let's check the divisibility test of 9 for the given number:
 $1 + 2 + 2 + 3 + 6 + 4 + 5 + 4 = 27 = 2 + 7 = 9$. Thus, the sum of the digits is divisible by 9. So, the number **12236454** is divisible by 9.
- ❖ Let's check the divisibility test of 11 for the given number:
 Sum of all odd placed digits: $4 + 4 + 3 + 2 = 13$.
 Sum of all even placed digits: $5 + 6 + 2 + 1 = 14$
 Thus, sum of the digits at odd places does not equal to the sum of the digits at even place. So, the number **12236454** is not divisible by 11.

- ❖ As the given number 12236454 is divisible by 9 but not by 11. So, the number is not divisible by 99.
- ❖ So, 12236454 does not pass the divisibility test of 99.

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 a number is n , and if $nk + 1 = 10p$, then positive osculator of n is p . ($p - n$) is a negative osculator.
 Eg: 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.
- ❖ (Positive Osculator) + (Negative Osculator) = (Number itself)

Use of a 'Positive Osculator':

Q34: 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.

SMART TRICK # 27:

Applications of Fraction to Percentage Conversions:

$$1 = 100\%$$

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

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

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

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

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

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

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

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

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

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

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

Applications of Fraction to Percentage Conversions:

Q35: What is the percentage value of $\frac{4}{5}$?

$$= 4 \times \frac{1}{5}$$

$$= 4 \times 20\%$$

$$= 80\%$$

Be a '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 human so we do have the capacity to be faster than the calculator because it is the creation of human brain only. Are you ready to become a human calculator? Go ahead with this book and explore!

Important points to remember to make most of this book:

1. Start reading from 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.

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5. Try to follow the SMART TRICKS in your mind without using pen and paper.
6. Apply all these new learnings to your daily life. Use these techniques while solving questions from your textbook.

Mega Practice Task # 1:

(A) Speed Enhancer Practice Task:

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

Ideal time limit: 15 – 30 seconds / question

1. 475×781

A) 346430

B) 348457

C) 370456

D) 370975

E) 364430

2. $721 \times 316 - 5467$

A) 222369

B) 222378

C) 232367

D) 223365

E) 222261

3. $82671 + 91729 = x - 433745$

A) 611148

B) 611149

C) 611141

D) 608145

E) 608146

4. $(4567)^2 + (123)^2 + (49)^3$

A) 20990267

B) 20990266

C) 20990265

D) 20990269

E) 20995265

5. $67 \times 34 + (54)^2 - 2367$

A) 5195

B) 5194

C) 2196

D) 2198

E) 2827

6. 867×849

A) 736083

B) 736830

C) 736380

D) 736038

E) None of these

7. Hiren has 40 pens. He gave 8 pens to Naiya. What percentage of pens Naiya has compared to Hiren right now?

A) 25%

B) 20%

C) 15%

D) 17%

E) None of these

8. 49% of a number is 45 less than 64% of the same number. What is the 30% of that number?

A) 30

B) 135

C) 90

D) 45

E) None of these

9. What is 87.5% of 3224.16?

A) 2821.14

B) 2821.67

C) 2821.30

D) 2821.34

E) None of these

10. Seema invested Rs.5355 in an investment scheme which provides her 5% return annually. What amount of SI Seema will get after 2 years?

A) Rs.535.5

B) Rs.1071

C) Rs.528

D) Rs.1071.5

E) None of these

11. Cost price of 7 articles is the same as selling price of 8 articles. What would be the percentage gain/loss?

- A) 12.5% gain B) 12.5% loss C) 14.28 % loss
D) 14.28% gain E) None of these

12. Find the perimeter of a rectangular table having length 1498 cm and breadth 4356 cm.

- A) 12770cm B) 14030 cm C) 11280 cm
D) 11708 cm E) None of these

13. Complete the number series: 2345, 2368, 2414, 2483, ?

- A) 2587 B) 2589 C) 2575
D) 2567 E) None of these

14. What is 16.67% of 5442?

- A) 908 B) 907 C) 906
D) 916 E) None of these

Answers:

- | | |
|----------------|-------------------|
| 1. D) 370975 | 8. C) 90 |
| 2. A) 222369 | 9. A) 2821.14 |
| 3. D) 608145 | 10. A) Rs.535.5 |
| 4. A) 20990267 | 11. B) 12.5% loss |
| 5. E) 2827 | 12. D) 11708 cm |
| 6. A) 736083 | 13. C) 2575 |
| 7. A) 25% | 14. B) 907 |

2

Unit Digit (Basics)

Identify the unit digit of any long calculation
in just a few seconds.

Glimpse of this chapter: This chapter talks about a method that helps in determination of last digit of the answer. No matter how big the calculation seems, we can easily get the value of unit digit in just a few seconds. Go ahead and explore!

SMART TRICK # 28:

BODMAS (Bracket of Division Multiplication Addition Subtraction)

- ❖ Solve the bracket first followed by division, multiplication, addition and subtraction, in that order.
- ❖ Brackets are to be solved in the order of small bracket {}, curly bracket {} and box bracket [].

Q1: $243 \div 9 \times 512 \div 4 + \frac{1}{2}$ of $\{1800 \div (11 \times 24 \div 8 \times 3 - 69)\}$.

Find out the answer.

$$\begin{aligned} &= 243 \div 9 \times 512 \div 4 + \frac{1}{2} \text{ of } \{1800 \div (11 \times 3 \times 3 - 69)\} \\ &= 243 \div 9 \times 512 \div 4 + \frac{1}{2} \text{ of } \{1800 \div (99 - 69)\} \\ &= 243 \div 9 \times 512 \div 4 + \frac{1}{2} \text{ of } \{1800 \div (30)\} \\ &= 243 \div 9 \times 512 \div 4 + \frac{1}{2} \text{ of } \{60\} \\ &= 243 \div 9 \times 512 \div 4 + 30 \\ &= 27 \times 128 + 30 \\ &= 3486 \end{aligned}$$

Q2: $243 + 9 \times 512 + 4 + \{1800 + (11 \times 24 + 8 \times 3 - 69)\}$.

Find out the answer.

$$\begin{aligned} &= 243 + 9 \times 512 + 4 + \{1800 + (264 + 24 - 69)\} \\ &= 243 + 9 \times 512 + 4 + \{1800 + 219\} \\ &= 243 + 9 \times 512 + 4 + \{2019\} \\ &= 243 + 9 \times 512 + 4 + \{2019\} \\ &= 243 + 4608 + 4 + 2019 \\ &= 6874 \end{aligned}$$

This method is quite lengthy, if we are given options, we can get the answer by looking at its unit digit only.

SMART TRICK # 29:

Determining the unit digit

- ❖ Unit digit of a number is basically the remainder got when a number is divided by 10.
- ❖ E.g. 56. When 56 is divided by 10, the remainder is 6 which is the unit digit of the given number.
- ❖ For any long simplification sum, it is very much easy to get the unit digit by performing the same operations with the unit digits of each term.
- ❖ We need to apply the knowledge of BODMAS here.
- ❖ When it is division, **we cannot** apply unit digit method.

Q3: $243 + 9 \times 512 + 4 + \{1800 + (11 \times 24 + 8 \times 3 - 69)\}$. Find out the unit digit of the Answer.

$$= 3 + 9 \times 2 + 4 + \{0 + (1 \times 4 + 24 - 69)\}$$

$$= 3 + 8 + 4 + \{0 + (8 - 9)\}$$

Here, $(8 - 9)$ is a negative number.

In such cases add 10 in the previous number i.e. 8.

$$= 3 + 8 + 4 + \{0 + (18 - 9)\}$$

$$= 3 + 8 + 4 + \{0 + (9)\}$$

$$= 3 + 8 + 4 + 9$$

$$= 4$$

Which means the answer would have 4 as its unit digit.

Q4: 34567×4567

(A) 157867489

(B) 156789567

(C) 134567896

(D) 157867488

- ❖ Here, if we calculate the entire sum, it takes a lot of time. We need to focus on unit digit as we have options. 7×7 ends in 9. Only one option has unit digit 9. So, the answer is option (A).

Importance of knowing this method:

- ❖ In long questions of simplifications, this method is a boon.
- ❖ Combination of the logic of 'moolank' and 'unit digit' helps to find answers of long simplification-based questions in a very short period of time.
- ❖ This also acts as a checking tool of the answer.
- ❖ When options are given for a question, combination of both the method is apt in solving the questions in just a few seconds.
- ❖ In next chapter, we shall use all these concepts to get the answer.

Mega Practice Task # 2:

(A) Speed Enhancer Practice Task:

Find out unit digit of ' x ' based on the SMART TRICKS explained in this chapter.

Ideal time limit: 5 seconds / question

1. $54679 + 34521 = x + 43668$
2. $956 \times 753 = x$

$$3. x = 3647 + 4898 + 2120 + 165$$

$$4. 8994 + 4178 + 2094 = x$$

$$5. x = 315 \times 114 - 1565$$

$$6. x = 713896 + 24630 + 10687$$

$$7. x = 566 \times 166 \times 66$$

$$8. 432 \times 66 - 1562 = x$$

$$9. 8994 - 4178 - 2094 = x$$

$$10. x = 32 \times 68 \times 95$$

$$11. 66606 + 40998 = x - 24848$$

$$12. 477 + 177 \times 74 = x$$

$$13. 13 + 12 \times 60 + 6 = x$$

$$14. x = 348 \times 82 - 20000$$

$$15. x = 24 \times 513 + 27 - 9$$

$$16. x = (12)^2 + (6)^2 + (4)^2$$

$$17. x = 1862 \times 28$$

$$18. x = 8 \times 5 + (8)^2$$

$$19. x = 1256 \times 3892$$

$$20. x = 445 \times 98 - 2005$$

Answers:

$$1) 2$$

$$6) 3$$

$$11) 2$$

$$16) 6$$

$$2) 8$$

$$7) 6$$

$$12) 5$$

$$17) 6$$

$$3) 0$$

$$8) 0$$

$$13) 9$$

$$18) 4$$

$$4) 6$$

$$9) 2$$

$$14) 6$$

$$19) 2$$

$$5) 5$$

$$10) 0$$

$$15) 0$$

$$20) 5$$

3

SMART TRICK #30

Application of SMART TRICK # 1 to #29

Glimpse of this chapter : This chapter would enable you to check whether you can apply whatever you have studied under SMART TRICK # 1 to # 29. Solving these questions would be a real fun if you have understood all the tricks till now. Go ahead and explore!

Q1. $54679 + 34521 = x + 43668$

- | | |
|----------|----------|
| a) 45532 | b) 45232 |
| c) 42455 | d) 45552 |

Solution:

- ❖ This question can be solved in the fraction of a moment.
- ❖ Focus on the unit digit.
- ❖ I can easily understand; the unit digit of my answer would be '2' as $'9 + 1 - 8'$.
- ❖ So, eliminate, option (c).
- ❖ Read the question like $54679 + 34521 - 43668 = x$
- ❖ Use your knowledge of the Vedic concept 'Moolank'.
- ❖ Yog Moolank of LHS is $4 + 6 - 0 = 10 = 1$
- ❖ Yog Moolank of RHS is the moolank of x . Check options.
The option that has Yog Moolank '1' is the answer:
 - a) $45532 = 1$
 - b) $45232 = 7$
 - d) $45552 = 3$
- ❖ So, the answer is option (a)

Q2. $956 \times 753 = x$

- | | |
|-----------|-----------|
| a) 723692 | b) 719868 |
| c) 710308 | d) 719869 |

Solution:

- ❖ This question can be solved in the fraction of a moment.
Focus on the unit digit. We can easily understand; the unit digit of my answer would be (6×3) which ends in '8'.

- ❖ So, eliminate, option (a) and (d).
- ❖ Use your knowledge of the Vedic concept 'Moolank'.
- ❖ Yog Moolank of LHS is $2 \times 6 = 3$
- ❖ Yog Moolank of RHS is the moolank of x . Check options.
The option that has Yog Moolank '3' is the answer:
 - b) $719868 = 3$
 - c) $710308 = 1$
- ❖ So, the answer is option (b)

Q3. $(125)^2 + (634)^2 + (424)^3$

- a) 76597195 b) 76597285
- c) 76597155 d) 76642605

Solution:

- ❖ Unit digit would be $5 + 6 + 4 = 5$
- ❖ Here all options are having the same unit digit.
- ❖ Use your knowledge of the Vedic concept 'Moolank'.
- ❖ Yog Moolank of LHS is $1 + 7 + 1 = 9$ or Zero
- ❖ Yog Moolank of RHS is the moolank of x . Check options.
- ❖ The option that has Yog Moolank '0 or 9' is the answer:
 - a) 76597195 = 4
 - b) 76597285 = 4
 - c) 76597145 = 8
 - d) 76642605 = 0
- ❖ So, the answer is option (d).

Q4. $54679 + 34521 = x + 43668$

- a) 45532 b) 45352
c) 42455 d) 43552

Solution: You may think this is the same question as Q1. But focus on the options, which make it difficult.

- ❖ Focus on the unit digit. We can easily understand; the unit digit of our answer would be '2' as ' $9 + 1 - 8$ '.
- ❖ So, eliminate, option (c) but rest three options have '2' as the unit digit. So, we need to apply 'Moolank' method.
- ❖ Read the question like $54679 + 34521 - 43668 = x$
Use your knowledge of the Vedic concept 'Moolank'.
Yog Moolank of LHS is $4 + 6 - 0 = 10 = 1$
Yog Moolank of RHS is the moolank of x . Check options.
The option that has Yog Moolank '1' is the answer:

- a) $45532 = 1$
b) $45352 = 1$
d) $43552 = 1$

- ❖ Now, all the options above have its moolank 1 which matches with the moolank of the question. Now, we need to check last two digits:

$$79 + 21 - 68$$

Use the knowledge of quick addition and subtraction from Level 1.

$$7+2-6 = 3 \text{ (ten's place)} \qquad 9+1-8 = 2 \text{ (unit's place)}$$

So, the last two digits have to be 32 which is in only one option i.e. (a).

Mega Practice Task # 3:

(A) Speed Enhancer Practice Task:

Solve the following questions based on the SMART TRICK #30 explained in this chapter.

Ideal time limit: 10 – 15 seconds / question

1. $3647 + 4898 + 2120 + 165$

- A) 10830 B) 10850
- C) 10910 D) 10930
- E) None of these

2. $8994 - 4178 - 2094 =$

- A) 2720 B) 2726
- C) 2730 D) 2734
- E) None of these

3. $315 \times 114 - 1565$

- A) 34345 B) 73628
- C) 81003 D) 72960
- E) None of these

4. $71389 - 24630 - 10687$

- A) 22220 B) 11112
- C) 36072 D) 33250
- E) None of these

5. $566 \times 166 \times 66$

- A) 6102196 B) 6021196
- C) 6201096 D) 6012296
- E) None of these

6. $432 \times 66 - 1562 =$

- A) 23450 B) 24360
C) 25890 D) 26950
E) None of these

7. $348 \times 82 - 20000$

- A) 5536 B) 6647
C) 8536 D) 9647
E) None of these

8. 1862×28

- A) 63247 B) 52136
C) 32563 D) 44221
E) None of these

Answers:

1. A) 10830
2. E) None of these
3. A) 34345
4. C) 36072
5. C) 6201096
6. D) 26950
7. C) 8536
8. B) 52136

4

Magic in Multiplication Part 1

'Vilokanam'

An observational method for multiplication

Glimpse of this chapter : The entire chapter explains you about fast calculations concentrating on the area of multiplication. Different vedic methods which can be used in multiplication are explained properly. In this chapter, we have divided entire logic of calculation in the form of SMART-TRICKS and then we have very meticulously connected the logic taught to the students in the vedic terminology. This chapter focuses on developing students' ability to learn multiplication fast by observational method.

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SMART TRICK # 31:

To multiply any two-digit number (Whose sum of the digits is less than 10) with 11:

Q1: 27 X 11

Step1: Separate both the digits of a number other than 11. In this question it is 27. So, write as follows.

$$= 2 \quad \quad \quad 7$$

Step2: Write sum of both the digits in between the separated digits.

$$= 2 \quad (2+7) \quad \quad 7$$

Step3: Solve and get your answer.

$$= 2 \quad (2+7=9) \quad \quad 7$$

$$= 2 \quad (9) \quad \quad 7$$

$$= 297$$

Thus, the answer is 297.

	2	7	
X	1	1	
2	(2+7)	7	
2	9	7	
Answer: 297			

Q2: 12 X 11

$$= 1 (1+2) 2$$

$$= 132 \text{ Answer}$$

It must be quite clear by now.

Ideal time to solve such kind of questions is 2 seconds.

	1	2	
X	1	1	
1	(1+2)	2	
1	3	2	
Answer: 132			

Q3: 61 X 11

$$= 6 (6+1) 1 \quad (\text{within a second})$$

$$= 6 (7) 1 \quad (\text{within 2 seconds at the max}) = 671 \text{ Answer}$$

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Q4: 15 X 11

$$= 1(1+5) 5$$

$$= 165$$

Q5: 53 X 11

$$= 5 (5+3) 3$$

$$= 583$$

Practice Task # 4.1:

Find out the answers of the following questions based on the SMART TRICK #31.

1) 63×11

2) 34×111

3) 54×11

4) 36×11

5) 25×11

SMART TRICK # 32:

To multiply any two-digit number (whose sum of the digits is more than 10) with 11:

Q6: 97 X 11

Step1: Separate both the digits of a number other than 11.

In this question it is 97. So, write as follows.

$$= 9 \quad 7$$

Step2: Write sum of both the digits in between the separated digits.

$$= 9 \quad (9+7) \quad 7$$

Step3: Solve and get your answer.

$$= 9 \quad (9+7=16) \quad 7$$

	9	7	
X	1	1	
9	(9+7)	7	
9	16	7	
1			
9	6	7	
10	6	7	
Answer: 1067			

Step4: In the middle bracket, there has to be only one digit. As over here, 16 has two digits, 1 would be carried forward on the first digit i.e. 9.

$$\begin{array}{r} 1 \\ = 9 \quad (6) \quad 7 \\ = 1067 \end{array}$$

Thus, the answer is 1067.

Q7: 89 X 11

$$\begin{array}{r} = 8 (8+9) 9 \\ = 8 (17) 9 \end{array}$$

$$\begin{array}{r} 1 \\ = 8 (7) 9 \\ = 979 \end{array}$$

Ideal time to solve such kind of questions is 2 seconds.

Q8: 68 X 11

$$\begin{array}{r} = 6 (6+8) 8 \quad (\text{within a second}) \\ = 6 (14) 8 \quad (\text{within 2 seconds at the max}) \\ = 748 \end{array}$$

Q9: 95 X 11

$$\begin{array}{r} = 9(9+5) 5 \\ = 9 (14) 5 \\ = 1045 \end{array}$$

Q10: 79 X 11

$$\begin{array}{r} = 7 (7+9) 9 \\ = 7 (16) 9 \quad = 869 \end{array}$$

Practice Task # 4.2:

Find out the answers of the following questions based on the SMART TRICK #32.

1) 69×11

2) 94×111

3) 74×11

4) 67×11

5) 85×11

SMART TRICK # 33:

To multiply any number with 11:

Q11: 127×11

Step1: Separate the unit digit and the rest of the digits of the number other than 11.

In this question it is 127. So, write as follows.

$$= 12 \quad 7$$

Step2: Write sum of the separated parts in between.

$$= 12 \quad (12+7) \quad 7$$

Step3: Solve and get your answer.

$$= 12 \quad (12+7=19) \quad 7$$

Step4: In the middle bracket, there has to be only one digit. As over here, 19 has two digits, 1 would be carried forward on the first digit i.e. 2.

$$\begin{array}{r} 1 \\ = 12 \quad (9) \quad 7 \\ = 1397 \end{array}$$

Thus, the answer is 1397.

	12	7	
X	1	1	
12	(12+7)	7	
12	19	7	
1			
12	9	7	
13	9	7	
Answer: 1397			

Q12: 2897 X 11

$$= 289 (289+7) \ 7$$

$$= 289 (296) \ 7$$

$$29$$

$$= 289 (6) \ 7$$

$$= 31867$$

Ideal time to solve such kind of questions is 3 seconds.

Q13: 689 X 11

$$= 68 (68+9) \ 9 \quad (\text{within a second})$$

$$= 68 (68+9) \ 9 \quad (\text{within 2 seconds at the max})$$

$$= 68 (77) \ 9$$

$$= 7579$$

Q14: 95.1 X 11

Remember calculate taking 951 instead of 95.1. Answer must be divided by 10.

$$= 95 (95+1) \ 1$$

$$= 95 (96) \ 1$$

$$= (95+9) (6) \ 1$$

$$= 104 \ 6 \ 1$$

$$= 10461$$

Now divide the answer by 10 and get the final answer.

$$= 1046.1$$

Q15: 49 X 11

$$= 4 (4+9) \ 9$$

$$= 4 (13) \ 9$$

$$= 539$$

Practice Task # 4.3:

Find out the answers of the following questions based on the SMART TRICK #33.

- 1) 69.2×11 2) 2394×11 3) 7498×11
4) 67.5×11 5) 8.75×11

Vilokanam Explained:

We had a good discussion over something very interesting on multiplying any number with 11. These tricks are derived from the knowledge from our Vedas. This method of multiplication is basically the application of a Vedic Sutra **Vilokanam** (विलोकनम्)."

We have covered multiplication with 11 as of now under 'Vilokanam' Sutra. In this method, we talked about three SMART TRICKS. Which other numbers can be multiplied with using Vilokanam" Sutra? Numbers like 5, 10, 25, 100, 125, 250, 500, 1000 and so on. We just need to take proper fractions. For an example for 5, we can take $10/2$. For 25, we can take $100/4$. For 125, $1000/8$. For 250, $1000/4$ and likewise. For 10, add one zero. For 100, add two zeroes. For 1000, three zeros and likewise.

- ❖ $5 = 10/2$
- ❖ $10 = \text{add one zero}$
- ❖ $25 = 100/4$
- ❖ $50 = 100/2$
- ❖ $100 = \text{add two zeros}$
- ❖ $125 = 1000/8$
- ❖ $250 = 1000/4$

SMART TRICK # 34:

Multiplication with 5.

The only catch here is, read 5 as $(10/2)$. So, put one zero behind the number to be multiplied with 5, and divide it by 2.

Q16: 42×5

$$\begin{aligned} &= 42 \times (10/2) \\ &= (42 \times 10) / 2 \\ &= 420 / 2 \\ &= 210 \end{aligned}$$

Q17: 67×5

$$\begin{aligned} &= 670 / 2 \\ &= 335 \end{aligned}$$

Q18: 2345×5

$$\begin{aligned} &= 23450 / 2 \\ &= 11725 \end{aligned}$$

Q19: 234.56×5

$$\begin{aligned} &= (234.56 \times 10) / 2 \\ &= 2345.6 / 2 \\ &= 1172.8 \end{aligned}$$

Q20: 3.12×5

$$\begin{aligned} &= 31.2 / 2 \\ &= 15.6 \end{aligned}$$

Practice Task # 4.4:

Find out the answers of the following questions based on the SMART TRICK #34.

1) 69.2×5

2) 2394×5

3) 7498×5

4) 67.5×5

5) 8.75×5

SMART TRICK # 35:

Multiplication with 25.

The only catch here is, read 25 as $(100/4)$. So, put two zeroes behind the number to be multiplied with 25, and divide it by 4.

Q21: 42×25

$= 42 \times (100/4)$

$= (42 \times 100) / 4$

$= 4200 / 4$

$= 1050$

Q22: 67×25

$= 6700 / 4$

$= 1675$

Q23: 2345×25

$= 234500 / 4$

$= 58625$

Q24: 234.56×25

$= (234.56 \times 100) / 4$

$= 23456 / 4$

$= 5864$

Q25: 3.12×25

$$= 3.12 \times (100/4)$$

$$= 312/4$$

$$= 78$$

Practice Task # 4.5:

Find out the answers of the following questions based on the

SMART TRICK #35

1) 69.2×25

2) 2394×25

3) 7498×25

4) 67.5×25

5) 8.75×25

SMART TRICK # 36:

Multiplication with 125.

The only catch here is, read 125 as $(1000/8)$. So, put three zeroes behind the number to be multiplied with 125, and divide it by 8.

Q26: 42×125

$$= 42 \times (1000/8)$$

$$= (42 \times 1000) / 8$$

$$= 42000 / 8$$

$$= 5250$$

Q27: 67×125

$$= 67000 / 8$$

$$= 8375$$

Q28: 2345×125

$$= 2345000 / 8$$

$$= 293125$$

Q29: 234.56×125

$$= (234.56 \times 1000) / 8$$

$$= 234560 / 8$$

$$= 29320$$

Q30: 3.12×125

$$= 3120 / 8$$

$$= 390$$

Practice Task # 4.6:

Find out the answers of the following questions based on the SMART TRICK #36.

1) 69.2×125

2) 2394×125

3) 7498×125

4) 67.5×125

5) 8.75×125

SMART TRICK # 37:

Multiplication with 250.

The only catch here is, read 250 as $(1000/4)$. So, put three zeroes behind the number to be multiplied with 250, and divide it by 4.

Q31: 42×250

$$= 42 \times (1000/4)$$

$$= (42 \times 1000) / 4$$

$$= 42000 / 4$$

$$= 10500$$

Q32: 67×250

$$= 67000 / 4$$

$$= 16750$$

Q33: 2345 X 250

$$= 2345000/4$$

$$= 586250$$

Q34: 234.56 X 250

$$= (234.56 \times 1000)/4$$

$$= 234560 /4$$

$$= 58640$$

Q35: 3.12 X 250

$$= 3120/4$$

$$= 780$$

Practice Task # 4.7:

Find out the answers of the following questions based on the **SMART TRICK #37**.

1) 69.2×250

2) 2394×250

3) 7498×250

4) 67.5×250

5) 8.75×250

The following is the list of the smart tricks covered in this chapter.

SMART TRICK No.	SMART TRICK deals with:
#31	To multiply any two-digit number (whose sum of the digits is less than 10) with 11:
#32	To multiply any two-digit number (whose sum of the digits is more than 10) with 11:

#33	To multiply any number with 11
#34	Multiplication with 5.
#35	Multiplication with 25.
#36	Multiplication with 125.
#37	Multiplication with 250.

Mega Practice Task # 4:

(A) Speed Enhancer Practice Task:

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

Ideal time limit: 5 seconds / question

- | | |
|----------------------|------------------------|
| 1) 23×11 | 15) 89×11 |
| 2) 24×11 | 16) 38×11 |
| 3) 265×11 | 17) 39×11 |
| 4) 0.026×11 | 18) 40123×11 |
| 5) 127×11 | 19) 41×11 |
| 6) 28×11 | 20) 92×11 |
| 7) 29×11 | 21) 4.32×11 |
| 8) 3.04×11 | 22) 544×11 |
| 9) 8.1×11 | 23) 45.7×11 |
| 10) 7.2×11 | 24) 46×11 |
| 11) 33×11 | 25) 2347×11 |
| 12) 14×11 | 26) 23456×125 |
| 13) 2345×11 | 27) 2489×125 |
| 14) 63×11 | 28) 26561×125 |

- 29) 0.026×125
- 30) 127×125
- 31) 28×125
- 32) 298.45×125
- 33) 3.04×125
- 34) 8.1×125
- 35) 7.2×125
- 36) 33×125
- 37) 14×125
- 38) 2345×125
- 39) 631×125
- 40) 89×125
- 41) 38×125
- 42) 9879×125
- 43) 40123×125
- 44) 451×125
- 45) 92×125
- 46) 4.32×125
- 47) 544×125
- 48) 45.7×125
- 49) 469×125
- 50) 2347×125
- 51) 23456×25
- 52) 2489×25
- 53) 26561×25
- 54) 0.026×25
- 55) 127×25

- 56) 28×25
- 57) 298.45×25
- 58) 3.04×25
- 59) 8.1×25
- 60) 7.2×25
- 61) 773×25
- 62) 14×25
- 63) 2345×25
- 64) 631×25
- 65) 89×25
- 66) 38×25
- 67) 39×25
- 68) 40123×25
- 69) 451×25
- 70) 92456×25
- 71) 4.32×25
- 72) 544×25
- 73) 45.7×25
- 74) 469×25
- 75) 2347×25
- 76) 23456×250
- 77) 2489×250
- 78) 26561×250
- 79) 0.026×250
- 80) 127×250
- 81) 28×250
- 82) 298.45×250
- 83) 3.04×250

- 84) 8.1×250
85) 7.2×250
86) 93×25
87) 14×250
88) 2345×250
89) 631×250
90) 89×250
91) 38×250
92) 39×250

- 93) 40123×250
94) 451×250
95) 92×250
96) 4.32×250
97) 544×250
98) 45.7×250
99) 469×250
100) 2347×250

(B) Application based questions:

1. The cost of 3 pens and 12 erasers is Rs.389. What is the cost of 33 pens and 132 erasers?
2. The difference between 58% of a number and 33% of the same number is 247. What is that number?
3. Find the area of a rectangle having length 125 cm and breadth 64 cm.
4. A wall, having length 6m and height 2m, is to be painted. What is the cost of painting the wall, with labour at the rate of 75 per sqm?
5. What is the rate of interest at which amount of Rs.12000 on simple interest becomes Rs.15600 in 4 years?

6. Find out the area of a rectangle having length of 52 cm and breadth of 25 cm.

Hint: $52 \times 25 = 52 \times 100 / 4$

7. The cost price (CP) of an article is Rs. 600. A shopkeeper earns the profit of 25% on that article. What would be its selling price?

Hint: $SP = 125\% \text{ of } CP = 125 \times (CP)/100 = \frac{1000}{8} \times \frac{600}{100}$

Answers:

(A)

- | | | |
|-----------|--------------|-------------|
| 1) 253 | 17) 429 | 33) 380 |
| 2) 264 | 18) 441353 | 34) 1012.5 |
| 3) 2915 | 19) 451 | 35) 900 |
| 4) 0.286 | 20) 1012 | 36) 4125 |
| 5) 1397 | 21) 47.52 | 37) 1750 |
| 6) 308 | 22) 5984 | 38) 293125 |
| 7) 319 | 23) 502.7 | 39) 78875 |
| 8) 33.44 | 24) 506 | 40) 11125 |
| 9) 89.1 | 25) 25817 | 41) 4750 |
| 10) 79.2 | 26) 2932000 | 42) 1234875 |
| 11) 363 | 27) 311125 | 43) 5015375 |
| 12) 154 | 28) 3320125 | 44) 56375 |
| 13) 25795 | 29) 3.25 | 45) 11500 |
| 14) 693 | 30) 15875 | 46) 540 |
| 15) 979 | 31) 3500 | 47) 68000 |
| 16) 418 | 32) 37306.25 | 48) 5712.5 |

49) 58625	67) 975	85) 1800
50) 293375	68) 1003075	86) 2325
51) 586400	69) 11275	87) 3500
52) 62225	70) 2311400	88) 586250
53) 664025	71) 108	89) 157750
54) 0.65	72) 13600	90) 22250
55) 3175	73) 1142.5	91) 9500
56) 700	74) 11725	92) 9750
57) 7461.25	75) 58675	93) 10030750
58) 76	76) 5864000	94) 112750
59) 202.5	77) 622250	95) 23000
60) 180	78) 6640250	96) 1080
61) 19325	79) 6.5	97) 136000
62) 350	80) 31750	98) 11425
63) 58625	81) 7000	99) 117250
64) 15775	82) 74612.5	100) 586750
65) 2225	83) 760	
66) 950	84) 2025	

(B)

1. Rs.4279

2. 988

3. 8000 sq cm

4. Rs900

5. 7.5%

6. 1300 sq cm

7. Rs. 750

5

Magic in Multiplication Part 2

'Urdhva-tiryag-bhyam'

Multiplying any two numbers quickly

Glimpse of this chapter: The entire chapter explains you about fast calculations concentrating on the area of multiplication specifically long and tedious numbers. This method helps to calculate the answer in very comfortable way by helping our brain to initiate the process left to right instead of right to left. Go ahead and explore!

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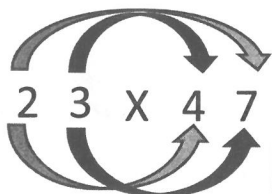
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SMART TRICK # 38:

To multiply any two 2-digit numbers:

Q1: 23 X 47



Step1:

(10's digit of the 1st number)

X

(10's digit of the 2nd number)

$$2 \times 4 = 8$$

Write it in two digits

08

Step2:

(unit digit of the 1st number)

X

(unit digit of the 2nd number)

$$3 \times 7 = 21$$

Write it in two digits

21

Step 3:

{{(10's digit of the 1st number) X
(unit digit of the 2nd number)} +

{{(unit digit of the 1st number) X
(10's digit of the 2nd number)}}}

$$(2 \times 7) + (3 \times 4) = 26$$

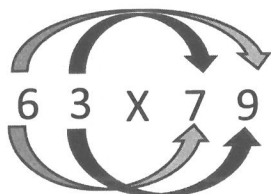
Write in two digits

26

$$\begin{array}{r} 0821 \\ + \quad 260 \\ \hline 1081 \end{array}$$

Answer: 1081

Q2: 63 X 79



Step1:

(10's digit of the 1st number)

X

(10's digit of the 2nd number)

$$6 \times 7 = 42$$

Write it in two digits

42

Step2:

(unit digit of the 1st number)

X

(unit digit of the 2nd number)

$$3 \times 9 = 27$$

Write it in two digits

27

$$\begin{array}{r} 4227 \\ + \quad 750 \\ \hline 4977 \end{array}$$

Step 3:

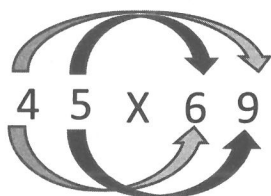
(10's digit of the 1st number) X (unit digit of the 2nd number) + {(unit digit of the 1st number) X (10's digit of the 2nd number)}

$$(6 \times 9) + (3 \times 7) = 54 + 21 = 75$$

75

Answer: 4977

Q3: 45 X 69



$$\begin{array}{r}
 2445 \\
 + \quad 660 \\
 \hline
 3105
 \end{array}$$

Step1:

(10's digit of the 1st number)

X

(10's digit of the 2nd number)

$$4 \times 6 = 24$$

Write it in two digits

24

Step2:

(unit digit of the 1st number)

X

(unit digit of the 2nd number)

$$5 \times 9 = 45$$

Write it in two digits

45

Step 3:

(10's digit of the 1st number) X (unit digit of the 2nd number)} + {(unit digit of the 1st number) X (10's digit of the 2nd number)}

$$(4 \times 9) + (5 \times 6) = 36 + 30 = 66$$

Write it in two digits

66

Answer: 3105

Ultimately what you have to remember is, when numbers are of two digits. Let us assume the two numbers are 'ab' and 'cd'. Then use the following method:

$$ab \times cd = (a \times c) / (a \times d + b \times c) / (b \times d)$$

Practice Task # 5.1:

Find out the answers of the following questions based on the SMART TRICK #38.

- 1) 63×29 2) 34×34 3) 54×98
4) 36×67 5) 73×57

SMART TRICK # 39:

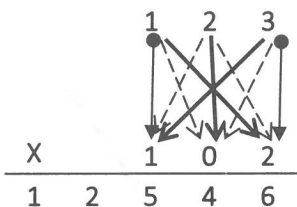
To multiply any two 3-digit numbers:

Let two numbers be 'abc' and 'def'.

$$abc \times def = (a \times d) / (a \times e + b \times d) / (a \times f + b \times e + c \times d) / (b \times f + c \times e) / (c \times f)$$

Let's say we need to multiply 123 with 102.

Q4: 123×102



- Step 1: $(1 \times 1) = 1$
Step 2: $(1 \times 0) + (2 \times 1) = 2$
Step 3: $(1 \times 2) + (3 \times 1) + (2 \times 0) = 5$
Step 4: $(2 \times 2) + (3 \times 0) = 4$
Step 5: $(3 \times 2) = 6$

Answer: 12546

Q5: 456 X 231 (concept of carry forward)

			4	5	6
			↓	↓	↓
X		2	3	1	
	8	2	1	3	6
	2	3	2		
	1	0	5	3	3
					6

Step 1:	$(4 \times 2) =$	8
Step 2:	$(4 \times 3) + (5 \times 2) =$	22
Step 3:	$(4 \times 1) + (6 \times 2) + (5 \times 3) =$	31
Step 4:	$(5 \times 1) + (6 \times 3) =$	23
Step 5:	$(6 \times 1) =$	6

Answer: 105336

Q6: 163 X 179

			1	6	3
			↓	↓	↓
X		1	7	9	
	1	3	4	5	7
	1	5	7	2	
	2	8	1	7	7
		1			
	2	9	1	7	7

Step 1:	$(1 \times 1) =$	1
Step 2:	$(1 \times 7) + (6 \times 1) =$	13
Step 3:	$(1 \times 9) + (3 \times 1) + (6 \times 7) =$	54
Step 4:	$(6 \times 9) + (3 \times 7) =$	75
Step 5:	$(3 \times 9) =$	27

Answer: 29177

Practice Task # 5.2:

Find out the answers of the following questions based on the SMART TRICK #39.

- 1) 369 X 128 2) 494 X 234 3) 574 X 891
4) 167 X 334 5) 185 X 179

SMART TRICK # 40:

(Application of SMART TRICK # 38 and # 39)

To multiply any two numbers with the help of above tricks:

Let's say we need to multiply 127 with 43.

Q7: 127 X 43

Remember in such cases, you need to put a zero in front of 43 and need to write it as 043. Follow SMART TRICK # 35 as follows.

		1	2	7
		●	●	●
		↓	↓	↓
X		0	4	3
0	4	1	4	1
	1	3	2	
	5	4	6	1

Step 1:	$(1 \times 0) =$	0
Step 2:	$(1 \times 4) + (2 \times 0) =$	4
Step 3:	$(1 \times 3) + (7 \times 0) + (2 \times 4) =$	11
Step 4:	$(2 \times 3) + (7 \times 4) =$	34
Step 5:	$(7 \times 3) =$	21

Answer: 5461

Q8: 4163 X 1796

Step 1:	$(4 \times 1) =$	4
Step 2:	$(1 \times 1) + (4 \times 7) =$	29
Step 3:	$(6 \times 1) + (4 \times 9) + (1 \times 7) =$	49
Step 4:	$(3 \times 1) + (4 \times 6) + (6 \times 7) + (1 \times 9) =$	78

Step 5:	$(7 \times 3) + (1 \times 6) + (6 \times 9) =$	81
Step 6:	$(3 \times 9) + (6 \times 6) =$	63
Step 7:	$(3 \times 6) =$	18

$$\begin{array}{r}
 \begin{array}{cccccc}
 2 & 4 & 7 & 8 & 6 & 1 \\
 4 & 9 & 9 & 8 & 1 & 3 & 8
 \end{array} \\
 \hline
 \begin{array}{cccccc}
 1 & 1 & 1 & & & & \\
 6 & 3 & 6 & 6 & 7 & 4 & 8
 \end{array} \\
 \hline
 \begin{array}{cccccc}
 7 & 4 & 7 & 6 & 7 & 4 & 8
 \end{array}
 \end{array}$$

Answer: 7476748

Practice Task # 5.3:

Find out the answers of the following questions based on the SMART TRICK # 40.

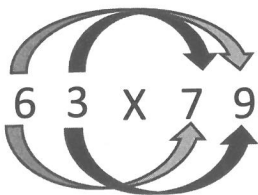
- 1) 692×543 2) 294×123 3) 7008×198
 4) 67×1234 5) 875×1230

SMART TRICK # 41:

(In the case of decimals)

Q9: 6.3×7.9

We need to calculate the above number as 63×79 only. Once we get the answer, we need to put as many decimals.



Step1:

$$6 \times 7 = 42$$

42

Step2:

$$3 \times 9 = 27$$

27

Step 3:

$$(6 \times 9) + (3 \times 7) = 54 + 21 = 75$$

75

$$\begin{array}{r} 4227 \\ + \quad 750 \\ \hline 4977 \end{array}$$

Hence the answer is 4977. We have got total two decimal places in the question, so we need to put a decimal at two digits from the right. **So, the answer here would be 49.77**

Practice Task # 5.4:

Find out the answers of the following questions based on the SMART TRICK #41.

1) 6.9×5.4

2) 29.4×1.23

3) 7008×19.8

4) 6.7×123.4

5) 87.5×1.23

These tricks are also derived from the knowledge of our Vedas. This method of multiplication is basically the application of a Vedic Sutra Urdhva – tiryagbhyam (ऊर्ध्व तिर्यग्भ्याम्). This sutra means “Vertically and Crosswise”. This sutra is one of the best-known Vedic Sutras, and has found many applications. This sutra is used to multiply two numbers together. Two-digit multiplication, three-digit multiplication, four-digit multiplication etc. can be done effectively by ऊर्ध्व तिर्यग्भ्याम्.

‘Urdhva’ means vertical.

‘tiryak’ means crosswise.

‘Urdhvatiryagbhyam’ means vertical and crosswise.

- ❖ In this method we do the calculation from left to right unlike in the conventional method, where we start from right. This enables us to calculate significant digits of the answer prior to the non-significant ones.
- ❖ We divide this method for these cases:

A) When numbers are of two digits each. Let two numbers be ‘ab’ and ‘cd’.

$$ab \times cd = (a \times c) / (a \times d + b \times c) / (b \times d)$$

B) When numbers are of three digits each:

Let the two numbers be ‘abc’ and ‘def’.

$$abc \times def = (a \times d) / (a \times e + b \times d) / (a \times f + b \times e + c \times d) / (b \times f + c \times e) / (c \times f)$$

The entire Sutra of Urdhvatiryagbhaym is divided into three SMART TRICKS. These smart tricks will help you to understand this Vedic Sutra in a very easy and effective manner.

The following is the list of the SMART TRICKS covered:

SMART TRICK No.	SMART TRICK deals with
#38	To multiply any two 2-digit numbers
#39	To multiply any two three-digit numbers
#40	Application of SMART TRICK # 8 and # 9
#41	Decimal Cases

Mega Practice Task # 5:

(A) Speed Enhancer Practice Task:

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

Ideal time limit: 5 – 10 seconds / question

- | | | |
|---------------------|------------------------|------------------------|
| 1) 23×46 | 10) 72×34 | 19) 41×34 |
| 2) 24×54 | 11) 337×131 | 20) 92×87 |
| 3) 265×453 | 12) 14×113 | 21) 42×32 |
| 4) 236×209 | 13) 2345×9876 | 22) 544×23 |
| 5) 127×114 | 14) 63×23 | 23) 457×34 |
| 6) 28×31 | 15) 89×46 | 24) 46×23 |
| 7) 29×49 | 16) 38×98 | 25) 2347×2345 |
| 8) 304×154 | 17) 39×342 | 26) 234×283 |
| 9) 81×88 | 18) 40123×23 | 27) 248×254 |

- | | | |
|------------------------|------------------------|------------------------|
| 28) 26561×25 | 53) 261×129 | 78) 261×243 |
| 29) 0.026×25 | 54) 67×76 | 79) 39×24 |
| 30) 127×251 | 55) 12×12 | 80) 127×257 |
| 31) 28×63 | 56) 28×97 | 81) 28×69 |
| 32) 298×123 | 57) 47×53 | 82) 298×256 |
| 33) 3.04×2.09 | 58) 34×98 | 83) 323×259 |
| 34) 8.1×7.6 | 59) 81×77 | 84) 87×259 |
| 35) 7.2×81 | 60) 7.2×56 | 85) 72×259 |
| 36) 773×55 | 61) 343×157 | 86) 98×27 |
| 37) 14×95 | 62) 147×123 | 87) 149×987 |
| 38) 2345×28 | 63) 65×54 | 88) 234×876 |
| 39) 631×29 | 64) 63×34 | 89) 631×136 |
| 40) 89×298 | 65) 89×76 | 90) 89×98 |
| 41) 381×235 | 66) 38×57 | 91) 385×583 |
| 42) 309×209 | 67) 9879×342 | 92) 39×93 |
| 43) 403×295 | 68) 43×32 | 93) 48×23 |
| 44) 451×18 | 69) 451×123 | 94) 451×154 |
| 45) 924×12 | 70) 92×234 | 95) 92×53 |
| 46) 4.32×234 | 71) 4.32×432 | 96) 4.32×23.4 |
| 47) 544×251 | 72) 544×234 | 97) 544×258 |
| 48) 45.7×12 | 73) 45.7×47.5 | 98) 45.7×259 |
| 49) 469×234 | 74) 469×469 | 99) 469×257 |
| 50) 2347×253 | 75) 237×235 | 100) 27×67 |
| 51) 236×128 | 76) 256×259 | |
| 52) 249×125 | 77) 248×258 | |

(B) Application Based Questions:

1. The cost of 3 pens and 12 erasers is Rs.389. What will be the cost of 63 pens and 252 erasers?
2. A circular plot having radius 52m has to be fenced. Cost of fencing is Rs. 43/m. Find the total cost.
3. A rectangular plot having length of 456 m and breadth of 234 m has to be cleaned for a construction site. What area must be cleaned (in sq.m)?
4. A tailor earns Rs.235 on each uniform he makes. In the month of May, he made total 347 uniforms. What would be his total earning for that month?

Answers:

(A)

- | | | |
|-----------|--------------|-------------|
| 1) 1058 | 11) 44147 | 21) 1344 |
| 2) 1296 | 12) 1582 | 22) 12512 |
| 3) 120045 | 13) 23159220 | 23) 15538 |
| 4) 49324 | 14) 1449 | 24) 1058 |
| 5) 14478 | 15) 4094 | 25) 5503715 |
| 6) 868 | 16) 3724 | 26) 66222 |
| 7) 1421 | 17) 13338 | 27) 62992 |
| 8) 46816 | 18) 922829 | 28) 664025 |
| 9) 7128 | 19) 1394 | 29) 0.65 |
| 10) 2448 | 20) 8004 | 30) 31877 |

31) 1764	55) 144	79) 936
32) 36654	56) 2716	80) 32639
33) 6.3536	57) 2491	81) 1932
34) 61.56	58) 3332	82) 76288
35) 583.2	59) 6237	83) 83657
36) 42515	60) 403.2	84) 22533
37) 1330	61) 53851	85) 18648
38) 65660	62) 18081	86) 2646
39) 18299	63) 3510	87) 147063
40) 26522	64) 2142	88) 204984
41) 89535	65) 6764	89) 85816
42) 64581	66) 2166	90) 8722
43) 118885	67) 3378618	91) 224455
44) 8118	68) 1376	92) 3627
45) 11088	69) 55473	93) 1104
46) 1010.88	70) 21528	94) 69454
47) 136544	71) 1866.24	95) 4876
48) 548.4	72) 127296	96) 101.088
49) 109746	73) 2170.75	97) 140352
50) 593791	74) 219961	98) 11836.3
51) 30208	75) 55695	99) 120533
52) 31125	76) 66304	100) 1809
53) 33669	77) 63984	
54) 5092	78) 63423	

- (B) 1. Rs. 8169 2. Rs.14055
3. 106704 sq.m 4. Rs. 81545



Magic in Multiplication Part 3

'Eknyunenpurvena'

Magic in multiplication with 9's

Glimpse of this chapter: The entire chapter explains you about fast calculations concentrating on the area of multiplication specifically for the numbers made up of 9's. Go ahead and explore!

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math mantra : ३

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SMART TRICK # 42:

Case 1: To multiply a number with the number made up of 9's which contains as many numbers of 9's as the number of digits in the given number.

Let's say we need to multiply 38 with 99.

3 8	
X	9 9
LHS	RHS
38 - 1	99
37	99
-	37
37	62
Answer: 3762	

Q1: 38 X 99

Step 1: lessen 1 from 38 and put the result of Left Hand Side (LHS).

$$(38 - 1 = 37)$$

Step 2: Write 99 on Right Hand Side (RHS).

After step 2, we can have 3799

Step 3: subtract the number got at the end of step 1 from the above number.

$$3799 - 37 = 3762$$

So, 3762 would be the answer.

Q2 637 X 999

6 3 7	
X	9 9 9
LHS	RHS
637 - 1	999
636	999
-	636
636	363
Answer: 636363	

SMART TRICK # 43:

Case 2: To multiply a number with the number made up of 9's which contains lesser number of 9's than the number of digits in the given number.

Q3: 637×99

	6	3	7
X		9	9
LHS			RHS
637 - 1			99
636			99
-			36
630			63
Answer: 63063			

Q4: 63×9

	6	3
X		9
LHS		RHS
63 - 1 =		9
62		9
- 6		2
56		7
Answer: 567		

SMART TRICK # 44:

Case 3: To multiply a number with the number made up of 9's which contains a greater number of 9's than the number of digits in the given number.

Q5: 63×999

		6	3
X	9	9	9
LHS		RHS	
63 - 1 =		999	
62		999	
0		62	
62		937	
Answer: 62937			

Q6: 54263×99999

	5	4	2	6	3
x	9	9	9	9	9
LHS			RHS		
54263 - 1			99999		
54262			99999		
			54262		
54262			45737		
Answer: 5426245737					

Q7: 632 X 999

	6	3	2
x	9	9	9
LHS	RHS		
632 - 1	999		
631	999		
	631		
631	368		

Answer: 631368

Q8: 537 X 99

	5	3	7
x		9	9
LHS		RHS	
537 - 1		999	
536		99	
5		36	
531		63	

Answer: 53163

Q9: 78 X 9

	7	8
x		9
LHS		RHS
78 - 1 = 77		9
77		9
7		7
70		2

Answer: 702

Q10: 43 X 999

	4	3		
x	9	9	9	
LHS			RHS	
43-1 = 42			999	
42			999	
			42	
42			957	

Answer: 42957

Q11: 12345 X 99999

	1	2	3	4	5
x	9	9	9	9	9
LHS			RHS		
12345 - 1			99999		
12344			99999		
			12344		
12344			87655		

Answer: 1234487655

Practice Task # 6.1:

Find out the answers of the following questions based on the SMART TRICK #42.

- 1) 63 X 99 2) 34 X 999 3) 5984 X 9
4) 3623 X 99 5) 73 X 9999

Practice Task # 6.2:

Find out the answers of the following questions based on the SMART TRICK #43 and #44.

- 1) 63×99 2) 34×999 3) 5984×9
4) 3623×99 5) 73×9999

SMART TRICK # 45:

To multiply any number with the number made up of 9's. (in Decimals)

Q12: 3.8×99

- ❖ Here read 3.8 as 38 only and calculate 38×99 as per above method given.
- ❖ Find out the answer and adjust for the decimals.

	3 8
x 9 9	
LHS	RHS
$38-1=37$	99
37	99
6	37
37	62
Answer: 3762	

Here in the question we have one decimal. So, we need to put decimal after one digit from the right. **So, answer is 376.2**

Q13: 3.8 X 9.9

- ❖ Here read 3.8 as 38 and 9.9 as 99 only and calculate 38 X 99 as per above method given. Find out the answer and adjust for the decimals.

	3 8
x	9 9
LHS	RHS
38-1=37	99
37	99
6	37
37	62

Answer: 3762

Here in question, there are two decimals. So, we need to put the point before two digits from the right. **So, the answer is 37.62**

Q14: 63.7 X 999

- ❖ Here read 63.7 as 637 and 99 as 999 only and calculate 637 X 99 as per above method given. Find out the answer and adjust for the decimals.

	6 3 7
x	9 9 9
LHS	RHS
637-1=636	999
636	999
	636
636	363

Answer: 636363

Here in question, there is just one decimal. So, we need to put the point before one digit. **So, answer is 63636.3**

Practice Task # 6.3:

Find out the answers of the following questions based on the SMART TRICK #45.

1) 6.6×99

2) 78.4×99.99

3) 594×9999.9

4) 32.3×9.9

5) 73.98×99

Hence, there are majorly three conditions in this SMART TRICK to multiply numbers with a number solely made up of 9's only. To be precise,

Case 1: As many digits one number contains, the other number contains the same number of nines. For an example, (876×999) . Here 876 contain three digits. And another number is 999 which contains three nines.

Case 2: As many digits one number contains, the other number contains lesser number of nines than the number of the digits of that number. For an example, (876×99) . Here 876 contain three digits. And another number is 99 which contains only two nines.

Case 3: As many digits one number contains, the other number contains a greater number of nines than the number of the digits of that number. For an example, (876×99999) . Here 876 contains three digits. And another number is 99999 which contains five nines. We also have to consider decimals in the given cases, if any.

These SMART TRICKS are basically called the Vedic Sutra *Eknyunenpurvena* (एकन्यूनेनपूर्वेण). Here *ek* (एक) means one, *Nyun* (न्यून) means Less, *Purvena* (पूर्वेण) means the previous one. So, the meaning of entire Sutra is 'By one less than the previous one'. We always reduced one from the given number. We had LHS and RHS. We took one less than the number of the given number and wrote in LHS part. This is called '*eknyun-sankhya*' of the given number.

Mega Practice Task # 6:

(A) Speed Enhancer Practice Task:

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

Ideal time limit: 5 – 10 seconds / question

- | | |
|----------------------|-----------------------|
| 1) 23×99 | 13) 2345×999 |
| 2) 24×9 | 14) 63×9 |
| 3) 265×999 | 15) 89×999 |
| 4) 236×9.99 | 16) 38×99 |
| 5) 12.7×99 | 17) 39×9.9 |
| 6) 28×999 | 18) 40123×99 |
| 7) 29×9999 | 19) 41×9 |
| 8) 304×999 | 20) 92×99 |
| 9) 81×9 | 21) 42×99 |
| 10) 72×999 | 22) 544×99 |
| 11) 337×999 | 23) 45.7×999 |
| 12) 14×99 | 24) 4.6×99 |

25) 2347×9999
26) 234×99
27) 248×9999
28) 26561×99
29) 0.026×999
30) 127×99
31) 28×9999
32) 298×99
33) 3.04×9
34) 8.1×9.9
35) 7.2×99
36) 773×99
37) 149×99
38) 2345×99
39) 631×99
40) 89×99
41) 381×999
42) 309×999
43) 403×999
44) 451×99
45) 924×99
46) 4.32×99
47) 544×999
48) 45.7×9
49) 469×99
50) 2347×999
51) 236×99

52) 249×9
53) 261×9
54) 67×9
55) 12×99
56) 28×999
57) 47×99
58) 34×99
59) 81×999
60) 7.2×99
61) 343×9
62) 147×9
63) 65×9
64) 63×9999
65) 89×99
66) 38×9
67) 9879×99
68) 43×9
69) 451×9
70) 92×999
71) 4.32×9
72) 54476×9
73) 45.7×99
74) 469234×999
75) 237×235
76) 25634×99
77) 24867×99
78) 261456×99

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- | | |
|--------------------------|------------------------|
| 79) 3956×99 | 90) 89×99 |
| 80) 12767×99 | 91) 385×9999 |
| 81) 2856×99 | 92) 39×999 |
| 82) 29866×9 | 93) 48×99 |
| 83) 3236789×9 | 94) 451×999 |
| 84) 877894×9 | 95) 92×999 |
| 85) 72467×99999 | 96) 4.32×999 |
| 86) 98×9 | 97) 544×9999 |
| 87) 149×9 | 98) 45.7×9999 |
| 88) 234×99 | 99) 469×9 |
| 89) 631×99 | 100) 4767×99 |

(B) Applications based questions:

1. Jay sold a plot through a broker for Rs. 12,80,000. The broker charged 9.9 % brokerage for this work. What amount Jay has to give to the broker?
2. A 'scooty' costs Rs.38,756. If a customer gets a rebate of 9 % on that, at what amount does the customer get the 'scooty'?
3. If $X + Y = 424$ and $2X + 3Y = 1173$, find the value of $(X \times Y)$.
4. The marked price of a clock is Rs.3200. It is to sold at a discount of 1%. What would be the selling price of the clock?

5. I have purchased 999 tables at the discount of 12%. MRP of one table was Rs.3000. What cost would I have incurred to purchase 999 tables?

Answers:

(A)

- | | | |
|-------------|--------------|-------------|
| 1) 2277 | 21) 4158 | 41) 380619 |
| 2) 216 | 22) 53856 | 42) 308691 |
| 3) 264735 | 23) 45654.3 | 43) 402597 |
| 4) 2357.64 | 24) 455.4 | 44) 44649 |
| 5) 1257.3 | 25) 23467653 | 45) 91476 |
| 6) 27972 | 26) 23166 | 46) 427.68 |
| 7) 289971 | 27) 2479752 | 47) 543456 |
| 8) 303696 | 28) 2629539 | 48) 411.3 |
| 9) 729 | 29) 25.974 | 49) 46431 |
| 10) 71928 | 30) 12573 | 50) 2344653 |
| 11) 336663 | 31) 279972 | 51) 23364 |
| 12) 1386 | 32) 29502 | 52) 2241 |
| 13) 2342655 | 33) 27.36 | 53) 2349 |
| 14) 567 | 34) 80.19 | 54) 603 |
| 15) 88911 | 35) 712.8 | 55) 198 |
| 16) 3762 | 36) 76527 | 56) 27972 |
| 17) 386.1 | 37) 14751 | 57) 4653 |
| 18) 3972177 | 38) 232155 | 58) 3366 |
| 19) 369 | 39) 62469 | 59) 80919 |
| 20) 9108 | 40) 8811 | 60) 712.8 |

61) 3087	75) 55695	89) 62469
62) 1323	76) 2537766	90) 8811
63) 585	77) 2461833	91) 3849615
64) 629937	78) 25884144	92) 38961
65) 8811	79) 391644	93) 4752
66) 342	80) 1263933	94) 450549
67) 978021	81) 282744	95) 91908
68) 387	82) 268794	96) 4315.68
69) 4059	83) 29131101	97) 5439456
70) 91908	84) 7901046	98) 456954.3
71) 38.88	85) 7246627533	99) 4221
72) 490284	86) 882	100) 471933
73) 4524.3	87) 1341	
74) 468764766	88) 23166	

(B)

1. Rs. 1,26,720
2. Rs.35268
3. 32175
4. Rs.3168
5. Rs.26,37,360

7

Magic in Multiplication Part 4

'Nikhilam Sutra'

Learning the 'base' method

Glimpse of this chapter: The entire chapter explains you about fast calculations concentrating on the area of multiplication. This chapter explains 'the base' and its applications. We have designed the entire chapter in a way that a student can understand all steps just by reading them once. Go ahead and explore!

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Introduction:

- ❖ There is an interesting method of multiplying any two numbers which are nearby. A few concepts that we require to understand the method are as follows:

Base (आधार): 10, 100, 1000, 10000 and so on.

Sub-base (उप-आधार): 30, 200, 5000... etc.

Deviation(विचलन): Deviation means the difference of the number from the base or sub-base.

- ❖ IMPORTANT NOTE: Base is always in 10's power. Sub-base is always in multiplication of the base.

SMART TRICK # 46:

Multiplication of two numbers lesser than the base:

Step 1: Find the base or sub-base.

Step 2 : Find the Deviation.

Step 3: Find the sum (Left side-LHS)

Step 4: Find the Product (Right Side-RHS)

Step 5: Take care of the number of zeroes present in the base and write digits accordingly to the right side.

X	Number 1 (n1)	Difference 1 (d1)
	Number 2 (n2)	Difference 2 (d2)
	LHS	RHS
	SUM	PRODUCT
	$n1 + d2$	$d1 \times d2$
	$n2 + d1$	Sign is important here

Q1: Solve 9 X 9 by Nikhil Method.

Base identified: 10

	9	-1
X	9	-1
LHS		RHS
SUM		PRODUCT
(9) + (-1)		(-1) X (-1)
8		1
Answer: 81		

Q2: Solve 7 X 8 by Nikhil Method.

Base identified: 10

	7	-3
X	8	-2
LHS		RHS
SUM		PRODUCT
(8) + (-3)		(-3) X (-2)
5		6
Answer: 56		

Q3: Solve 6 x 9 by Nikhil Method.

Base identified: 10

	6	-4
X	9	-1
LHS		RHS
SUM		PRODUCT
(9) + (-4)		(-4) X (-1)
5		4
Answer: 54		

Q4: Solve 97 x 96 by Nikhil Method.

Base identified 100.

	97	-3
X	96	-4
	LHS	RHS
	SUM	PRODUCT
	(96) + (-3)	(-3) X (-4)
	93	12

Answer: 9312

Q5: Solve 98 x 94 by Nikhil Method.

Base identified 100.

	98	-2
X	94	-6
	LHS	RHS
	SUM	PRODUCT
	(94) + (-2)	(-2) X (-6)
	92	12

Answer: 9212

Q6: Solve 93 x 96 by Nikhil Method.

Base identified 100.

	93	-7
X	96	-4
	LHS	RHS
	SUM	PRODUCT
	(96)+(-7)	(-7) X (-4)
	89	28

Answer: 8928

Q7: Solve 91 x 92 by Nikhil Method.

Base identified 100.

	91	-9
X	92	-8
	LHS	RHS
	SUM	PRODUCT
	(92)+(-9)	(-9) X (-8)
	83	72
Answer: 8372		

Q8: Solve 99 x 97 by Nikhil Method.

Base identified 100.

	99	-1
X	97	-3
	LHS	RHS
	SUM	PRODUCT
	(97)+(-1)	(-1) X (-3)
	96	3
Answer: 9603		

Practice Task # 7.1:

Find out the answers of the following questions based on the SMART TRICK #46.

- 1) 87X 89
- 2) 85 x 95
- 3) 95 x 94
- 4) 91 x 88
- 5) 99 x 92

SMART TRICK # 47:

Multiplication of two numbers which are greater than the base.

Q9: Solve 11×12 by Nikhil Method.

Base Identified: 10

	11	+1
X	12	+2
	LHS	RHS
	SUM	PRODUCT
	$(12)+(1)$	$(1) \times (2)$
	13	2

Answer: 132

Q10: Solve 15×18 by Nikhil Method.

Base identified :10

	15	+5
X	18	+8
	LHS	RHS
	SUM	PRODUCT
	$(18)+(5)$	$(5) \times (8)$
	23	40

Here, on RHS, only one digit can be placed as we have only one zero in the base.

$23 + 4$	0
27	0

Answer: 270

Q11: Solve 15×13 by Nikhil Method

Base identified: 10

	15	+5
X	13	+3
LHS		RHS
SUM		PRODUCT
$(13) + (5)$		$(5) \times (3)$
18		15

Here, on RHS, only one digit can be placed as we have only one zero in the base.

$18 + 1$	5
19	5

Answer: 195

Q12: Solve 14×19 by Nikhil Method

Base identified: 10

	14	+4
X	19	+9
LHS		RHS
SUM		PRODUCT
$(19) + (4)$		$(4) \times (9)$
23		36

Here, on RHS, only one digit can be placed as we have only one zero in the base.

$23 + 3$	6
26	6

Answer: 266

Q13: Solve 12×17 by Nikhil Method

Base identified: 10

	12	2
X	17	7
LHS		RHS
SUM		PRODUCT
$(17) + (2)$		$(2) \times (7)$
19		14

Here, on RHS, only one digit can be placed as we have only one zero in the base.

$19 + 1 = 20$	4
---------------	---

Answer: 204

Q14: Solve 102×103 by Nikhil Method

Base identified 100.

	102	2
X	103	3
LHS		RHS
SUM		PRODUCT
$(103) + (2)$		$(2) \times (3)$
105		6

Here, on RHS, two digits must be placed as we have two zeroes in the base.

105	06
-----	----

Answer: 10506

Q15: Solve 112×107 by Nikhil Method

Base identified 100.

	112	+12
X	107	+7
	LHS	RHS
	SUM	PRODUCT
	$(107) + (12)$	$(12) \times (7)$
	119	84
Here, on RHS, two digits must be placed as we have two zeroes in the base.		
	119	84
	Answer: 11984	

Q16: Solve 115×115 by Nikhil Method

Base identified 100.

	115	15
X	115	15
	LHS	RHS
	SUM	PRODUCT
	$(115) + (15)$	$(15) \times (15)$
	130	225
Here, on RHS, two digits must be placed as we have two zeroes in the base.		
	130+2	25
	132	25
	Answer: 13225	

Q17: Solve 114×111 by Nikhil Method

Base identified :100

	114	14
X	111	11
	LHS	RHS
	SUM	PRODUCT
	$(111) + (14)$	$(14) \times (11)$
	125	154
Here, on RHS, two digits must be placed as we have two zeroes in the base.		

$$125 + 1 = 126$$

$$54$$

Answer: 12654

Q18: Solve 118×104 by Nikhil Method

Base identified :100

	118	18
X	104	4
	LHS	RHS
	SUM	PRODUCT
	$(118) + (4)$	$(18) \times (11)$
	122	72
Here, on RHS, two digits must be placed as we have two zeroes in the base.		

$$122$$

$$72$$

Answer: 12272

Practice Task # 7.2:

Find out the answers of the following questions based on the SMART TRICK #47.

- 1) 15×12 2) 19×21 3) 12×13 4) 16×17
5) 13×11 6) 122×125 7) 114×103 8) 104×106
9) 115×117 10) 121×125

SMART TRICK # 48:

Multiplication of two numbers near the base:

Q19: 18×9

Step 1: Find the base or sub-base. Over here base is 10.

Step 2: Find the Deviation. $D1=+8$ and $D2=-1$

Step 3: Find the sum (Left side-LHS).
Here, the sum is $(18)+(-1)=17$.

Step 4: Find the Product (Right Side-RHS).
But here product would be negative. $(+8) \times (-1) = (-8)$

Step 5: Write as many zeros as present in the base on the RHS.
Read LHS and RHS together as one number.
Subtract the product from the newly formed number.
Here base is 10 so add one zero on RHS. LHS is 17. When we combine LHS and RHS, we would get 170. Now subtract 8 from a newly formed number 170.
 $(170 - 8 = 162)$. Answer is 162.

	18	+8	<i>Base: 10</i>
	X 9	-1	
	LHS	RHS	
	SUM	PRODUCT	
	(9) + (8)	(8) X (-1)	
Subtract (1) from LHS	17	-8	Product + Base
	17-1	(-8) + (10)	
	16	2	
	Answer: 162		

Q20: 98 X 109

	98	-2	<i>Base: 100</i>
	X 109	+9	
	LHS	RHS	
	SUM	PRODUCT	
	(109) + (-2)	(-2) X (9)	
Subtract (1) from LHS	107	-18	Product + Base
	107-1	(-18) + (100)	
	106	82	
	Answer: 10682		

Practice Task # 7.3:

Find out the answers of the following questions based on the SMART TRICK #48.

1) 96 X 108

2) 998 X 1004

3) 9999 X 10009

4) 7 X 18

5) 97 X 106

SMART TRICK # 49 (A):

Multiplication of two numbers near any base

Q21: 56×59

Step 1: Find the base & sub-base. Be clear about multiplying factor. (Note: base $\times$ multiplying factor = sub-base)

Over here sub-base is 50. Base is 10 and multiplying factor is 5. (base $\times$ multiplying factor = subbase),
($10 \times 5 = 50$)

Step 2: Find the deviation. Here deviations, $d1=+6$ and $d2=+9$.

Step 3: Find the sum (Left side-LHS) ($59 + 6 = 65$)

Step 4: Find the product (Right Side-RHS) ($6 \times 9 = 54$)

Step 5: Multiply LHS with the multiplying factor.

Write the result of this multiplication at LHS.

($65 \times 5 = 325$)

Step 6: Take care of the number of zeroes present in the base.

Write digits accordingly to the right side.

Over here, base contains only one zero and RHS is 54.

So, 4 would be written on RHS and 5 would be carried forward on LHS side. LHS had 325 already.

So, ($325+5= 330$). Now entire answer would be 3304.

Base: 10×5
 Multiplying factor : 5

	X	56 59	+6 +9
		LHS SUM (59) + (6)	RHS PRODUCT (6) X (9)
multiply sum of LHS with the multiplying factor. $65 \times 5 = 325$		65	54
		325	54
		325+5	4
		330	4
		Answer: 3304	
			apply all the above logic for RHS. Carry forward/ addition of zero/ addition of base when negative etc.

Practice Task # 7.4:

Find out the answers of the following questions based on the SMART TRICK #49(A).

- 1) 69×64
- 2) 94×98
- 3) 1008×1013
- 4) 72×74

SMART TRICK # 49 (B):

Multiplication of the two numbers with multiples of base:
(same base) Part2

Q22: 56 X 49

Base: 10 X 5

Multiplying factor: 5

	56	+6
X	49	-1
	LHS	RHS
	SUM	PRODUCT
	(56) + (-1)	(6) X (-1)
	55	-6
	275	-6
	275 - 1	-6 + 10
	274	4

multiply sum
of LHS with
the
multiplication
factor.
 $55 \times 5 = 275$

apply all of
the above
logic for
RHS. Carry
forward/
addition of
zero/
addition of
base when
negative
etc.

Answer: 2744

Q22: 76 X 85

Base: 10 X 8

Multiplying factor: 8

	76	-4
X	85	+5
	LHS	RHS
	SUM	PRODUCT
	$(85) + (-4)$	$(-4) \times (5)$
	81	-20
	648	-20
	648 - 1	-20 + 10
	647	-10
	647 - 1	-10 + 10
	646	0

Answer: 6460

Practice Task # 7.5:

Find out the answers of the following questions based on the SMART TRICK #49(B).

1) 36 X 28

2) 49 X 54

3) 57 X 65

4) 17 X 24

5) 85 X 79

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The following is the list of the smart tricks covered in this chapter:

SMART TRICK No.	SMART TRICK deals with
#46	Multiplication of two numbers less than the base
#47	Multiplication of two numbers more than the base
#48	Multiplication of the two numbers near the base
#49(A)	Multiplication of the two numbers with multiples of the base: (same base) Part1
#49(B)	Multiplication of the two numbers with multiples of the base: (same base) Part2

Mega Practice Task # 7:

(A) Speed Enhancer Practice Task:

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

Ideal time limit: 5 – 10 seconds / question

- | | |
|-----------------------|----------------------------|
| 1) 99×97 | 8) 9989×9987 |
| 2) 99×92 | 9) 99986×99991 |
| 3) 98×89 | 10) 9999.7×9999.6 |
| 4) 97×87 | 11) 9.9×8.8 |
| 5) 89×93 | 12) 12×13 |
| 6) 87×98 | 13) 14×21 |
| 7) 9998×9998 | 14) 15×19 |

- | | |
|-------------------|-------------------|
| 15) 109 X 105 | 40) 87 X 85 |
| 16) 106 X 117 | 41) 98 X 123 |
| 17) 112 X 115 | 42) 34 X 29 |
| 18) 1008 X 1007 | 43) 54 X 46 |
| 19) 1120 X 1002 | 44) 45 X 59 |
| 20) 10005 X 10009 | 45) 87 X 76 |
| 21) 1121 X 1011 | 46) 114 X 109 |
| 22) 12.1 X 10.2 | 47) 11.4 X 10.9 |
| 23) 96 X 92 | 48) 1.14 X 109 |
| 24) 98X 91 | 49) 1.14 X 1.09 |
| 25) 998 X 991 | 50) 99.8 X 9.91 |
| 26) 16 X 8 | 51) 89 X 93 |
| 27) 116 X 98 | 52) 87 X 8.1 |
| 28) 108X 97 | 53) 68 X 69 |
| 29) 96 X 104 | 54) 661 X 662 |
| 30) 105 X 105 | 55) 891 X 893 |
| 31) 112 X 112 | 56) 8.7 X 0.98 |
| 32) 23 X 24 | 57) 99.8 X 99.8 |
| 33) 34 X 35 | 58) 99.9 X 99.7 |
| 34) 78 X 77 | 59) 999.6 X 99.91 |
| 35) 45 X 43 | 60) 997 X 996 |
| 36) 112 X 114 | 61) 9.91 X 98.8 |
| 37) 123 X 125 | 62) 123 X 133 |
| 38) 73 X 76 | 63) 143 X 141 |
| 39) 67 X 62 | 64) 0.15 X 19 |

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- | | |
|----------------------------|------------------------|
| 65) 10.9×10.5 | 83) 34×39 |
| 66) 1.06×11.7 | 84) 78×74 |
| 67) 1.12×1.15 | 85) 45×44 |
| 68) 10.08×10.07 | 86) 116×118 |
| 69) 112×100.2 | 87) 123×127 |
| 70) 100.05×100.09 | 88) 76×76 |
| 71) 11.21×10.11 | 89) 67×68 |
| 72) 12×21 | 90) 87×73 |
| 73) 54×45 | 91) 988×1112 |
| 74) 32×23 | 92) 341×339 |
| 75) 99.8×99.1 | 93) 154×146 |
| 76) 1.6×8 | 94) 145×159 |
| 77) 11.6×9.8 | 95) 187×176 |
| 78) 10.8×97 | 96) 214×209 |
| 79) 96×10.9 | 97) 21.7×20.9 |
| 80) 10.5×9.3 | 98) 2.14×208 |
| 81) 11.2×112 | 99) 3.16×3.09 |
| 82) 2.3×24 | 100) 9.81×992 |

(B) Applications based questions:

1. Hitanshu purchased 15 cup-cakes worth Rs.12/piece. What would be the total cost that he might have incurred?

2. What is the volume of a cylinder having height of $\frac{343}{22}$ cm and base radius of 6 cm?
3. If $X + Y = 197$ and $2X + 3Y = 492$, find the value of $(X \times Y)$.
4. If the cost of 5 pens and 4 sharpeners is Rs.107, then what is the cost of 525 pens and 420 sharpeners?
5. Which fraction is greater: $\frac{57}{58}$ or $\frac{59}{61}$?

Answers:

(A)

- | | |
|-----------------|---------------|
| 1) 9603 | 15) 11445 |
| 2) 9108 | 16) 12402 |
| 3) 8722 | 17) 12880 |
| 4) 8439 | 18) 1015056 |
| 5) 8277 | 19) 1122240 |
| 6) 8526 | 20) 100140045 |
| 7) 99960004 | 21) 1133331 |
| 8) 99760143 | 22) 123.42 |
| 9) 9997700126 | 23) 8832 |
| 10) 99993000.12 | 24) 8918 |
| 11) 87.12 | 25) 989018 |
| 12) 156 | 26) 128 |
| 13) 294 | 27) 11368 |
| 14) 285 | 28) 10476 |

29)	9984	56)	8.526
30)	11025	57)	9960.04
31)	12544	58)	9960.03
32)	552	59)	99870.036
33)	1190	60)	993012
34)	6006	61)	979.108
35)	1935	62)	16359
36)	12768	63)	20163
37)	15375	64)	2.85
38)	5548	65)	114.45
39)	4154	66)	12.402
40)	7395	67)	1.288
41)	12054	68)	101.5056
42)	986	69)	11222.4
43)	2484	70)	10014.0045
44)	2655	71)	113.3331
45)	6612	72)	252
46)	12426	73)	2430
47)	124.26	74)	736
48)	124.26	75)	9890.18
49)	1.2426	76)	12.8
50)	989.018	77)	113.68
51)	8277	78)	1047.6
52)	704.7	79)	1046.4
53)	4692	80)	97.65
54)	437582	81)	1254.4
55)	795663	82)	55.2

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83) 1326
84) 5772
85) 1980
86) 13688
87) 15621
88) 5776
89) 4556
90) 6351
91) 1098656

92) 115599
93) 22484
94) 23055
95) 32912
96) 44726
97) 453.53
98) 445.12
99) 9.7644
100) 9731.52

(B)

1. Rs. 180
2. 1764 cc
3. 9702
4. Rs.11235
5. $\frac{57}{58}$



Magic in Multiplication Part 5

'Ekadhiken Purvena'

A Special Case

Glimpse of this chapter: The entire chapter explains you about fast calculations concentrating on the area of multiplication. Different vedic methods which can be used in multiplication are explained properly. In this chapter, we have divided entire logic of calculation in the form of SMART TRICKS and then we have very meticulously connected the logic taught to the vedic terminology. We have designed the entire chapter in a way that a student can understand all the steps just by reading them once. Go ahead and explore!

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Introduction:

- ❖ *Ekadhiken-purvena* (एकाधिकेनपूर्वेण) is a Vedic Sutra.
- ❖ 'Ek' means one.
- ❖ 'Adhiken' means more
- ❖ 'Purvena' means the previous one.
- ❖ *Ek-adhiken-prurven* (*Ekadhkenapurvena*) means 'One more than the previous one'
- ❖ Following are the two important processes under the sutra 'Ekadhikenapurvena':
 1. *Antya-yor Dasake'pi* (अन्त्ययोर्दशकेऽपि)
 2. *Viparit Antyayor Dasake'pi* (विपरीत अन्त्ययोर्दशकेऽपि)

SMART TRICK # 50 (A):

Antya-yor Dasake'pi (अन्त्ययोर्दशकेऽपि)

- ❖ '*Antya-yor Dasake'pi*' means multiplication of the numbers of which the last digits when added up give 10 or powers of 10 as the answer.'
- ❖ Peculiarities:
 1. Numbers must have left side digits same.
 2. Numbers must have the sum of the digits at the right-side be equal to 10, 100, 1000, 10000 and so on.

Q1: 12 X 18

- ❖ Left side digits are same in both the number and i.e. 1.
- ❖ Sum of the right-side digits is 10 i.e. (2+8=10).
- ❖ So, we can conclude that it is the case of *Antya-yor Dasake'pi* (अन्त्ययोर्दशकेऽपि).

❖ Following are the steps to follow:

Step 1: LHS in Question for both the numbers is 1.

That represents the previous part of the number. Always remember, previous part of the number would be always same under the case of *Antya-yor Dasake'pi* (अन्त्ययोर्दशकेऽपि). According to *Ekadhikenapurvena*, we need to increase one in the previous part of the number as discussed earlier. So here we need to add one more in the previous part which is same in both the numbers to be multiplied.

$1 + 1 = 2$ (this becomes one more than the previous one)

Step 2: Multiply the previous part with one more than the LHS.

(The previous one) X (one more than the previous one)

$(1) \times (2) = 2$

This "2" would be kept aside. This would make LHS part of the answer.

Step3: RHS part of first number is 2 and second number is 8.

$2 \times 8 = 16$. This "16" would make RHS part of the answer.

So, the answer would be: "216".

	1	2
	1	8
LHS		RHS
1X2		2X8
2		16
Answer: 216		

Q2: 89 X 81

- ❖ Left side digits are same in both the number and i.e. 8.
- ❖ Sum of the right-side digits is 10 i.e. (9+1=10).
- ❖ So, this is a case of *Antya-yor Dasake'pi* (अन्त्ययोर्दशकेऽपि).

Step 1: LHS in Question for both the numbers is 8.

That represents the previous part of the number. Always remember, previous part of the number would be always same under the case of *Antya-yor Dasake'pi* (अन्त्ययोर्दशकेऽपि). According to *Ekadhikena purvena*, we need to increase one in the previous part of the number as discussed earlier. So here we need to add one more in the previous part which is same in both the numbers to be multiplied. So, $8 + 1 = 9$ (this becomes one more than the previous one)

Step 2: Multiply the previous part with one more than the previous one.

(The previous one) X (one more than the previous one)

$$(8) \times (9) = 72$$

This "72" would be kept aside. This would make LHS part of the answer.

Step3: RHS part of first number is 9 and second number is 1.

$$9 \times 1 = 9$$

But we need to write it in two digits hence we add a zero to the left of the resultant number. So, it would be,

$$9 \times 1 = 09$$

This "09" would make RHS part of the answer.

So, the answer would be: "7209"

$$\begin{array}{r}
 8 \ 9 \\
 \hline
 \begin{array}{r|l}
 \text{X} & 8 \ 1 \\
 \hline
 \text{LHS} & \text{RHS} \\
 8 \times 9 & 9 \times 1 \\
 72 & 9 \\
 \hline
 \text{Answer: } 7209
 \end{array}
 \end{array}$$

Q3: 13 X 17

$$\begin{array}{r}
 1 \ 3 \\
 \hline
 \begin{array}{r|l}
 \text{X} & 1 \ 7 \\
 \hline
 \text{LHS} & \text{RHS} \\
 1 \times 2 & 3 \times 7 \\
 2 & 21 \\
 \hline
 \text{Answer: } 221
 \end{array}
 \end{array}$$

Q4: 194 X 196

$$\begin{array}{r}
 19 \ 4 \\
 \hline
 \begin{array}{r|l}
 \text{X} & 19 \ 6 \\
 \hline
 \text{LHS} & \text{RHS} \\
 19 \times 20 & 4 \times 6 \\
 380 & 24 \\
 \hline
 \text{Answer: } 38024
 \end{array}
 \end{array}$$

Q5: 192 X 108

- ❖ Hundredth digits are same in both the number and i.e. 1.
- ❖ Sum of the last two digits of RHS is 100 i.e. (92+08=100).
- ❖ So, this is the case of *Antya-yor Dasake'pi* (अन्त्ययोर्दशकेऽपि)

Step 1: LHS in question for both the numbers is 1. That represents the previous part of the number. Always remember, previous part of the number would be always same under the case of *Antya-yor Dasake'pi* (अन्त्ययोर्दशकेऽपि). According to *Ekadhikenapurvena*, we need to increase one in the previous part of the number as discussed earlier. So here we need to add one more in the previous part which is same in both the numbers to be multiplied. So,

$1 + 1 = 2$ (this becomes one more than the previous one)

Step 2: Multiply the previous part with one more than the previous one.

(The previous one) X (one more than the previous one)

$(1) \times (2) = 2$

This "2" would be kept aside. This would make LHS part of answer.

Step3: RHS part of first number is 92 and second number is 08.

$92 \times 08 = 736$

But we need to write it in four digits. Hence, we need to add a zero in the front. So, it would be,

$92 \times 08 = 0736$

This "0736" would make RHS part of my answer.
So, the answer would be: "20736"

$$\begin{array}{r}
 1 \ 92 \\
 \times \quad 1 \ 08 \\
 \hline
 \begin{array}{r|l}
 \text{LHS} & \text{RHS} \\
 1 \times 2 & 92 \times 08 \\
 2 & 736 \\
 \hline
 \end{array}
 \end{array}$$

Answer: 20736

Q5: 1399 X 1301

$$\begin{array}{r}
 13 \ 99 \\
 \times \quad 13 \ 01 \\
 \hline
 \begin{array}{r|l}
 \text{LHS} & \text{RHS} \\
 13 \times 14 & 99 \times 01 \\
 182 & 99 \\
 182 & 0099 \\
 \hline
 \end{array}
 \end{array}$$

Answer: 1820099

Practice Task # 8.1:

Find out the answers of the following questions based on the SMART TRICK #50(A).

- | | |
|----------------|--------------|
| 1) 69 X 61 | 2) 947 X 943 |
| 3) 74 X 73 | 4) 2.7 X 2.3 |
| 5) 1859 X 1851 | |

SMART TRICK # 50(B):

Viparit Antyayor Dasake'pi (विपरीत अन्त्ययोर्दशकेऽपि)

- ❖ *Viparit Antyayor Dasake'pi* (विपरीत अन्त्ययोर्दशकेऽपि) means multiplication of the numbers, of which the first digits when added up give 10 or the powers of 10.
- ❖ Peculiarities:
 1. Numbers must have the sum of the left-hand side digits must be equal to 10, 100, 1000, 10000.
 2. Numbers must have the same digits on the right side.

Q6: 21 X 81

- ❖ Sum of the left-hand side digits is 100 i.e. (2+8=10).
- ❖ Right side digits are same in both the number i.e. 1.
- ❖ So, this is the case of ***Viparit Antyayor Dasake'pi*** (विपरीत अन्त्ययोर्दशकेऽपि)

Step1: LHS part of first number is 2 and second number is 8.

$$2 \times 8 = 16$$

Step 2: According to *Ekadhi kenapurvena*, we need to increase one in the previous part of the number as discussed earlier. So here we need to add 'one' more in the LHS part thus got i.e. we need to add 1 in 16. 1 is RHS part, which is common in both. Sum of LHS part of the given numbers is 10 so we need to multiply RHS part with 1 and need to add in LHS part of the given numbers in the above question.

$$16 + (1 \times 1) = 17$$

Ultimately, $(2 \times 8) + (1 \times 1)$

This "17" would be kept aside. It would make the LHS part of the answer.

Step 3: RHS in Question for both the numbers is 1.

$$1 \times 1 = 1$$

We need to write it in two digits so as we get,

$$1 \times 1 = 01$$

This "01" would make RHS part of the answer.

So, the complete answer would be: "1701"

	2	1
X	8	1
LHS		RHS
$(2 \times 8) + (1 \times 1)$		1×1
$16 + 1$		01
17		01

Answer: 1701

Q7: 98×18

- ❖ Sum of the Left side digits is 10 ie $(9+1=10)$.
- ❖ Right side digits are same in both the number and i.e. 8.
- ❖ So, This is the case of **Viparit Antyayor Dasake'pi** (विपरीत अन्त्ययोर्दशकेऽपि)

Step1: LHS part of first number is 9 and second number is 1.

$$9 \times 1 = 09$$

Step 2: According to *Ekadhikenapurvena*, we need to increase one in the previous part of the number as discussed

earlier. So here we need to add one more in the LHS part thus got i.e. we need to add 8 in 09. 8 is RHS part, which is common in both. Sum of LHS part got is 09 so we need to multiply RHS part with 8 and need to add in LHS part of the given numbers in the above question.

$$09 + (8 \times 1) = 17$$

Ultimately,

$$(9 \times 1) + (8 \times 1)$$

This **"17"** would be kept aside. It would make LHS part of answer.

Step 3: RHS in Question for both the numbers is 8.

$$8 \times 8 = 64$$

We need to write it in two digits and it is already of two digits,

$$8 \times 8 = 64$$

This **"64"** This would make RHS part of the answer.

So, the complete answer would be: **"1764"**.

	9	8
X	1	8
LHS		RHS
$(9 \times 1) + (8 \times 1)$		8×8
$9 + 8$		64
17		64
Answer: 1764		

Q8: 419 X 619

- ❖ Sum of the Left side digits is 10 i.e. (4+6=10).
- ❖ Right side digits are same in both the number and i.e. 19.
- ❖ So, this is the case of *Viparit Antyayor Dasake'pi* (विपरीत अन्त्ययोर्दशकेऽपि)

Step1: LHS part of first number is 4 and second number is 6.

$$4 \times 6 = 24$$

Step 2: According to *Ekadhikena-purvena*, we need to increase one in the previous part of the number as discussed earlier. So here we need to add one more in the LHS part thus got i.e. we need to add 19 in 24 ideally. But here sum of LHS is 10. So, we can add up to only first unit of RHS into the right digit of LHS. $24 + 19$ must be written as,
 $=2(4+1)9 = 259$

19 is RHS part, which is common in both.

Ultimately,

$$= (4 \times 6) + (19 \times 1) = (24) + (19) = 2(4+1)9 = 259$$

This "**259**" would be kept aside. It would make LHS part of answer.

Step 3: RHS in Question for both the numbers is 19.

$$19 \times 19 = 361$$

This "**361**" This would make RHS part of the answer.

So, the complete answer would be: "**259361**"

	4	1	9
X	6	1	9
LHS			RHS
$(4 \times 6) + (19 \times 1)$			19×19
$24 + 19$			361
$2(4+1)9$			361
259			361

Answer: 259361

Q9: 921X 81

- ❖ Sum of the Left side digits is 100 ie $(92+8=100)$.
- ❖ Right side digits are same in both the number and ie 1.
- ❖ So, this is the case of *Viparit Antyayor Dasake'pi* (विपरीत अन्त्ययोर्दशकेऽपि)

Step1: LHS part of first number is 92 and second number is 8.
 $92 \times 8 = 736$

Step 2: According to *Ekadhikena-purvena*, we need to increase one in the previous part of the number as discussed earlier.

So here we need to add one more in the LHS part thus got i.e. we need to add 1 in 736. 1 is RHS part, which is common in both.

Sum of LHS part got is 09 so we need to multiply RHS part with 8 and need to add in LHS part of the given numbers in the above question.

$$(92 \times 8) + (1 \times 10) = 746$$

Remember over here, while addition, we have multiplied 10 with the RHS part and then we have added the same in LHS part of that stage as the sum of LHS part is 100.

Remember, if sum of LHS part is 10, we need to multiply RHS part with 1 while adding it into the LHS part of that stage. if sum of LHS part is 100, we need to multiply RHS part with 10 while adding it into the LHS part of that stage and so on.

$$\begin{aligned} &\text{Ultimately,} \\ &= (92 \times 8) + (1 \times 10) \\ &= (736) + (10) \\ &= 746 \end{aligned}$$

This **"746"** would be kept aside. It would make LHS part of answer.

Step 3: RHS in Question for both the numbers is 1

$$1 \times 1 = 1$$

We need to write it in two digits hence we write,

$$1 \times 1 = 01$$

This **"01"** This would make RHS part of the answer.

So, the complete answer would be: **"74601"**

	92	1	
X	8	1	
LHS		RHS	
(92X8) +		1X1	
(1X10)			
736 + 10		01	
746		01	

Answer: 74601

Practice Task # 8.2:

Find out the answers of the following questions based on the SMART TRICK #50(B).

- 1) 937 X 73
- 2) 9948 X 68
- 3) 74 X 34
- 4) 749 X 269
- 5) 83 X 23

❖ The following are the list of the SMART TRICKS covered in this chapter.

SMART TRICK No.	SMART TRICK deals with
#50(A)	Antyayor Dasake'pi (अन्त्ययोर्दशकेऽपि)
#50(B)	Viparit Antyayor Dasake'pi (विपरीत अन्त्ययोर्दशकेऽपि)

Mega Practice Task # 8:

(A) Speed Enhancer Practice Task:

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

Ideal time limit: 5 – 10 seconds / question

- | | |
|------------------------|--------------------------|
| 1) 17×13 | 21) 62×6.8 |
| 2) 24×26 | 22) 89×81 |
| 3) 46×44 | 23) 1401×1499 |
| 4) 54×56 | 24) 14.01×14.09 |
| 5) 903×907 | 25) 153×157 |
| 6) 123×127 | 26) 147×143 |
| 7) 1098×1092 | 27) 204×206 |
| 8) 238×232 | 28) 406×404 |
| 9) 77×73 | 29) 514×516 |
| 10) 567×563 | 30) 93×97 |
| 11) 9901×9909 | 31) 12×18 |
| 12) 9901×9999 | 32) 198×192 |
| 13) 36×34 | 33) 612×688 |
| 14) 256×244 | 34) 71×79 |
| 15) 256×254 | 35) 502×598 |
| 16) 2.3×27 | 36) 992×998 |
| 17) 2.3×2.7 | 37) 95×95 |
| 18) 25.6×25.4 | 38) 86×84 |
| 19) 198×192 | 39) 26×2.4 |
| 20) 19.8×1.92 | 40) 25×25 |

- 41) 49.3×49.7
- 42) 493×497
- 43) 306×304
- 44) 498×492
- 45) 988×982
- 46) 982×988
- 47) 79×7.1
- 48) 401×199
- 49) 14.1×14.9
- 50) 34.3×34.7
- 51) 714×314
- 52) 421×621
- 53) 643×443
- 54) 451×651
- 55) 39×79
- 56) 21×81
- 57) 819×219
- 58) 126×886
- 59) 17×97
- 60) 25×985
- 61) 299×899
- 62) 59×59
- 63) 68×48
- 64) 62×4.2
- 65) 52×52

- 66) 3.49×7.49
- 67) 348×748
- 68) 729×289
- 69) 849×249
- 70) 898×128
- 71) 987×27
- 72) 791×211
- 73) 891×111
- 74) 141×149
- 75) 343×347
- 76) 71×31
- 77) 42×62
- 78) 64×44
- 79) 45×65
- 80) 390×790
- 81) 312×712
- 82) 9810×9210
- 83) 823×223
- 84) 77×37
- 85) 756×356
- 86) 1990×9990
- 87) 199×9999
- 88) 63×43
- 89) 562×442
- 90) 562×542

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91) 3.2×72

92) 3.2×7.2

93) 6.25×4.25

94) 819×219

95) 8.19×21.9

96) 26×8.6

97) 98×1.8

98) 114×9914

99) 1.14×9.14

100) 315×715

(B) Applications based questions:

1. Rahul has purchased a sofa set. The MRP of it was Rs.23000. He has purchased it at the discount of 27%. How much amount did he save?
2. Mr. Generous donated Rs.127 to each of the 123 poor people living in a slum. What was the total money donated by Mr. Generous to them?
3. In a building construction, 108 bricks are required to construct a wall. It is known that a total 192 such walls need to be constructed. What is the total number of bricks that will be required?
4. Anju purchased a refrigerator having MRP of Rs.32000 at a discount of 72%. How much amount did she spend?
5. Mr. Greedy saved Rs.712 on each of the 312 items that he had purchased. What was the total amount of money saved by him?

Answers:

(A)

- | | | |
|--------------|--------------|-------------|
| 1) 221 | 24) 197.4009 | 47) 539.6 |
| 2) 624 | 25) 24021 | 48) 79799 |
| 3) 2024 | 26) 21021 | 49) 210.09 |
| 4) 3024 | 27) 42024 | 50) 1190.21 |
| 5) 819021 | 28) 164024 | 51) 224196 |
| 6) 15621 | 29) 265224 | 52) 261441 |
| 7) 1199016 | 30) 9021 | 53) 284849 |
| 8) 55216 | 31) 216 | 54) 293601 |
| 9) 5621 | 32) 38016 | 55) 3081 |
| 10) 319221 | 33) 421056 | 56) 1701 |
| 11) 98109009 | 34) 5609 | 57) 179361 |
| 12) 99000099 | 35) 300196 | 58) 111636 |
| 13) 1224 | 36) 990016 | 59) 1649 |
| 14) 62464 | 37) 9025 | 60) 24625 |
| 15) 65024 | 38) 7224 | 61) 268801 |
| 16) 62.1 | 39) 62.4 | 62) 3481 |
| 17) 6.21 | 40) 625 | 63) 3264 |
| 18) 650.24 | 41) 2450.21 | 64) 260.4 |
| 19) 38016 | 42) 245021 | 65) 2704 |
| 20) 38.016 | 43) 93024 | 66) 26.1401 |
| 21) 421.6 | 44) 245016 | 67) 260304 |
| 22) 7209 | 45) 970216 | 68) 210681 |
| 23) 2100099 | 46) 970216 | 69) 211401 |

70) 114944	81) 222144	92) 23.04
71) 26649	82) 90350100	93) 26.5625
72) 166901	83) 183529	94) 179361
73) 98901	84) 2849	95) 179.361
74) 21009	85) 269136	96) 223.6
75) 119021	86) 19880100	97) 176.4
76) 2201	87) 1989801	98) 1130196
77) 2604	88) 2709	99) 10.4196
78) 2816	89) 248404	100) 225225
79) 2925	90) 304604	
80) 308100	91) 230.4	

(B)

1. Rs. 6210
2. Rs.15621
3. 20736
4. Rs. 8960
5. Rs.2,22,144



SMART Squares

Calculate Right In Your Mind

Glimpse of this chapter :

In this chapter, we have discussed SMART TRICKS that help to calculate the square of any number without usage of pen and paper.

Introduction:

Squares of a number

“Square” means multiplying a number with itself.

$$A \times A = A^2$$

We can go for squares of any number within the fraction of a moment by knowing the technique which is given in this chapter.

Once we know the squares of 1 to 30, we can remember the squares of 1 to 110 and answer them within a few seconds only.

We can divide the numbers in the following segments:

Segment 1	1 to 30
Segment 2	40 to 60
Segment 3	30 to 40
Segment 4	60 to 70
Segment 5	90 to 110
Segment 6	80 to 90
Segment 7	110 to 120
Segment 8	70 to 80

SMART TRICK # 51:

Segment: 1 to 30 (to be memorized as explained earlier.)

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	

Practice Task # 9.1:

Write down squares of 1 to 30 five times.

SMART TRICK # 52:

Segment: 40 to 60

You need to work on base method.

Here, we would take '50' as base.

We would do the mind calculations with three simple steps.
The steps are given in the following page.

Step 1: Find the difference from base i.e. [(Number) – (Base)]

Step 2: (25) + (difference). This makes the first two digits of the answer.

Step 3: Square of the difference. This makes last two digits of the answer.

Let's understand this more by taking a few examples:

Q1: (49)²

Step 1: Find the difference from base

$$49 - 50 = (-1)$$

Step 2: (25) + (difference)

$$25 + (-1) = 24$$

Step 3: Square of the difference to be written in two digits

$$(-1)^2 = 01$$

Thus, the answer comes to 2401.

Q2: (51)²

Step 1: Find the difference from base

$$51 - 50 = (1)$$

Step 2: (25) + (difference)

$$25 + (1) = 26$$

Step 3: Square of the difference to be written in two digits

$$(1)^2 = 01$$

Thus, the answer comes to 2601.

Q3: $(43)^2$

Step 1: Find the difference from base

$$43 - 50 = (-7)$$

Step 2: $(25) + (\text{difference})$

$$25 + (-7) = 18$$

Step 3: Square of the difference to be written in two digits

$$(-7)^2 = 49$$

Thus, the answer comes to 1849.

Q4: $(57)^2$

Step 1: Find the difference from base

$$57 - 50 = (7)$$

Step 2: $(25) + (\text{difference})$

$$25 + (7) = 32$$

Step 3: Square of the difference to be written in two digits

$$(7)^2 = 49$$

Thus, the answer comes to 3249.

Practice Task # 9.2:

Write down squares of all the numbers between 40 to 60.

SMART TRICK # 53:**Segment: 30 to 40**

You need to just extend the idea of the above SMART TRICK.

Here, we would again take '50' as base. We would do the mind calculations with three simple steps:

Step 1: Find the difference from base i.e. $[(\text{Number}) - (\text{Base})]$

Step 2: $(25) + (\text{difference})$. This makes first two digits of the answer.

Step 3: Square of a difference. This makes last two digits of the answer. If the square is of three digits, we need to keep last two digits of it which represent last two digits of the answer. The hundreds place would be carried forward. Let's understand this more by taking a few examples:

Q5: $(39)^2$

Step 1: Find the difference from base

$$39 - 50 = (-11)$$

Step 2: $(25) + (\text{difference})$

$$25 + (-11) = 14$$

Step 3: Square of the difference to be written in two digits

$$(-11)^2 = 121$$

So, it comes to 14121

Step 4: 121 is of three digits and we need only two digits so first digit would be carried forward.

$$1(4+1)21$$

$$1521$$

Thus, the answer comes to 1521.

Practice Task # 9.3:

Write down squares of all the numbers between 30 and 40.

SMART TRICK # 54:

Segment: 60 to 70

You need to just extend the idea of the above SMART TRICK.
Here, base is 50.

We would do the mind calculations with three simple steps:

Step 1: Find the difference from base i.e. [(Number) – (Base)]

Step 2: (25) + (difference). This makes first two digits of the answer.

Step 3: Square of a difference. This makes last two digits of the answer. If the square is of three digits, we need to keep last two digits of it which represent last two digits of the answer. The hundreds place would be carried forward.

Let's understand this more by taking a few examples:

Q6: $(61)^2$

Step 1: Find the difference from base

$$61 - 50 = (11)$$

Step 2: (25) + (difference)

$$25 + (11) = 36$$

Step 3: Square of the difference to be written in two digits

$$(11)^2 = 121$$

So, it comes to 36121

Step 4: 121 is of three digits and we need only two digits so first digit would be carried forward.

$$3(6+1)21$$

3721. Thus, the answer comes to 3721.

Q7: $(67)^2$

Step 1: Find the difference from base

$$67 - 50 = (17)$$

Step 2: $(25) + (\text{difference})$

$$25 + (17) = 42$$

Step 3: Square of the difference to be written in two digits

$$(17)^2 = 289$$

So, it comes to 42289

Step 4: 289 is of three digits and we need only two digits so first digit would be carried forward.

$$4(2+2)89$$

$$4489$$

Thus, the answer comes to 4489.

Practice Task # 9.4:

Write down squares of all the numbers between 60 and 70.

SMART TRICK # 55:

Segment: 90 to 110

You need to just extend the idea of the above SMART TRICK.

Here, we would take '100' as base. We would do the mind calculations with three simple steps:

Step 1: Find the difference from base i.e. $[(\text{Number}) - (\text{Base})]$

Step 2: $(\text{Number itself}) + (\text{difference})$.

This makes the first two digits of the answer.

Step 3: Square of a difference. This makes the last two digits of the answer. If the square is of three digits, we need to keep last two digits of it which represent last two digits of the answer. The hundreds place would be carried forward.

Let's understand this more by taking a few examples:

Q8: $(99)^2$

Step 1: Find the difference from base

$$99 - 100 = (-1)$$

Step 2: $(99) + (\text{difference})$

$$99 + (-1) = 98$$

Step 3: Square of the difference to be written in two digits

$$(-1)^2 = 01$$

So, it comes to 9801.

Thus, the answer comes to 9801.

Q9: $(108)^2$

Step 1: Find the difference from base

$$108 - 100 = (8)$$

Step 2: $(108) + (\text{difference})$

$$108 + (8) = 116$$

Step 3: Square of the difference to be written in two digits

$$(8)^2 = 64$$

So, it comes to 11664

Thus, the answer comes to 11664.

Practice Task # 9.5:

Write down squares of all the numbers between 90 and 110.

SMART TRICK # 56:

Segment: 80 to 90

You need to just extend the idea of the above SMART TRICK.

Here, base is 100

We would do the mind calculations with three simple steps:

Step 1: Find the difference from base i.e. [(Number) – (Base)]

Step 2: (Number itself) + (difference).

This makes first digits of the answer.

Step 3: Square of a difference. This makes last two digits of the answer. If the square is of three digits, we need to keep last two digits of it which represent last two digits of the answer. The digits at its hundredth place would be carried forward.

Let's understand this more by taking a few examples:

Q10: $(89)^2$

Step 1: Find the difference from base

$$89 - 100 = (-11)$$

Step 2: $(89) + (\text{difference})$

$$89 + (-11) = 78$$

Step 3: Square of the difference to be written in two digits

$$(-11)^2 = 121$$

So, it comes to 78121

Step 4: 121 is of three digits and we need only two digits so first digit would be carried forward.

$$7(8+1)21$$

$$7921$$

Thus, the answer comes to 7921.

Q11: $(83)^2$

Step 1: Find the difference from base

$$83 - 100 = (-17)$$

Step 2: $(83) + (\text{difference})$

$$83 + (-17) = 66$$

Step 3: Square of the difference to be written in two digits

$$(-17)^2 = 289$$

So, it comes to 66289

Step 4: 289 is of three digits and we need only two digits so first digit would be carried forward.

$$6(6+2)89$$

$$6889$$

Thus, the answer comes to 6889.

Practice Task # 9.6:

Write down squares of all the numbers between 80 and 90

SMART TRICK # 57:**Segment: 70 to 80**

You need to just extend the idea of the above SMART TRICK.

Here, base can be taken as 100 or 50.

We would do the mind calculations with three simple steps suggested previously.

Let's understand this more by taking a few examples:

Q12: $(79)^2$

Step 1: Find the difference from base

$$79 - 100 = (-21)$$

Step 2: $(79) + (\text{difference})$

$$79 + (-21) = 58$$

Step 3: Square of the difference to be written in two digits

$$(-21)^2 = 441$$

So, it comes to 58441

Step 4: 441 is of three digits and we need only two digits so first digit would be carried forward.

$$5(8+4)41$$

$$5(12)41$$

$$6241$$

Thus, the answer comes to 6241.

Q13: $(71)^2$

Step 1: Find the difference from base

$$71 - 50 = (21)$$

Step 2: $(25) + (\text{difference})$

$$25 + (21) = 46$$

Step 3: Square of the difference to be written in two digits

$$(21)^2 = 441$$

So, it comes to 46441

Step 4: 441 is of three digits and we need only two digits so first digit would be carried forward.

$$4(6+4)41$$

$$4(10)41$$

$$5041$$

Thus, the answer comes to 5041.

Practice Task # 9.7:

Write down squares of all the numbers between 70 and 80.

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Transforming Kids To Calculators!
Level-2 For Standard - 7th / 8th

Mega Practice Task # 9:

(A) Speed Enhancer Practice Task:

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

Ideal time limit: 3 – 5seconds / question

Q1: Write down squares of all numbers from 1 to 110.

Q2: Try out calculating the square of the following in your mind.

- | | |
|--------------|----------------|
| 1) $(42)^2$ | 17) $(36)^2$ |
| 2) $(38)^2$ | 18) $(74)^2$ |
| 3) $(56)^2$ | 19) $(48)^2$ |
| 4) $(87)^2$ | 20) $(76)^2$ |
| 5) $(46)^2$ | 21) $(93)^2$ |
| 6) $(67)^2$ | 22) $(57)^2$ |
| 7) $(54)^2$ | 23) $(81)^2$ |
| 8) $(97)^2$ | 24) $(78)^2$ |
| 9) $(83)^2$ | 25) $(69)^2$ |
| 10) $(44)^2$ | 26) $(92)^2$ |
| 11) $(37)^2$ | 27) $(125)^2$ |
| 12) $(59)^2$ | 28) $(12.5)^2$ |
| 13) $(71)^2$ | 29) $(1.25)^2$ |
| 14) $(44)^2$ | 30) $(111)^2$ |
| 15) $(68)^2$ | 31) $(1111)^2$ |
| 16) $(84)^2$ | 32) $(999)^2$ |

$$33) (9999)^2$$

$$34) (495)^2$$

$$35) (120)^2$$

$$36) (121)^2$$

$$37) (142)^2$$

$$38) (190)^2$$

$$39) (980)^2$$

$$40) (465)^2$$

(B) Applications based questions:

1. Malhar lent Rs.23000 to his friend Preet at 23% of simple interest (SI). How much amount he would earn at the end of one year as interest?
2. Savitri is a very religious lady. She puts Rs.121 every day in a donation-box at Kameshwar temple. She did it for 121 days regularly without missing even a single day. What is the total amount of money that she has put in the donation box?
3. 97 bricks are required in a construction of a wall. It is known that total 97 such walls need to be constructed. What is the total number of bricks that is required?
4. Yugal wanted to lawn his garden. Cost estimate of which was Rs.45000. But, as the gardener was in his relation, he offered him the entire work at the discount of 55%. How much amount Yugal would have to pay?
5. What will be the area of a square, the diagonal of which measures $67\sqrt{2}$ cm?

(A) Q1:

X	$(X)^2$
1	1
2	4
3	9
4	16
5	25
6	36
7	49
8	64
9	81
10	100
11	121
12	144
13	169
14	196
15	225
16	256
17	289
18	324
19	361
20	400

21	441
22	484
23	529
24	576
25	625
26	676
27	729
28	784
29	841
30	900
31	961
32	1024
33	1089
34	1156
35	1225
36	1296
37	1369
38	1444
39	1521
40	1600
41	1681

42	1764
43	1849
44	1936
45	2025
46	2116
47	2209
48	2304
49	2401
50	2500
51	2601
52	2704
53	2809
54	2916
55	3025
56	3136
57	3249
58	3364
59	3481
60	3600
61	3721
62	3844
63	3969
64	4096
65	4225

66	4356
67	4489
68	4624
69	4761
70	4900
71	5041
72	5184
73	5329
74	5476
75	5625
76	5776
77	5929
78	6084
79	6241
80	6400

81	6561
82	6724
83	6889
84	7056
85	7225
86	7396
87	7569
88	7744
89	7921
90	8100
91	8281
92	8464
93	8649
94	8836
95	9025

96	9216
97	9409
98	9604
99	9801
100	10000
101	10201
102	10404
103	10609
104	10816
105	11025
106	11236
107	11449
108	11664
109	11881
110	12100

(A) Q2:

- 1) 1764
- 2) 1444
- 3) 3136
- 4) 7569
- 5) 2116
- 6) 4489
- 7) 2916
- 8) 9409

- 9) 6889
- 10) 1936
- 11) 1369
- 12) 3481
- 13) 5041
- 14) 1936
- 15) 4624
- 16) 7056

- 17) 1296
- 18) 5476
- 19) 2304
- 20) 5776
- 21) 8649
- 22) 3249
- 23) 6561
- 24) 6084

25) 4761	31) 1234321	37) 20164
26) 8464	32) 998001	38) 36100
27) 15625	33) 99980001	39) 960400
28) 156.25	34) 245025	40) 216225
29) 1.5625	35) 14400	
30) 12321	36) 14641	

(B)

1. Rs. 5290
2. Rs. 14641
3. 9409
4. Rs. 20250
5. 4489 sq.cm

10

Calculate Right In Your Mind

Division Through 'Nikhilam'

Glimpse of this chapter :

In this chapter we have discussed SMART TRICKS that help in dividing any number without the usage of pen and paper. There are three sutras for division "Nikhilum Navatascharam Dashtaha", "Paravartya Yojayet" and "Urdhva Triyagbhyam". In this chapter we have considered the very first one. Go ahead and explore !

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Transforming Kids To Calculators!
Level-2 For Standard - 7th/ 8th

Introduction:

- ❖ Sutras used for quick division:
 1. 'Nikhilam Navatascharam Dashtaha'
 2. 'Paravartya Yojayet'
 3. 'Urdhva Triyagbhyam'

Division using 'Nikhilam' Sutra:

- ❖ The entire process of division involving divisor and dividend can be understood in five simple steps given below.
- ❖ The number that is to be divided is called 'Dividend'
- ❖ The number that divides is called 'Divisor'
- ❖ E.g.: $18 \div 2$ that means 18 is dividend and 2 is divisor.

SMART TRICK # 58:

Division with the one-digit number.

Q1: $231 \div 9$

Step 1:

- ❖ First separate extreme right digit or digits of a dividend.
- ❖ The separated digits of the dividend would be equal to the number of digits in the divisor. This represents RHS.
- ❖ Make three columns for divisor, quotient and remainder.
- ❖ Be clear about 'Nikhilam'(N) of the divisor and put it as shown in below table.
- ❖ RHS – remainder LHS – Quotient

	LHS		RHS
Divisor	Quotient		Remainder
9	2	3	1
N=1			

Step 2

- ❖ Focus on the row having title 'sum'.
- ❖ Put the 1st digit of the quotient column in the row of the sum exactly below it. Here it is '2'.
- ❖ Multiply '2' with the Nikhil and put it below 2nd digit of the quotient column i.e. 3.
- ❖ Make sum of '3' and '2'. $3+2=5$. Put '5' in row of the 'sum' exactly below '3'.
- ❖ Multiply '5' with the next digit in next first column and repeat the process till you reach the last column.
- ❖ Once you reach the last column, stop the process.

	LHS		RHS
Divisor	Quotient		Remainder
9	2	3	1
N=1		$(2 \times 1) = 2$	$(5 \times 1) = 5$
Sum	2	$3 + 2 = 5$	$1 + 5 = 6$

Step 3

- ❖ Get the final answer by putting the final sum.
- ❖ If the remainder is more than divisor, you need to divide the remainder by divisor and add quotient of it in the quotient column and the remainder got is the actual remainder.
- ❖ If a column is containing more than one digit, carry forward concept comes into the picture.
- ❖ We have taken another example to understand it.

LHS			RHS
Divisor	Quotient		Remainder
9	2	3	1
N=1		$(2 \times 1) = 2$	$(5 \times 1) = 5$
Sum	2	$3 + 2 = 5$	$1 + 5 = 6$
	2	5	6
	25		6

- ❖ When 231 is divided by 9,
Quotient = 25 and
remainder = 6.

Q2: $4897 \div 9$

Step1/2/3:

LHS				RHS
Divisor	Quotient			Remainder
9	4	8	9	7
N=1		4	12	21
Sum	4	12	21	28
	4+1	2+2	1	28
	5	4	1	28
	541 + 3			1
	544			1

divide 28
by 9 as it is
greater
than the
divisor.
Q=3 R= 1

Q3: $123456 \div 7$

LHS						RHS
Divisor	Quotient					Remainder
7	1	2	3	4	5	6
N=3		3	15	54	174	537
Sum	1	5	18	58	179	543
	1	6	13	25	9	543
	1	7	5	5	9	543
	17559 + 77					4
	17636					4

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Q4: $27241 \div 8$

LHS					RHS
Divisor	Quotient				Remainder
8	2	7	2	4	1
N=2		4	22	48	104
Sum	2	11	24	52	105
	3	3	9	2	105
	3392				$13 \times 8 + 1$
	$3392 + 13$				1
	3405				1

SMART TRICK # 59:

Division with the two-digit number:

- ❖ There is only one difference here i.e. using two columns for putting values after multiplying sum with the Nikhilam of the divisor as the divisor contains two digits.
- ❖ When we reach the last column, stop the entire process.
- ❖ Follow all the steps of the SMART TRICK # 55 with the few changes mentioned above.

Q5: $27241 \div 98$

LHS				RHS	
Divisor	Quotient			Remainder	
98	2	7	2	4	1
N=02		0	4		
			1	4	
				1	4
sum	2	7	7	9	5
	277			95	

Q6: $27241 \div 78$

LHS				RHS	
Divisor	Quotient			Remainder	
78	2	7	2	4	1
N=22		4	4		
			24	2	
				66	0
sum	2	11	30	72	1
	340			721	
	340 + 9			19	
	349			19	

SMART TRICK # 60:

Division with the three-digit number:

Q7: $27241 \div 889$

	LHS		RHS		
Divisor	Quotient		Remainder		
889	2	7	2	4	1
N=111		2	2	2	
			9	9	9
Sum	2	9	13	15	10
	29		1460		
	30		571		

Mega Practice Task # 10:**(A) Speed Enhancer Practice Task:**

Find out 'Quotient' and 'Remainder' for the given 'Dividend' and 'Divisor' as per the SMART TRICKS explained in this chapter.

Ideal time limit: 5 – 10 seconds / question

	Dividend	Divisor
1	123	9
2	3456	9
3	45678	9

4	178639	9
5	987653437	9
6	123	8
7	3456	8

8	45678	8
9	178639	8
10	987653437	8
11	123	6
12	3456	6
13	45678	7
14	178639	7
15	987653437	7
16	3456	98
17	987653437	98
18	3456	97
19	45678	97

20	178639	97
21	987653437	97
22	123	76
23	3456	89
24	45678	95
25	178639	41
26	987653437	69
27	3456	987
28	45678	877
29	178639	851
30	987653437	999

(B) Applications based questions:

1. Rimzim purchased 93 T-shirts at a cost of Rs.50685. What is the cost of one T-shirt?
2. Ritu had 23456 chocolates and he distributed it amongst children in such a way that each gets 23 chocolates. How many children are there?
3. In above question, how many chocolates would be left-over?
4. Ritesh's grandpa has Rs.30,000. He wants to distribute it amongst his 5 sons, 7 daughters and 7 grandchildren equally in an integer form. Whatever money is left, is to be given to a beggar. The beggar wants to buy a bread-packet costing Rs.

17 once he gets the money after the division. Would the beggar be able to purchase bread-packet out of the money that has been given to him? What amount of money would be given to beggar?

Answers:
(A)

Question Number	Quotient	Remainder
1	13	6
2	384	0
3	5075	3
4	19848	7
5	109739270	7
6	15	3
7	432	0
8	5709	6
9	22329	7
10	123456679	5
11	20	3
12	576	0
13	6525	3
14	25519	6
15	141093348	1

16	35	26
17	10078096	29
18	35	61
19	470	88
20	1841	62
21	10181994	19
22	1	47
23	38	74
24	480	78
25	4357	2
26	14313817	64
27	3	495
28	52	74
29	209	780
30	988642	79

(B)

1. Rs. 545
2. 1019
3. 19
4. Yes. Rs.18

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Twist N' Turn

A Rubik's Cube Guide
Fun While you Learn

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लवठे लवन्तवः ५

Transforming Kids To Calculators!
Level-2 For Standard - 7th / 8th

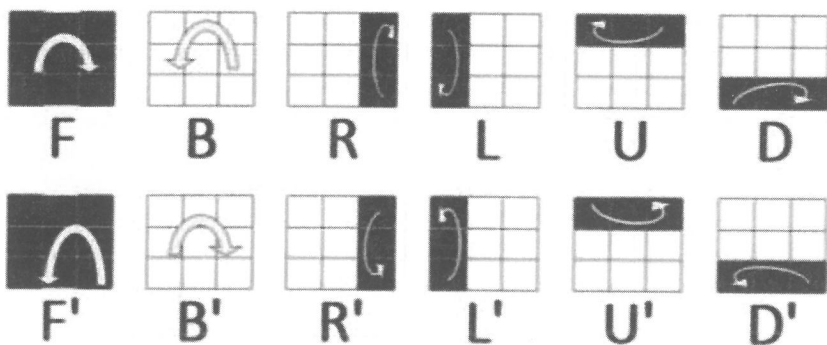
Introduction:

- ❖ Rubik's cube is a puzzle which is made up of twenty-six smaller cubes (in a cube of 3X3). 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:

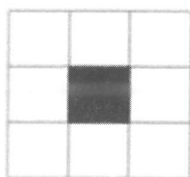
- ❖ We must know how to read the terminology of the Rubik's cube:
 - F: front
 - B: Back
 - R: right
 - L: left
 - U: up
 - D: down.

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

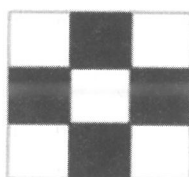


Remember:

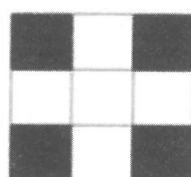
- ❖ There are three types of pieces:



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:

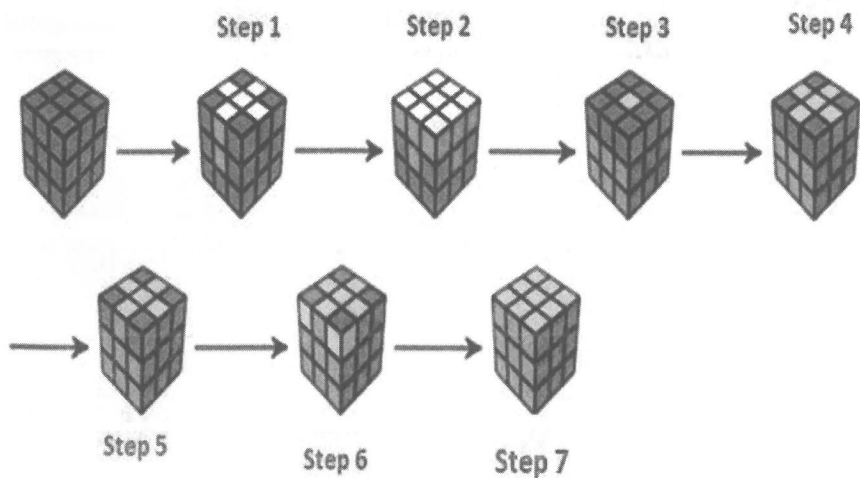
Matching of the other colour of the edge piece of the 'PLUS' State with the same coloured face

Step 6:

Making correct position of the corners of the third layer

Step 7:

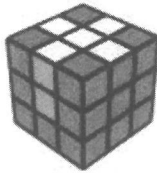
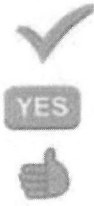
Completing the 3rd layer



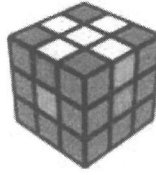
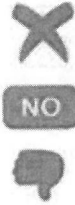
Step 1: Make a 'White PLUS'

- ❖ 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 piece

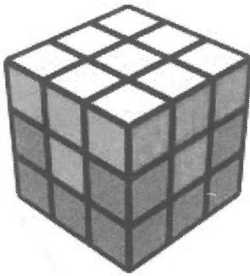


Sides not matching
with centre piece



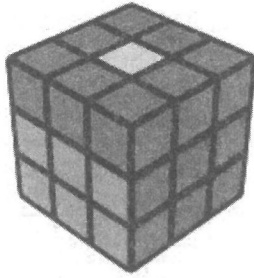
Step 2: 1st Layer Solved

- ❖ 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.

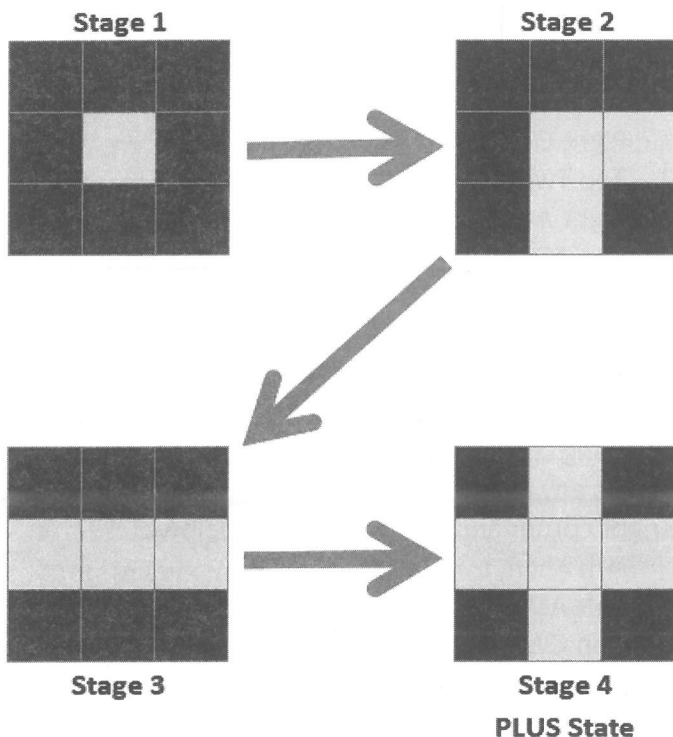


Step 4: Yellow 'PLUS' State:

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:

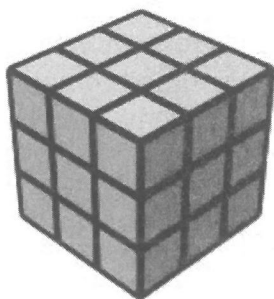
- ❖ Placing the corner correctly is one thing and turning them to match all the colours correctly is the other.
- ❖ Place the correctly turned corner on the left-hand side.
- ❖ This step helps to complete the entire Rubik's cube correctly.

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!

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મથ-મંત્રા : ૨

Test Yourself!

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મથ મંત્રા : ૨

Transforming Kids To Calculators!
Level-2 For Standard - 7th / 8th

Find out answers of the following questions based on the knowledge of SMART TRICKS explained in **लार्थ लान्त्रा : ३**.
Ideal time limit: 15 – 30 seconds / question

1. In a competition in a school, if 85 % students pass the test out of 60 students, then find the number of students who passed the test.

- A) 51 B) 52 C) 49
D) 50 E) None of These

2. The average age of 3 friends is 27 years. If age of 4th friend is added, the average comes to 28 years. What is age of the fourth friend?

- A) 31 years B) 26 years C) 32 years
D) 24 years E) None of These

3. $3647 + 4898 + 2120 + 165$

- A) 10830 B) 10850 C) 10750
D) 10810 E) None of These

4. 20% of a number is 14 less than 25% of the same number. What is the 55% of that number?

- A) 145 B) 154 C) 156
D) 165 E) None of These

5. Which of the following fraction is having the highest value?

- A) $\frac{2}{3}$ B) $\frac{3}{5}$ C) $\frac{3}{4}$
D) $\frac{5}{7}$ E) $\frac{2}{7}$

6. 1111111×1111111

- A) 123456789101112 B) 1234567654321 C) 1567432112345621
D) None of these E) Cannot be determined

7. Profit earned by selling an article for Rs.740 is the same as the loss incurred by selling the article for Rs.620. What is the cost price of the article (in Rs.)?

- A) Data inadequate B) Rs.650 C) Rs.720
D) Rs. 680 E) Rs. 640

8. What is 33.33% of 963.18?

- A) 321.16 B) 331.06 C) 321.06
D) 321.66 E) 322.16

9. $(4.6)^2$

- A) 211.66 B) 24.16 C) 25.16
D) 21.16 E) 24.46

10. 816×125

- A) 102000 B) 892000 C) 196200
D) 1012900 E) None of these

11. $1004 \times 1007 = ?$ (Hint: use 'Nikhilam')

- A) 1011063 B) 1011028 C) 1011061
D) 1011062 E) None of These

12. $8193 \times 9999 = ?$ (Hint: use 'Eknyunenpurvena')

- A) 1921810 B) 1921808 C) 81921807
D) 81921811 E) None of These

13. $192 \times 108 = ?$ (Hint: use 'Ekadikenapurvena')

- A) 20736 B) 20721 C) 20739
D) 20728 E) None of These

14. $123 \times 102 = ?$ (Hint: use 'Urdva-Tiryak-Bhyam')

- A) 12542 B) 12543 C) 12541
D) 12546 E) None of These

15. $381 \times 11 = ?$ (Hint: use 'Vilokanam')

- A) 4191 B) 4194 C) 4192
D) 4195 E) None of These

16. $6569 \times 2321 = ?$

- A) 15246641 B) 15246649 C) 15246648
D) 15246642 E) None of These

17. $641 \times 446 - 231534$

- A) 54352 B) 54358 C) 54351
D) 54359 E) None of These

18. $2671 + 91729 = x - 545$

- A) 163858 B) 163859 C) 163851
D) 163855 E) None of These

19. $(67)^2 + (82)^2 + (53)^2$

- A) 14,022 B) 14,026 C) 14021
D) 14029 E) None of These

20. $567 \times 134 + (54)^2$

- A) 78895 B) 78899 C) 78896
D) 78894 E) None of These

21. Complete the series. 22, 23, 27, 36, 52, 77, ?

- A) 111 B) 109 C) 117
D) 113 E) None of These

22. Complete the series. 668, 656, 632, 584, 488, ?

- A) 294 B) 296 C) 300
D) 396 E) None of These

23. Complete the series. 2, 6, 12, 20, 30, 42, ?

- A) 56 B) 53 C) 54
D) 57 E) None of These

24. Complete the series. 49, 121, 169, 289, 361, ?

- A) 518 B) 519 C) 529
D) 514 E) None of These

25. Complete the series. 84, 64, 46, 30, ?

- A) 16 B) 17 C) 19
D) 12 E) None of These

26. A gold bracelet is sold for Rs. 14,500/- at a loss of 20%. What is the cost price of the gold bracelet? (in Rs.)

- A) 18125 B) 18126 C) 18129
D) 18213 E) None of These

27. The selling price of an article is 140% of its cost. What is gain or loss percent on selling that item?

- A) 100 B) 60 C) 40
D) 50 E) None of These

28. What is the compound interest on a sum of Rs. 1500 for 2 years at 5%?

- A) Rs. 158.25 B) Rs. 153.75 C) Rs. 78.75
D) Rs. 150.25 E) None of These

29. At a certain rate of simple interest, a certain sum doubles itself in 10 years. In how many years will it triple itself?

- A) 20 years B) 30 years C) 12 years
D) 13 years E) None of these

30. A sum of Rs. 12000 will give Rs. 1680 as simple interest at 7% per annum in how many years?

- A) 6 years B) 5 years C) 7 years
D) 2 years E) None of These

31. In a row of persons, position of Ishan from left side of the row is 27th and that from the right side of the row is 34th. Find the total number of persons in the row?

- A) 61 B) 60 C) 57
D) 45 E) Can't be determined

Directions (Q. 32 – 33): Study the following information carefully to answer the given questions:

Each of the five friends – A, B, C, D, E – scored different marks in an examination. C scored more than only A and E. D scored less than only B. E did not score the least. The one who scored the third highest marks scored 71 marks. E scored 52 marks.

32. Which of the following could possibly be C's score?

- A) 70 B) 94 C) 71
D) 61 E) 81

33. The person who scored the maximum, scored 15 marks more than C's marks. Which of the following can be B's score?

- A) 94 B) 86 C) 89
D) 78 E) 81

34. What is the number of diagonals that can be drawn in a polygon of 'n' sides?

- A) $n(n-1)/2$ B) $n(n-3)/2$ C) $n(n+1)/2$
D) None of these E) Cannot be determined

35. In Aayush's opinion, his weight is greater than 55 kg but lesser than 62 kg. His brother does not agree with Aayush and he thinks that Aayush's weight is greater than 50 kg but lesser than 60 kg. His mother's view is that his weight cannot be greater than 58 kg. If all are correct in their estimation, what is the average of different probable weights of Aayush?

- A) 57 kg B) 69 kg C) 51 kg
D) 67 kg E) 78 kg

36. The average of five numbers is 27. If one of the numbers is excluded, the average becomes 25. What is the excluded number?

- A) 30 B) 40 C) 32.5
D) 35 E) 42

37. Due to a 25% reduction in the price of rice per kilogram, a person is able to purchase 20 kg more for Rs. 400. Find the new price of rice per kilogram?

- A) Rs. 5 B) Rs. 6 C) Rs. 10
D) Rs. 4 E) Rs. 5.5

Directions (Q. 38-40) Study the following table carefully and answer the questions that follow:

	Shape	Side	Base	Height	Radius	Cost per sq.m. of flooring	Cost per m of fencing
	Shape	(in m)	(in m)	(in m)	(in m)	(in Rs.)	(in Rs.)
A	Triangle		17	10		11	27
B	Rectangle	12×8				99	39
C	Square	15				17	56
E	Circle				10	23	22

38. What is the cost of flooring of A?

- A) Rs.935 B) Rs.746 C) Rs.982
D) Rs.5000 E) Rs.4400

39. What is the difference between the cost of flooring of C and that of B?

A) Rs.2180

B) Rs.6120

C) Rs.2940

D) Rs.4360

E) None of these

40. What will be the cost of fencing of field E?

A) Rs.1205.34

B) Rs.1946.24

C) Rs.1871.56

D) Rs.1382.85

E) Rs. 2345.45

Answers:

1. A) 51
2. A) 31 years
3. A) 10830
4. B) 154
5. C) $3/4$
6. B) 1234567654321
7. D) Rs.680
8. C) 321.06
9. D) 21.16
10. A) 102000
11. B) 1011028
12. C) 81921807
13. A) 20736
14. D) 12546
15. A) 4191
16. B) 15246649

- 17. A) 54352
- 18. E) None of these
- 19. A) 14,022
- 20. D) 78894
- 21. D) 113
- 22. B) 296
- 23. A) 56
- 24. C) 529
- 25. A) 16
- 26. A) 18125
- 27. C) 40
- 28. C) Rs. 78.75
- 29. A) 20 years
- 30. D) 2 years
- 31. B) 60
- 32. C) 71
- 33. B) 86
- 34. B) $n(n-3)/2$
- 35. A) 57 kg
- 36. D) 35
- 37. A) Rs. 5
- 38. A) Rs.935
- 39. E) None of these
- 40. D) Rs.1382.85

| About The Book

'लार्थ लार्त्रः २' is the second book in the Math Mantra series which aims at simplifying the learning and understanding of Maths, especially for the students. This book uses a very simple and easy to understand language to train the students. Just like the first version of the series, 'लार्थ लार्त्रः १', this book employs the technique of examples and practice tasks which will enable the students to have a thorough understanding of the topics learnt. This book has a quick revision of SMART TRICKS 1 to 27 and further goes on to cover SMART TRICKS 28 to 60. This book also explains the concept of SMART Squares and Quick Division. This book, along with 'लार्थ लार्त्रः १', goes on to make the fundamentals of division, multiplication, addition and subtraction much stronger and quicker. This book will not only benefit the students but it will also be helpful to the grown-ups.

'लार्थ लार्त्रः २' will lay strong foundation of Mathematics in its readers.

Happy learning, the Vedic way!

| About The Author

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.



Paridhi Trivedi Parikh

❖ Connect with the Author ❖

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Sarva Vidyalaya Kelavani Mandal, Kadi.