About the Author

DP SINGH

Btech-NIT
12+ Years teaching experience
For govt. exam like SSC /RAILWAY/ BANK

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Why is "Competitive Maths - Shortcuts Secrets" the Right Path for You?

Student Problem #1 (Difficult Questions) I get stuck on difficult questions. How do I even start solving them?

Our Solution We have mapped every possible question type for every chapter. Once you finish this book, you won't find a single question in the exam that you haven't seen and solved before.

Student Problem #2 (Time management and accuracy) I know the method, but it takes too much time! How can I get the right answer faster?

Our Solution We provide the best proven tricks for every chapter. These shortcuts are designed to cut your solving time in half while ensuring 100% accuracy.

Student Problem #3 (Big confusion) I have memorized many tricks, but I always get confused—which trick should I use for this specific question?

Our Solution To end this confusion, every trick comes with a dedicated Solved Example. You will learn exactly which "Secret" unlocks which type of question.

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"The Verdict: Data proves that students using this book are 2x faster than the competition".

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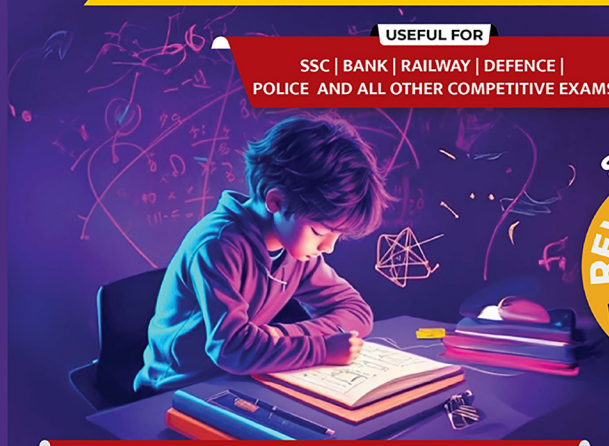

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Contents

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NEW Questions types marked as 'NEW' are collected from the latest Eduquity (SSC) papers. Focus on these to stay ahead of the changing exam pattern.

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Unit	Chapter No.	Chapter Name	Name of Type	No. of Ques.	Total Questions	Page No.
			19. Angle on the Semicircle is Right angle	**5**		
			20. Angle at the Centre of Circle is Twice the Subtended by Circumference	**4**		
			21. Angle in the Same Segment of a Circle	**5**		
			22. Questions Based on Tangent on Circle	**8**		
			23. Questions Related to Tangent and Alternative Angles	**5**		
			24. Two Secants are Drawn to Circle from an External Point	**5**		
			25. A Tangent and a Secant are Drawn to Circle from an External Point	**4**		
			26. Direct & Indirect Common Tangents to Two Circles	**5**		
			27. Cyclic Quadrilateral	**6**		
			28. Incircle of a Quadrilateral	**7**		
			29. Questions Based on Two Concentric Circles	**4**		
			30. Questions Based on Two Circular Sector	**4**		
			31. Miscellaneous	**37**		
	23.	**Mensuration** • Concepts, Short Tricks & Solved Examples • Questions (Based on Many Patterns)	**1.** Questions Based on Perimeter	**5**	**155**	**234-265**
			2. Finding Area of Triangle by Formula	**5**		
			3. Finding Area of Triangle by Heron's Formula	**4**		
			4. Finding Area of Quadrilateral by Dividing it into Two Triangles	**2**		
			5. Questions Based on Area of Rectangle and Square	**7**		
			6. Questions Based on Area of Parallelogram	**3**		
			7. Questions Based on Area of Rhombus	**4**		
			8. Questions Based on Area of Trapezium	**8**		
			9. Questions Based on Area of Path by Inside or Surrounding	**5**		

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Unit	Chapter No.	Chapter Name	Name of Type	No. of Ques.	Total Questions	Page No.
			8. Bayes' Theorem NEW	**12**		
			9. Miscellaneous	**27**		
	29.	**Statistics** • Concepts, Short Tricks & Solved Examples • Questions (Based on Many Patterns)	**1.** Questions Based on Range	**4**	**83**	**301-313**
			2. Mean of Ungrouped & Grouped Data by Direct Method	**10**		
			3. Median of Ungrouped and Grouped Data	**12**		
			4. Mode of Ungrouped and Grouped Data	**11**		
			5. Relation Between Mean, Median and Mode	**8**		
			6. Questions Based on Mean Deviation	**5**		
			7. Questions Based on Variance NEW	**6**		
			8. Karl Pearson Coefficient of Skewness NEW	**3**		
			9. Quartile Deviation NEW	**2**		
			10. Questions Based on Standard Deviation	**3**		
			11. Miscellaneous	**19**		
	30.	**Data Interpretation** • Concepts, Short Tricks & Solved Examples • Questions (Based on Many Patterns)	**1.** Questions Based on Tabulation NEW	**39**	**147**	**314-331**
			2. Questions Based on Line Graph NEW	**20**		
			3. Questions Based on Histogram NEW	**14**		
			4. Questions Based on Bar Graph NEW	**23**		
			5. Questions Based on Pie Chart NEW	**28**		
			6. Miscellaneous	**23**		
				Total Questions : 2885		

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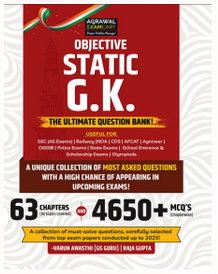


Objective Static G.K. (Question Bank)

CHAPTER 1

Speed Up Your Calculations

1. Addition

In this chapter, we will learn how to make addition even easier.

How would we add 63 and 9 ?

The easy way would be to add 10 and then subtract 1.

So, adding 10 to 63 we get 73 and then subtracting 1 from 73 we get 72. Hence, required answer is 72.

It is easy to add 10 to any number; for example adding 10 to 46 gives 56; adding 10 to 73 gives 83. If 10 is added to any number, then tens digit of the number is increased by 1.

Some basic Rules for addition are given below :

- To add 9, add 10 and then subtract 1;
- To add 8, add 10 and then subtract 2;
- To add 7, add 10 and then subtract 3; etc.

I. Addition of two digit numbers

In the addition of two-digit numbers, if the unit digit is high, round off to the next ten and then subtract the difference. If the unit digit is low, add the tens digit and then add the unit digit.

Ex. : To add 47, add 50 and then subtract 3; to add 96, add 100 and then subtract 4; to add 82, add 80 and then add 2 more etc.

To add 35, 67 and 42 together, we would begin with 35.

Now, $35 + 67 = (35 + 70) - 3$

$= 105 - 3 = 102$

Now, $102 + 42 = (102 + 40) + 2$

$= 142 + 2 = 144$

Hence, the addition of 35, 67 and 42 is 144.

II. Addition of three digit numbers :

We use the same method for adding three-digit numbers.

To add 355, 752 and 694 together, add the hundreds digit of each number, *i.e.*, $3 + 7 + 6 = 1600$

Now, remaining parts of the numbers,

$55 + 52 = (55 + 50) + 2$

$= 105 + 2$

$= 107$

and, $107 + 94 = (107 + 100) - 6$

$= 207 - 6 = 201$

Now, $355 + 752 + 694 = 1600 + 201$

$= 1801$

We can also solve the addition of larger numbers by the same method.

Ex. : $89978 + 12345 + 36218 = ?$

Sol. : $89978 + 12345 + 36218$

Step 1 : $\boxed{8}9\,9\,7\,8 + \boxed{1}2\,3\,4\,5 + \boxed{3}6\,2\,1\,8$

$8 + 1 + 3 = 120000$

Step 2 : $8\boxed{9}9\,7\,8 + 1\boxed{2}3\,4\,5 + 3\boxed{6}2\,1\,8$

$9 + 2 + 6 = 17000$

Now, $120000 + 17000 = 137000$

Step 3 : $8\,9\boxed{9}7\,8 + 1\,2\boxed{3}4\,5 + 3\,6\boxed{2}1\,8$

$9 + 3 + 2 = 1400$

Now, $137000 + 1400 = 138400$

Step 4 : $78 + 45 + 18$

$78 + 45 = (78 + 50) - 5 = 128 - 5 = 123$

and, $123 + 18 = (123 + 20) - 2 = 143 - 2$

$= 141$

Hence, $89978 + 12345 + 36218 = 138400 + 141$

$= 138541$

2. Subtraction

To subtract, round off the number we are subtracting and then correct the answer.

How would we subtract 9 from 63 ?

To subtract 9, subtract 10 and then add 1. So, subtracting 10 from 63, we get 53 and then adding 1. We get 54. The required answer will be 54.

Some basic rules for subtraction are given below :

- To subtract 9, subtract 10 and then add 1;
- To subtract 8, subtract 10 and then add 2;
- To subtract 7, subtract 10 and then add 3; etc.

To subtract a number near 100, take 100 and add the remainder.

For example : $436 - 97 = ?$

We subtract 100 from 436 and then add 3.

i.e., $(436 - 100) + 3 = 336 + 3 = 339$

So, required answer is 339.

- **Subtracting one number below a hundreds value from another which is just above the same hundreds number :**

  If the number to be subtracted is less than 100, and the number from which we are subtracting is greater than 100, then the difference, which is less than 100 and the other difference, which is greater than 100, add both the differences.

Ex. 1: 174 – 88 = ?

Sol : Here, 88, is less than 100 by 12 and 174 is more than 100 by 74.

So required answer = 12 + 74 = 86

Ex. 2: 7254 – 3897= ?

Sol : Here, the number 3897 is to be subtracted, then taking nearest thousand of this number, *i.e.*, 4000.

4000 is more than 3897 by 103 and less than 7254 by 3254.

So, 7254 – 3897 = 103 + 3254

= 3357

3. Multiplication

I. Multiplication by two-digit numbers :

If two-digit numbers are 23 and 34,

$$\begin{array}{r} 2\ 3 \\ \times\ 3\ 4 \\ \hline \end{array}$$

Step 1 : Multiply the unit digit of both the numbers each other.

i.e., $3 \times 4 = 12$

Now, write the unit digit 2 of the product 12 and take tens digit 1 as carry.

$$\begin{array}{r} \overset{\textcircled{1}}{} \\ 2\ 3 \\ \times\ 3\ 4 \\ \hline 2 \end{array}$$

Step 2 : Multiply tens digit of the first number and unit digit of the second number; and multiply unit digit of the first number and tens digit of the second number. Now, add both the products and the carry in step 1.

i.e., $(2 \times 4) + (3 \times 3) + 1 = 8 + 9 + 1 = 18$

Now, write the unit digit 8 of the sum 18 and take tens digit 1 as carry.

$$\begin{array}{r} \overset{\textcircled{1}}{} \\ 2\ 3 \\ \times\ 3\ 4 \\ \hline 8\ 2 \end{array}$$

Step 3 : Multiply tens digit of both the number each other and add the product and the carry in Step 2.

i.e., $(2 \times 3) + 1 = 6 + 1 = 7$

$$\begin{array}{r} 2\ 3 \\ \times\ 3\ 4 \\ \hline 7\ 8\ 2 \end{array}$$

Hence, $23 \times 34 = 782$

Ex. : 82 × 91= ?

Sol : Step 1 :

$$\begin{array}{r} 8\ 2 \\ \times\ 9\ 1 \\ \hline 2 \end{array}$$

Step 2 :

$$\begin{array}{r} 8\ 2 \\ \times\ 9\ 1 \\ \hline 6\ 2 \end{array}$$

Carry = 2

Step 3 :

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

Hence, $82 \times 91 = 7462$

II. Multiplication by three-digit numbers :

If three digit numbers are 837 and 456.

$$\begin{array}{r} 8\ 3\ 7 \\ \times\ 4\ 5\ 6 \\ \hline \end{array}$$

Step 1 : Multiply the unit digit of both the numbers each other.

i.e., $7 \times 6 = 42$

Now, write unit digit 2 of the product 42 and take tens digit 4 as carry.

$$\begin{array}{r} 8\ 3\ 7 \\ \times\ 4\ 5\ 6 \\ \hline 2 \end{array}$$

Carry = 4

Step 2 : Multiply the tens digit of first number and unit digit of second number; and multiply the unit digit of first number and tens duigit of second number. Now add both the products and the carry in step 1.

i.e., $(3 \times 6) + (7 \times 5) + 4 = 18 + 35 + 4 = 57$

Now, write the unit digit 7 of the sum 57 and take tens digit 5 as carry.

$$\begin{array}{r} 8\ 3\ 7 \\ \times\ 4\ 5\ 6 \\ \hline 7\ 2 \end{array}$$

Carry = 5

Step 3 : Multiply the hundreds digit of first number and the unit digit of second number; multiply the unit digit of first number and the hundreds digit of second number; and multiply the tens digit of both the numbers. Now add all the three products and the carry in step 2.

i.e., $(8 \times 6) + (7 \times 4) + (3 \times 5) + 5$

$= 48 + 28 + 15 + 5 = 96$

Now, write the unit digit 6 of the sum 96 and take tens digit 9 as carry.

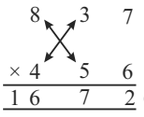
$$\begin{array}{r} 8\ 3\ 7 \\ \times\ 4\ 5\ 6 \\ \hline 6\ 7\ 2 \end{array}$$

Carry = 9

Step 4 : Multiply the hundreds digit of first number and the tens digit of second number; and multiply the tens digit of first number and hundreds digit of second number. Now add both the products and the carry in step 3.

i.e., $(8 \times 5) + (3 \times 4) + 9 = 40 + 12 + 9 = 61$

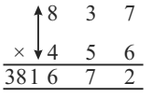
Now, write the unit digit 1 of the sum 61 and take tens digit 6 as carry.



Carry = 6

Step 5 : Multiply the hundreds digit of both the numbers each other. Now, add the product and the carry in step 4.

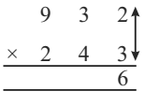
i.e., $(8 \times 4) + 6 = 32 + 6 = 38$



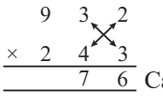
Hence, $837 \times 456 = 381672$

Ex. : $932 \times 243 = ?$

Sol : **Step 1 :**

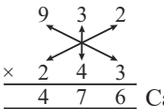


Step 2 :



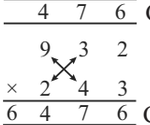
Carry = 1

Step 3 :



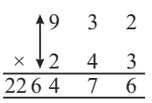
Carry = 4

Step 4 :



Carry = 4

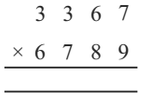
Step 5 :



Hence, $932 \times 243 = 226476$

III. Multiplication by Four digit numbers :

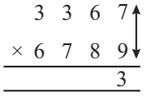
If four-digit numbers are 3367 and 6789, then :



Step 1 : Multiply the unit digit of both numbers each other.

i.e., $7 \times 9 = 63$

Write the unit digit 3 of the product 63 and take 6 tens digit 6 as carry :

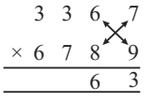


Carry = 6

Step 2 : Multiply the tens digit of first number and the unit digit of second number; and multiply the unit digit of first number and the tens digit of second number. Now add both the products and the carry in step 1.

i.e., $(6 \times 9) + (7 \times 8) + 6 = 54 + 56 + 6 = 116$

Now, write the unit digit 6 of the sum 116 and take the remaining part 11 as carry.



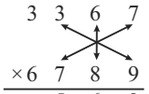
Carry = 11

Step 3 : Multiply the hundreds digit of first number and the unit digit of second number; multiply the unit digit of first number and the hundreds digit of second number; and multiply the tens digit of both the numbers. Now add all the three products and the carry in step 2.

i.e., $(3 \times 9) + (7 \times 7) + (6 \times 8) + 11$

$= 27 + 49 + 48 + 11 = 135$

Now, write the 135 unit digit 5 of the sum and take the remaining part 13 as carry.



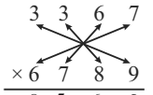
Carry = 13

Step 4 : Multiply the thousands, digit of first number and the unit digit of second number; multiply the hundreds digit of first number and the tens digit of second number; multiply the tens digit of first number and the hundreds digit of second; and multiply the unit digit of first number and the thousands digit of second number. Now add all the four products and the carry in step 3.

i.e., $(3 \times 9) + (3 \times 8) + (6 \times 7) + (7 \times 6) + 13$

$= 27 + 24 + 42 + 42 + 13 = 148$

Now, write the unit digit 8 of the sum 148 and take the remaining part 14 as carry.



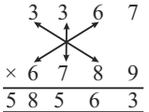
Carry = 14

Step 5 : Multiply the thousands digit of first number and the tens digit of second number; multiply the tens digit of first number and the thousands digit of second number; and multiply the hundreds digit of both the numbers. Now add all the three products and the carry in step 4.

i.e., $(3 \times 8) + (6 \times 6) + (3 \times 7) + 14$

$= 24 + 36 + 21 + 14 = 95$

Now, write the unit digit 5 of the sum 95 and take the remaining part 9 as carry.



Carry = 9

Step 6 : Multiply the thousands digit of first number and the hundreds digit of second number; and multiply the hundreds digit of first number and the thousands digit of second number. Now add both the products and the carry in step 5.

i.e., $(3 \times 7) + (3 \times 6) + 9 = 21 + 18 + 9 = 48$

Now, write the unit digit 8 of the sum 48 and take the remaining part 4 as carry.

$$\begin{array}{r} 3\ 3\ 6\ 7 \\ \times\ 6\ 7\ 8\ 9 \\ \hline 8\,5\,8\,5\ 6\ 3 \end{array}$$ Carry = 4

Step 7 : Multiply the thousands digit of both the numbers. Now add the product and the carry in step 6.

i.e., $(3 \times 6) + 4 = 18 + 4 = 22$

$$\begin{array}{r} 3\ 3\ 6\ 7 \\ \times\ 6\ 7\ 8\ 9 \\ \hline 22858\ 5\ 6\ 3 \end{array}$$

Hence, $3367 \times 6789 = 22858563$

Ex. : $5632 \times 1672 = ?$

Sol : Step 1 :

$$\begin{array}{r} 5\ 6\ 3\ 2 \\ \times\ 1\ 6\ 7\ 2 \\ \hline 4 \end{array}$$

Step 2 :

$$\begin{array}{r} 5\ 6\ 3\ 2 \\ \times\ 1\ 6\ 7\ 2 \\ \hline 0\ 4 \end{array}$$ Carry = 2

Step 3 :

$$\begin{array}{r} 5\ 6\ 3\ 2 \\ \times\ 1\ 6\ 7\ 2 \\ \hline 7\ 0\ 4 \end{array}$$ Carry = 4

Step 4 :

$$\begin{array}{r} 5\ 6\ 3\ 2 \\ \times\ 1\ 6\ 7\ 2 \\ \hline 6\ 7\ 0\ 4 \end{array}$$ Carry = 7

Step 5 :

$$\begin{array}{r} 5\ 6\ 3\ 2 \\ \times\ 1\ 6\ 7\ 2 \\ \hline 1\ 6\ 7\ 0\ 4 \end{array}$$ Carry = 8

Step 6 :

$$\begin{array}{r} 5\ 6\ 3\ 2 \\ \times\ 1\ 6\ 7\ 2 \\ \hline 4\,1\,6\,7\,0\,4 \end{array}$$ Carry = 4

Step 7 :

$$\begin{array}{r} 5\ 6\ 3\ 2 \\ \times\ 1\ 6\ 7\ 2 \\ \hline 9\,4\,1\,6\,7\,0\,4 \end{array}$$

Hence, $5632 \times 1672 = 9416704$

IV. Multiplication by the numbers nearest to 10, 100, 1000 etc.

If two numbers 46 and 98 are to be multiplied, then the number 98 is nearest to 100 or we can say that 98 is less than 100 by 2, then we can write 98 = 100 – 2.

Now, $46 \times 98 = 46 \times (100 - 2)$

$= 46 \times 100 - 46 \times 2$

$= 4600 - 92$

$= 4508$

Ex. 1 : $998 \times 85 = ?$

Sol : $998 \times 85 = (1000 - 2) \times 85$

$= 1000 \times 85 - 2 \times 85$

$= 85000 - 170$

$= 84830$

Ex. 2 : $99 \times 79 = ?$

Sol : $= (100 - 1) \times 79$

$= 79 \times 100 - 79$

$= 7900 - 79 = 7821$

V. Multiplication the numbers just below or above 100

If two numbers are 106 and 107, and their product is to be found.

i.e., $106 \times 107 = ?$

Than, $(100 + 6) \times (100 + 7)$

Now, $(100 + 6 + 7)$ or $(100 + 7 + 6) = 113$

A number 106 is more than 100 by 6 and another number 107 is more than 100 by 7, then multiply 6 and 7.

i.e., $6 \times 7 = 42$

Now, the sum 113 and the product 42 are written in the order.

Hence, $106 \times 107 = 11342$

Ex. 1 : $92 \times 97 = ?$

Sol : $92 \times 97 = (100 - 8) \times (100 - 3)$

Now, $(100 - 8 - 3)$ or $(100 - 3 - 8) = 89$

A number 92 is less than 100 by 8 and another number 97 is less than 100 by 3, then

$8 \times 3 = 24$

Now, the difference 89 and the product 24 are written in the order.

Hence, $92 \times 97 = 8924$

Ex. 2 : $108 \times 109 = ?$

Sol : $108 \times 109 = (100 + 8) \times (100 + 9)$

Now, $(100 + 8 + 9)$ or $(100 + 9 + 8) = 117$

A number 108 is more than 100 by 8 and another number 109 is more than 100 by 9, then

$8 \times 9 = 72$

Now, the sum 117 and the product 72 are written in the order.

Hence, $108 \times 109 = 11772$

VI. Multiplication by 11

If the number 8345 is to be multiplied by 11, then

Step 1 : The unit digit of 8345 is put down.

i.e., $\frac{8345 \times 11}{5}$

Step 2 : Each successive digit 8345 is added to its right-hand neighbour.

$\frac{8345\times11}{95}$ $(4+5=9)$

$\frac{8345\times11}{795}$ $(3+4=7)$

$\frac{8345\times11}{1795}$ $(8+3=11$; put unit digit 1 and carry over 1)

Step 3 : Now adding the first digit 8 of 8345 and the carry 1, the sum 8 + 1 = 9 is written :

i.e., $\frac{8345\times11}{91795}$

Hence, 8345 × 11 = 91795

Ex. : 89067 × 11 = ?

Sol : The unit digit of 89067 is put down $\frac{89067\times11}{7}$

Now, $\frac{89067\times11}{37}$ [6 + 7 = 13, put down the unit digit 3 and Carry = 1]

$\frac{89067\times11}{737}$ [0 + 6 + 1 (Carry) = 7]

$\frac{89067\times11}{9737}$ [9 + 0 = 9]

$\frac{89067\times11}{79737}$ [8 + 9 = 17 put down the unit digit 7 and Carry = 1]

Now, $\frac{89067\times11}{979737}$ [8 + 1 (Carry) = 9]

Hence, 89067 × 11 = 979737

VII. Multiplication by 12

If the number 35604 is to be multiplied by 12, then

Step 1 : Double the unit digit of the number 35604.

i.e., $\frac{35604\times12}{8}$ [4 × 2 = 8]

Step 2 : Double the first digit of two consecutive digits from the right of the number 35604 is added to the second digit.

$\frac{35604\times12}{48}$ [0 × 2 + 4 = 4]

$\frac{35604\times12}{248}$ [6 × 2 + 0 = 12, put down the unit digit 2 and Carry = 1]

$\frac{35604\times12}{7248}$ [5 × 2 + 6 + 1 (Carry) = 17, put down the unit digit 7 and Carry = 1]

$\frac{35604\times12}{27248}$ [3 × 2 + 5 + 1 (Carry) = 12, put down the unit digit 2 and Carry = 1]

Step 3 : The first digit of the number 35604. *i.e.*, 3 is added to the previous carry 1. So 3 + 1 = 4.

Now put down the sum 4.

i.e., $\frac{35604\times12}{427248}$ [3 + 1 (Carry) = 4]

Hence, 35604 × 12 = 427248

Ex. : 85762 × 12 = ?

Sol : $\frac{85762\times12}{4}$ [Double the unit digit 2 = 2 × 2 = 4]

$\frac{85762\times12}{44}$ [6 × 2 + 2 = 14, put down the unit digit 4 and Carry = 1]

$\frac{85762\times12}{144}$ [7 × 2 + 6 + 1 (Carry) = 21, put down the unit digit 1 and Carry = 2]

$\frac{85762\times12}{9144}$ [5 × 2 + 7 + 2 (Carry) = 19, put down the unit digit 9 and Carry = 1]

$\frac{85762\times12}{29144}$ [8 × 2 + 5 + 1 (Carry) = 22, put down the unit digit 2 and Carry = 2]

Now, $\frac{85762\times12}{1029144}$ [8 + 2 (Carry) = 10]

Hence, 85762 × 12 = 1029144

VIII. Multiplication by 13

If the number 56493 is to be multiplied by 13, then

Step 1 : Three times the unit digit of the number 56493.

i.e., $\frac{56493\times13}{9}$ [3 × 3 = 9]

Step 2 : Three times the first digit of two consecutive digits from the right of the number 56493 is added to the second digit.

$\frac{56493\times13}{9}$ [9 × 3 + 3 = 30, put down the unit digit 0 and Carry = 3]

$\frac{56493\times13}{409}$ [4 × 3 + 9 + 3 (Carry) = 24, put down the unit digit 4 and Carry = 2]

$\frac{56493\times13}{4409}$ [6 × 3 + 4 + 2 (Carry) = 24, put down the unit digit 4 and Carry = 2]

$\frac{56493\times13}{34409}$ [5 × 3 + 6 + 2 (Carry) = 23, put down the unit digit 3 and Carry = 2]

Step 3 : The first digit of the number 56493 *i.e.*, 5 is added to the previous carry = 2, So 5 + 2 = 7.

Now, put down the sum 7.

i.e., $\frac{56493\times13}{734409}$ [5 + 2 (Carry) = 7]

Hence, 56493 × 13 = 734409

Ex. : 11952 × 13 = ?

Sol : $\frac{11952\times13}{6}$ [three times the unit digit 2 = 2 × 3 = 6]

$\frac{11952\times13}{76}$ [5 × 3 + 2 = 17, put down the unit digit 7 and Carry = 1]

$\frac{11952\times13}{376}$ [9 × 3 + 5 + 1 (Carry) = 33, put down the unit digit 3 and Carry = 3]

$\frac{11952\times13}{5376}$ [1 × 3 + 9 + 3 (Carry) = 15, put down the unit digit 5 and Carry = 1]

$\frac{11952 \times 13}{55376}$ [1 × 3 + 1 + 1 (Carry) = 5]

$\frac{11952 \times 13}{155376}$ [First digit = 1 and Carry = 0
So, 1 + 0 = 1]

Hence, 11952 × 13 = 155376

IX. Multiplication by 25

If the number 9483 is to be multiplied by 25, then

Step 1 : Multiply by 100 the number 9483.

i.e., 9483 × 100 = 948300

Step 2 : Divide by 4 the product obtained in Step 1.

i.e., 948300 ÷ 4 = 237075

Hence, 9483 × 25 = 237075

Ex. : 77184 × 25 = ?

Sol : **Step 1:** 77184 × 100 = 7718400

Step 2: 7718400 ÷ 4 = 1929600

Hence, 77184 × 25 = 1929600

4. Division

I. Division by a 2 digit numbers

If the number 38952 is to be divided by 72, then

Step 1 : Out of the divisor 72, put down only the first digit, *i.e.*, 7 in the divisor-column and put the other digit, *i.e.*, 2 on the top of 7, as shown the below :

7^2	3	8	9	5	2

The number will be divided by 7.

Step 2 : Allot the last digit of the dividend 38952 *i.e.*, 2 to the remainder position of the answer, as shown below :

7^2	3	8	9	5	2

Step 3 : The first digit 3 of the dividend is less than the divisor 7, then take 38 as first dividend. When we divide 38 by 7, we get 5 as quotient and 3 as remainder. We put down 5 as the first quotient-digit and just prefix the remainder 3 before the next digit 9 of the dividend, as shown below :

7^2	38	$_3$9	5	2
	5			

Step 4 : Now our dividend is 39. Subtract the product of the indexed 2 in the divisor-column and the first quotient-digit 5 from the new dividend 39 *i.e.,* 39 – (2 × 5) = 39 – 10 = 29.

Hence, the remainder 29 is our net-dividend, now we divide 29 by 7. We get 4 as quotient and 1 as remainder. We put down 4 as the second quotient-digit and just prefix the remainder 1 before the next digit 5 of the dividend, as shown below :

7^2	38	$_3$9	$_1$5	2
	5	4		

Step 5 : Now our dividend is 15. Subtract the product of the indexed 2 in the divisor column and the second quotient-digit 4 from the new dividend 15 *i.e.*, 15 – (2 × 4) = 15 – 8 = 7.

Hence, the remainder 7 is our net-dividend, now we divided 7 by 7, we get 1 as quotient and 0 as remainder. We put down their respective places, as shown below :

7^2	38	$_3$9	$_1$5	$_0$2
	5	4	1	

Step 6 : Now our dividend is 2, we repeat the some process and we get, 2 – (2 × 1) = 2 – 2 = 0

Hence, we get zero (0) as remainder.

7^2	38	$_3$9	$_1$5	$_0$2
	5	4	1	0

Thus, the division process is completed, in which quotient = 541 and remainder = 0.

Ex. 1 : 16384 ÷ 128 = ?

Sol : **Step 1:**

12^8	1	6	3	8	4

∵ 12 is a small number to handle with, we can treat 128 as a two-digit number.

Step 2:

12^8	16	$_4$3	8	4
	1			

Dividing 16 by 12, we get quotient = 1 and remainder = 4

Step 3:

12^8	16	$_4$3	$_{11}$8	4
	1	2		

43 – (8 × 1) = 35

Divided 35 by 12, we get quotient = 2 and remainder = 11.

Step 4:

12^8	16	$_4$3	$_{11}$8	$_6$4
	1	2	8	

118 – (8 × 2) = 118 – 16 = 102

Divide 102 by 12, we get quotient = 8 and remainder = 6.

Step 5: 64 – (8 × 8) = 0

Hence, dividing 16384 by 128, we get quotient = 128 and remainder = 0

Ex. 2 : Divide the number 601325 by 76.

Sol : **Step 1:**

7^6	60	13	2	5

Step 2:

7^6	60	$_{11}$1	3	2	5
	7				

Here, if we put down 8 as first quotient digit, then the remainder will be negative in next step which is invalid. So, we take 7 as the quotient-digit and prefix the remainder 11 to the next digit of the dividend.

Step 3:

7^6	60	$_{11}1$	$_{6}3$	2	5
	7	9			

$111 - (6 \times 7) = 111 - 42 = 69$

Dividing 69 by 7, we get quotient = 9 and remainder = 6.

Step 4:

7^6	60	$_{11}1$	$_{6}3$	$_{2}2$	5
	7	9	1	0	

$63 - (6 \times 9) = 63 - 54 = 9$

Dividing 9 by 7, we get quotient = 1 and remainder = 2.

Step 5:

7^6	60	$_{11}1$	$_{6}3$	$_{2}2$	$_{2}5$
	7	9	1	2	

$22 - (6 \times 1) = 22 - 6 = 16$

Dividing 16 by 7, we get quotient = 2 and remainder = 2.

Step 6:

7^6	60	$_{11}1$	$_{6}3$	$_{2}2$	$_{2}5$
	7	9	1	2	13

$25 - (6 \times 2) = 25 - 12 = 13$

Hence, dividing 601325 by 76, we get quotient = 7912 and remainder = 13

II. Dividing a decimal number :

If the number 718. 589 is to be divided by 96 upto 4 decimal places, then :

Step 1:

9^6	7	1	8 · 5	8	9	0

Step 2:

9^6	7	1	$_{8}8 \cdot 5$	8	9	0
	7					

Dividing 71 by 9, we get quotient = 7 and remainder = 8

Step 3:

9^6	7	1	$_{8}8 \cdot {}_{10}5$	8	9	0
	7		4			

$88 - (6 \times 7) = 88 - 42 = 46$

Here, if we put down 5 as quotient-digit, then the remainder will be negative in next step which is invalid. So, we take 4 as the quotient-digit and 10 as the remainder.

Step 4:

9^6	7	1	$_{8}8 \cdot {}_{10}5$	$_{9}8$	9	0
	7		4	8		

$105 - (6 \times 4) = 105 - 24 = 81$

Here, if we put down 9 as quotient-digit, then the remainder will be negative in next step which is invalid. So, we take 8 as the quotient-digit and 9 as the remainder.

Step 5:

9^6	7	1	$_{8}8 \cdot {}_{10}5$	$_{9}8$	$_{5}9$	0
	7		4	8	5	

$98 - (6 \times 8) = 98 - 48 = 50$

Dividing 50 by 9, we get quotient = 5 and remainder = 5.

Step 6:

9^6	7	1	$_{8}8 \cdot {}_{10}5$	$_{9}8$	$_{5}9$	$_{2}0$
	7		4	8	5	3

$59 - (6 \times 5) = 59 - 30 = 29$

Dividing 29 by 9, we get quotient = 3 and remainder = 2.

Hence, required answer = 7.4853

III. Division by a three-digit number

If the number 1064321 is to be divided by 743, then

Step 1: Out of the divisor 743, put down only the first-digit *i.e.*, 7 in the divisor-column and put down the remaining two-digit *i.e.*, 43 on the top of 7. Now allot the last two-digit number of the dividend *i.e.*, 21 to the remainder position of the answer as shown below :

7^{43}	1	0	6	4	3	2	1

The number will be divided by 7.

Step 2: The first digit 1 of the dividend is less than the divisor 7, then take 10 as first-dividend and divide 10 by 7. Put down the obtained quotient 1 and remainder 3, their respective places, as shown below :

7^{43}	$_{3}10$	6	4	3	2	1
	1					

Step 3: Now our dividend is 36. Subtract the product of the tens digit of the indexed 43 in the divisor-column *i.e.*, 4 and the first quotient-digit 1 from the new dividend 36 *i.e.*, $36 - (4 \times 1) = 32$. Now net-dividend is 32 and it is dividend by 7. Put down the obtained quotient 4 and remainder 4 their respective places, as shown below :

7^{43}	$_{3}10$	$_{4}6$	4	3	2	1
	1	4				

Step 4: Now our dividend is 44. Subtract the sum of the cross-multiplication of the pairs of the indexed digits in divisor-column (43) and the two quotient-digits (1 & 4) from the new dividend 44.

i.e., $44 - (4 \times 4 + 3 \times 1) = 44 - 19 = 25$

Now net dividend is 25 and it is dividend by 7. Put down the obtained quotiont 3 and remainder 4 their respective places, as shown below :

7^{43}	$_{3}10$	$_{4}6$	$_{4}4$	$_{4}3$	2	1
	1	4	3			

Step 5: Now our dividend is 43. Subtract the sum of the cross-multiplication of the pair of the indexed digits in divisor-column (43) and the last two quotient-digits (43) from the new dividend 43.

i.e., $43 - (4 \times 3 + 3 \times 4) = 43 - 24 = 19$

Now net-dividend is 19 and it is dividend by 7. Put down the obtained quotient 2 and remainder 5 their respective places.

$7^{43}|10\ {}_{3}6\ {}_{4}4\ {}_{4}3|{}_{5}21$

$\quad\ |\ 1\ \ 4\ \ 3\ \ 2\ |$

Thus the division process is called, in which required remainder = Number obtained in remainder-column – 10 × (sum of the cross multiplication of the pair of the indexed digits in divisor-column and the last two quotient-digits) – Product of the unit digit of indexed number in divisor-column and the last quotient-digit.

$= 521 - 10 \times (4 \times 2 + 3 \times 3) - 3 \times 2$

$= 521 - 10 \times 17 - 6$

$= 345$

Hence, quotient = 1432 ; remainder = 345.

Ex. : Divided the number 4213 by 1234 upto 4 decimal places.

Sol : **Step 1:** $12^{34}|4\ 2|1\ 3\ 0\ 0\ 0$

$\quad\ |\ \ \ |\ \ \ |$

$\because$ 12 is a small number to handle with we can treat 1234 as a three-digit number.

We have to find the quotient in decimal so we can put zeroes in the last in decimal-column or remainder-column.

Step 2: $12^{34}|4\ 2|{}_{6}1\ 3\ 0\ 0\ 0$

$\quad\ |\ 3\ |$

Dividing 42 by 12, we get quotient = 3 and remainder = 6

Step 3: $12^{34}|4\ 2|{}_{6}1\ {}_{4}3\ 0\ 0\ 0$

$\quad\ |\ 3\ |4$

$61 - (3 \times 3) = 61 - 9 = 52$

Dividing 52 by 12, we get quotient = 4 and remainder = 4

Step 4: $12^{34}|4\ 2|{}_{6}1\ {}_{4}3\ {}_{7}0\ 0\ 0$

$\quad\ |\ 3\ |4\ 1$

$43 - (3 \times 4 + 4 \times 3) = 43 - 24 = 19$

Dividing 19 by 12, we get quotient = 1 and remainder = 7

Step 5: $12^{34}|4\ 2|{}_{6}1\ {}_{4}3\ {}_{7}0\ {}_{3}0\ 0$

$\quad\ |\ 3\ |4\ 1\ 4$

$70 - (3 \times 1 + 4 \times 4) = 70 - 19 = 51$

Dividing 51 by 12, we get quotient = 4 and remainder = 3

Step 6: $12^{34}|4\ 2|{}_{6}1\ {}_{4}3\ {}_{7}0\ {}_{3}0\ {}_{2}0$

$\quad\ |\ 3\ |4\ 1\ 4\ 1$

$30 - (3 \times 4 + 4 \times 1) = 30 - 16 = 14$

Dividing 14 by 12, we get quotient = 1 and remainder = 2

Hence, required answer 3.4141.

❑❑