

Important Tricks to Solve Numerical Problems

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Shortcut Tricks to find the Square of Numbers

SQUARE OF NUMBERS

- Square of a number is the product obtained by multiplying a number by itself

$$2 \times 2 = 4$$

$$11 \times 11 = 121$$

- To find the square of two digit numbers (10-99) we can consider the following steps

- 1) Let the 2-digit number be = AB
- 2) Now to find AB^2
- 3) Unit digit of square = B^2
- 4) Ten's digit of square = $2 \times A \times B$ (+ Carry if any from the previous step)
- 5) The rest of the digits of square = A^2 (+ Carry if any from the previous step)

FOR EXAMPLE

$$67^2 = ?$$

$$AB^2 = 67^2$$

STEP 1:

$$B^2 = 7^2 = \underline{4} \ 9$$



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Here "9" is the unit digit and "4" is carry

$$\rightarrow 67^2 = _ _ _ 9$$

STEP 2:

$[2 \times A \times B]$ + Carry from previous step i.e., 4

$$2 \times A \times B = 2 \times 6 \times 7 = 84$$

Add Carry '4' with the above '84' we get $[84 + 4 = \underline{88}]$

Therefore at the end of the 2nd Step

From Step 1, here "8" is the unit digit and "8" is carry

$$\rightarrow 67^2 = _ _ 8 9$$

STEP 3:

$$A^2 = 6^2 = 36$$

There is a carry of '8' from the previous step

$$\text{Therefore, } [36 + 8] = 44$$

The final answer is $67^2 = \underline{4} \underline{4} \underline{8} \underline{9}$

To find the square of a number which is a multiple of '5'

$$AB^2 = [A \times \text{next number}] B^2$$

$$25^2 = [2 \times 3] 5^2$$

$$= [6] 25 = 625$$

i.e., AB^2 where $B=5$

$$AB^2 = [A \times \text{next number}] B^2$$

$$\text{For example, } 85^2 = [8 \times 9] 25 = 7225$$

$$115^2 = [11 \times 12] 25 = 13225$$

$$155^2 = [15 \times 16] 25 = 24025$$

This method can be followed for all numbers divisible by 5



Important Tricks to Solve Numerical Problems



Easy Method to Take Square Root for a Number

SQUARE ROOT

POINTS TO REMEMBER:

- When $2^2 = 4$, then $\sqrt{4} = 2$
- Here 4 is the **square** of 2
- 2 is the **square root** of 4
- A **Square** of a number can **never end** with 2, 3, 7 and 8

Table 1:

One's digit of a square	One's digit of the square root
1	1 or 9
4	2 or 8
5	5
6	4 or 6
9	7 or 3

To find the square of a number which is a **multiple of '5'**

$$25^2 = [2 \times 3] 5^2$$

$$= [6] 25 = 625$$

i.e., AB^2 where $B=5$

$$AB^2 = [A \times \text{next number}] B^2$$

For example, $85^2 = [8 \times 9] 25 = 7225$

$$115^2 = [11 \times 12] 25 = 13225$$

$$155^2 = [15 \times 16] 25 = 24025$$

This method can be followed for all numbers divisible by 5



Important Tricks to Solve Numerical Problems

TYPE 1:

To find the square root of a 3-digit number

EXAMPLE: $\sqrt{841}$

STEP 1: Consider the one's digit of the given number i.e., 1

From Table 1, if the one's digit of the square is '1' then the square root would either end with '1' or '9'

STEP 2: Always ignore the ten's digit of the given number

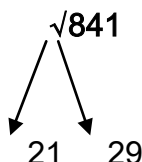
STEP 3: Now the remaining number other than the one's and the ten's digit in the given number is '8'

Consider a **square-root of a square** which is **nearer to** as well as **lesser than** '8'.

Here it is '4' which is nearer to as well as lesser than '8'. Hence the square root of 4 i.e., '2' is taken

STEP 4: we already know the one's digit of the square root to be either 1 or 9 from STEP 1

Therefore the square root of '841' lies between 21 and 29



STEP 5:

Take a number **divisible by '5'** between 21 and 29, that is '**25**'

$$25^2 = [2 \times 3] \ 25 = 625$$

Now $625 < 841$

25^2 is itself lesser than 841. Then 21^2 will be **much lesser** than 841.

Therefore, the remaining option is '29'

$$\sqrt{841} = 29$$

TYPE 2:

To find the square root of a 4-digit number

EXAMPLE: $\sqrt{8464}$

STEP 1: Consider the one's digit of the given number i.e., 4

From Table 1, if the one's digit of the square is '4' then the square root would either end with '2' or '8'

STEP 2: Always ignore the ten's digit of the given number

STEP 3: Now the remaining numbers other than the one's and the ten's digit in the given number is '84'

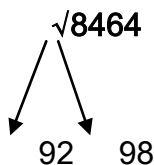
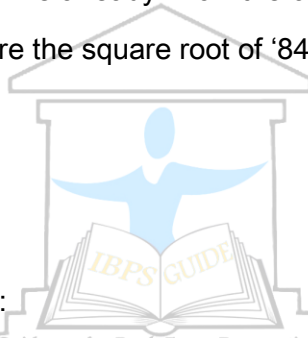
Consider a **square-root of a square** which is **nearer to** as well as **lesser than** '84'.

Here it is '81' which is nearer to as well as lesser than '84'. Hence the square root of 81 i.e., '9' is taken

Important Tricks to Solve Numerical Problems

STEP 4: we already know the one's digit of the square root to be either 2 or 8 from STEP 1

Therefore the square root of '8464' lies between 92 and 98



STEP 5:

Take a number **divisible by '5'** between 92 and 98, that is '**95**'

$$95^2 = [9 \times 10] 25 = 9025$$

Now $9025 > 8464$

95^2 is itself greater than 8464. Then 98^2 will be **much greater** than 8464

Therefore, the remaining option is '92'

$$\sqrt{8464} = 92$$

TYPE 4:

To find the square root of a 5-digit number

EXAMPLE: $\sqrt{18769}$

STEP 1: Consider the one's digit of the given number i.e., 9

From Table 1, if the one's digit of the square is '9' then the square root would either end with '**3**' or '**7**'

STEP 2: Always **ignore the ten's digit** of the given number

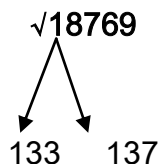
STEP 3: Now the remaining numbers other than the one's and the ten's digit in the given number is '**187**'

Consider a **square-root of a square** which is **nearer to** as well as **lesser than** '187'

Here it is '**169**' which is nearer to as well as lesser than 187. Hence the square root of 169 i.e., '**13**' is taken

STEP 4: we already know the one's digit of the square root to be either 3 or 7 from STEP 1

Therefore the square root of '18769' lies between 133 and 137



STEP 5:

Take a number **divisible by '5'** between 133 and 137, that is '**135**'

$$135^2 = [13 \times 14] 25 = 18225$$

Now $18225 < 18769$

135^2 is itself smaller than 18769. Then 133^2 will be **much lesser** than 18769



Important Tricks to Solve Numerical Problems

Therefore, the remaining option is '137'

$$\sqrt{18769} = 137$$

Shortcut for the Multiplication of 2 Digit & 3 Digit Numbers

MULTIPLICATION OF 2-DIGIT NUMBERS (10-99):

EXAMPLE 1:

$$78 \times 65 = ?$$

GIVEN:

$$N1 = 78; N2 = 65$$

SOLUTION

- STEP 1: One's digit of the product is obtained by multiplying the one's digits of N1 and N2

$$\text{One's digit of product} = [\text{One's digit of } N1 \times \text{One's digit of } N2]$$

$$= [8 \times 5]$$

$$= 40$$

'4' is taken as carry to the Step 2 i.e., $C1 = 4$

$$\begin{array}{r} 78 \\ \times 65 \\ \hline \end{array}$$

--- 0

- STEP 2:

$$\text{Ten's digit of product} = [\text{Ten's digit of } N1 \times \text{One's digit of } N2] +$$

$$[\text{One's digit of } N1 \times \text{Ten's digit of } N2] + C1$$

$$= [7 \times 5] + [6 \times 8] + 4$$

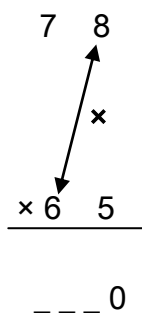
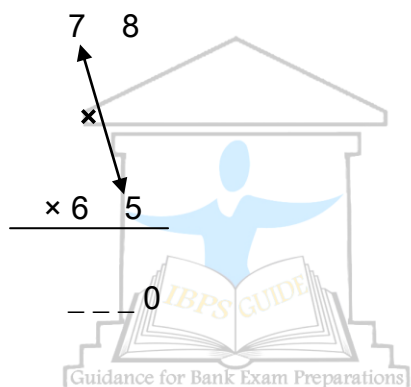
$$= 35 + 48 + 4$$

$$= 87$$

'8' is taken as the carry to Step 3 i.e., $C2 = 8$



Important Tricks to Solve Numerical Problems



Add the Products of the above 2-steps. At the end of Step 2 we have

$$\begin{array}{r} 78 \\ \times 65 \\ \hline _ _ 70 \end{array}$$

➤ STEP 3:

To calculate the hundredth and the thousandth digit of the product

$$= [\text{Ten's digit of } N1 \times \text{Ten's digit of } N2] + C2$$

$$= [7 \times 6] + 8$$

$$= [42] + 8$$

$$= 50$$

$$\begin{array}{r} 78 \\ \times 65 \\ \hline 5070 \end{array}$$

Therefore, $78 \times 65 = 5070$

Shortcut for the Multiplication of 2 Digit & 3 Digit Numbers

MULTIPLICATION OF NUMBERS BETWEEN (90-99):

The product can be determined by a simple multiplication and a subtraction. **BASE**

Important Tricks to Solve Numerical Problems

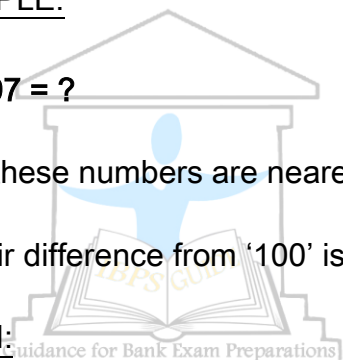
EXAMPLE:

$$98 \times 97 = ?$$

Here, these numbers are nearer to '100' in the number system.

So their difference from '100' is considered, i.e., [$D1=100-98=02$] & [$D2=100-97=03$]

GIVEN:



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No.1 = 98; No.2 = 97

Difference, $D1 = 02$; $D2 = 03$

SOLUTION:

The multiplication is done between 2-digit numbers so the **product** will definitely be a **4-digit number**.

$$\begin{array}{r} 98 \rightarrow 02 \\ \times 97 \rightarrow 03 \\ \hline \end{array}$$

The **one's** and **ten's** digit of the **product** will be the **product** of $D1$ and $D2$

$$\begin{array}{r} 98 \rightarrow 02 \\ \times 97 \rightarrow 03 \\ \hline \end{array}$$

-- 06

i.e., $D1 \times D2 = 02 \times 03 = 06$

Similarly, the **hundredth** and **thousand** digit of the **product** will be the **difference** between No.2 and $D1$. i.e., [$No.2 - D1 = 97 - 02 = 95$]

$$\begin{array}{r} 98 \rightarrow 02 \\ \times 97 \rightarrow 03 \\ \hline 9506 \end{array}$$

Therefore, $98 \times 97 = 9506$



Important Tricks to Solve Numerical Problems

This method can be applied to multiply 2-digit numbers whose difference from '100' can be multiplied with each other easily.

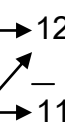
$$88 \times 89 = ?$$

Here, No.1=88; No.2=89; D1=100-88=12; D2=100-89=11



$$\begin{array}{r} 88 \rightarrow 12 \\ \times 89 \rightarrow 11 \\ \hline \end{array}$$

Here, $12 \times 11 = \underline{1}32$, we know that the product is a 4-digit number so '1' is taken as carry




$$\begin{array}{r} 88 \rightarrow 12 \\ \times 89 \rightarrow 11 \\ \hline \end{array}$$

_ _ 3 2

For the hundredth and thousand digits of the product, No.2 - D1 = 89-12=77

Now we have one carry from the previous step '1', that is added to this difference [77+1=78]



$$\begin{array}{r} 88 \rightarrow 12 \\ \times 89 \rightarrow 11 \\ \hline \end{array}$$

7 8 3 2

Therefore, $88 \times 89 = 7832$

MULTIPLICATION OF NUMBERS BETWEEN (101-110):

Here the product can be determined by a simple multiplication and an addition.

EXAMPLE:

$$108 \times 107 = ?$$



Important Tricks to Solve Numerical Problems

Here, these numbers are nearer to '100' in the number system.

So their difference from '100' is considered, i.e., $[D1=108-100=08]$ &

$[D2=107-100=07]$

GIVEN:

No.1 = 108; No.2 = 107

Difference, $D1 = 08$; $D2 = 07$

SOLUTION:

The multiplication is done between 3-digit numbers below 200(<200) so the **product** will definitely be a **5-digit number**.

Here, the method is same as that of 2-digit multiplication except for a small change.

STEP 1: product of $D1$ and $D2$ is same i.e., $[D1 \times D2 = 08 \times 07 = 56]$

$$\begin{array}{r} 108 \rightarrow 08 \\ \times 107 \rightarrow 07 \\ \hline \quad \quad 56 \end{array}$$

STEP 2: Since the numbers are greater than 100, the sum of No.2 and $D1$ is taken

$$[No.2 + D1 = 107 + 08 = 115]$$

$$\begin{array}{r} 108 \rightarrow 08 \\ \times 107 \rightarrow 07 \\ \hline 11556 \end{array}$$

Therefore, $108 \times 107 = 11556$

Similarly if $D1$ and $D2$ are more than 10, then the carry over from the product of $D1 \times D2$ is added to the sum of $No.2 + D1$

For example, $111 \times 112 = ?$



Important Tricks to Solve Numerical Problems

Here $D1=11$; $D2=12$ (>10)

Therefore, $D1 \times D2 = 11 \times 12 = 132$

In step 2, $No.2 + D1 = 112 + 11 = 123 + \text{carry} = 123 + 1 = 124$

So, $111 \times 112 = 12432$

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Shortcut for the Multiplication of 3 Digit & 4 Digit Numbers

MULTIPLICATION OF NUMBERS BETWEEN (900-999):

The product can be determined by a **simple multiplication** and a **subtraction**.

EXAMPLE:

$$998 \times 997 = ?$$

Here, these numbers are nearer to '1000' in the number system.

So their difference from '1000' is considered, i.e., [$D1=1000-998=002$] & [$D2=1000-997=003$]

GIVEN:

No.1 = 998; No.2 = 997

Difference, $D1 = 002$; $D2 = 003$

SOLUTION:

The multiplication is done between 3-digit numbers so the **product** will definitely be a **6-digit number**.

$$\begin{array}{r} 998 \rightarrow 002 \\ \times 997 \rightarrow 003 \\ \hline \end{array}$$

The **one's**, **ten's** and **hundredth** digit of the **product** will be the **product** of **D1** and **D2**

$$998 \rightarrow 002 \quad \times$$



Important Tricks to Solve Numerical Problems

$$\times \begin{array}{r} 997 \rightarrow 003 \\ \hline \end{array}$$

$$\begin{array}{r} \text{---} 006 \\ \hline \end{array}$$

i.e., $D1 \times D2 = 002 \times 003 = 006$

Similarly, the 1st 3 digits of the product will be the difference between No.2 and D1. i.e., $[No.2 - D1 = 97 - 02 = 95]$

$$998 \rightarrow 002$$

$$\times \begin{array}{r} 997 \rightarrow 003 \\ \hline \end{array}$$

$$995006$$

Therefore, $998 \times 997 = 995006$

This method can be applied to multiply 3-digit numbers whose difference from '1000' can be multiplied with each other easily.

$$988 \times 989 = ?$$

Here, No.1=988; No.2=989; $D1=1000-988=12$; $D2=1000-989=11$

$$\begin{array}{r} 988 \rightarrow 12 \\ \times 989 \rightarrow 11 \\ \hline \text{---} \end{array}$$

Here, $12 \times 11 = 132$

$$\begin{array}{r} 988 \rightarrow 12 \\ \times 989 \rightarrow 11 \\ \hline \text{---} 132 \end{array}$$

For the 1st 3 digits of the product, $No.2 - D1 = 989 - 12 = 977$

$$\begin{array}{r} 988 \rightarrow 12 \\ \times 989 \rightarrow 11 \\ \hline 977132 \end{array}$$



Important Tricks to Solve Numerical Problems

Therefore, $988 \times 989 = 977132$

MULTIPLICATION OF NUMBERS BETWEEN (1001-1010):

Here the product can be determined by a **simple multiplication** and an **addition**.

EXAMPLE:

$$1008 \times 1007 = ?$$

Here, these numbers are nearer to '1000' in the number system.

So their difference from '1000' is considered, i.e., [$D1 = 1008 - 1000 = 008$] &

$$[D2 = 1007 - 1000 = 007]$$

GIVEN:

$$\text{No.1} = 1008; \text{No.2} = 1007$$

$$\text{Difference, } D1 = 008; D2 = 007$$

SOLUTION:

The multiplication is done between 4-digit numbers so the **product** will definitely be a **7-digit number**.

Here, the method is same as that of 3-digit multiplication except for a small change.

STEP 1: product of D1 and D2 is same i.e., [$D1 \times D2 = 008 \times 007 = 056$]

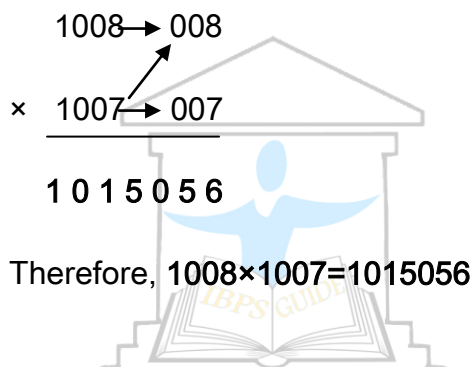
$$\begin{array}{r} 1008 \rightarrow 008 \\ \times 1007 \rightarrow 007 \\ \hline \quad \quad \quad 056 \end{array}$$

STEP 2: Since the numbers are greater than 1000, the sum of No.2 and D1 is taken

$$[\text{No.2} + D1 = 1007 + 08 = 1015]$$



Important Tricks to Solve Numerical Problems



Therefore, $1008 \times 1007 = 1015056$

Fast and Easy Method to Take Cube Root

POINTS TO REMEMBER:

- When $2^3 = 8$, then $(8)^{1/3} = 2$
- Here 8 is the **cube** of 2
- 2 is the **cube root** of 8

Table 1:

	One's digit of a cube	One's digit of the cube root	
TYPE To find cube of a 4- number	1	1	1: the root digit
	2	8	
	3	7	
	4	4	
	5	5	
	6	6	
	7	3	
	8	2	
	9	9	
	0	0	

EXAMPLE: $(9261)^{1/3}$

STEP 1: Consider the one's digit of the given number i.e., 1

From Table 1, if the one's digit of the cube is '1' then the cube root would also end with '1'



Important Tricks to Solve Numerical Problems

STEP 2: Always ignore the ten's and the hundredth digits of the given number i.e., ignore '2' and '6' in the given number

STEP 3: Now the remaining number other than the one's, ten's and the hundredth digit in the given number is '9'

Consider a **cube-root of a cube** which is **nearer to** as well as **lesser than** '9'.

Here it is '8' which is nearer to as well as lesser than '9'. Hence the cube root of 8 i.e., '2' is taken

STEP 4: we already know the one's digit of the cube root is 1 from STEP 1

Therefore the cube root of '9261' is 21

$$\begin{array}{c} (9261)^{1/3} \\ \downarrow \\ 21 \end{array}$$

Therefore $(9261)^{1/3} = 21$

TYPE 2:

To find the cube root of a 5-digit number

EXAMPLE: $(32768)^{1/3}$

STEP 1: Consider the one's digit of the given number i.e., 8

From Table 1, if the one's digit of the cube is '8' then the cube root would end with '2'

STEP 2: Always ignore the ten's and the hundredth digits of the given number i.e., '6' and '7' here

STEP 3: Now the remaining numbers other than the one's, ten's and the hundredth digits in the given number is '32'

Consider a **cube-root of a cube** which is **nearer to** as well as **lesser than** '32'.

Here it is '27' which is nearer to as well as lesser than '32'. Hence the cube root of 27 i.e., '3' is taken

STEP 4: we already know the one's digit of the cube root to be 2 from STEP 1

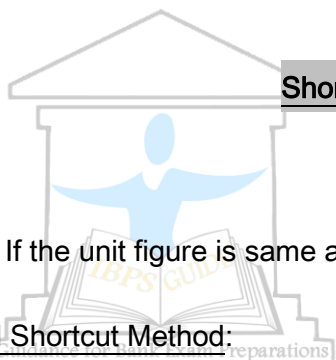
Therefore the cube root of '32768' is 32

$$\begin{array}{c} (32768)^{1/3} \\ \downarrow \\ 32 \end{array}$$

Therefore $(32768)^{1/3} = 32$



Important Tricks to Solve Numerical Problems



Shortcut Rules for Basic Multiplication

Type-1: If the unit figure is same and the sum of the tens figure is 10, then follow the below method.

General Shortcut Method:

$[\text{Tens fig.} \times \text{Tens fig.} + \text{Unit fig.}] [\text{Unit fig.} \times \text{Unit fig.}]$

Example:

$86 \times 26 = [8 \times 2 + 6] [6 \times 6] = [22] [36]$; so answer is: 2236.

Note: Here, the unit figure denotes the number that present in the ones digit (6, 6), and tens figure denotes the number that present in the tens digit (8, 2).

Type-2: If the sum of the unit figure is 5 and the tens figure are equal. Then follow the below method.

General Shortcut Method:

$[(\text{Tens figure})^2 + \frac{1}{2} \times \text{Tens figure}] [\text{Unit fig.} \times \text{Unit fig.}]$

Example:

$83 \times 82 = [8^2 + \frac{1}{2} \times 8] [3 \times 2] = [68] [06]$ So the answer is: 6806

Type-3: If the unit figures are same and the sum of tens figures is 5.

General Shortcut Method:

$[\text{Tens fig} \times \text{Tens fig} + \frac{1}{2} \times \text{Unit fig}] [(\text{Unit fig.})^2]$

Example:

$36 \times 26 = [3 \times 2 + \frac{1}{2} \times 6] [6^2]$

$= [9] [36]$; Answer is 936.

Type-4: If the unit figures are 5 and difference between the tens figures is 1 then the rule is,

General Shortcut Method:



Important Tricks to Solve Numerical Problems

[(Larger tens fig + 1) × (Smaller tens fig)] [75]

Example:

$$35 \times 45 = [(4 + 1) \times 3] [75]$$

= [15] [75]; So the Answer is, 1575.

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MULTIPLICATION BY 11 WITH ANY NUMBER AND ANY DIGITS

TWO DIGIT NUMBERS:

TYPE I: When the sum of the one's and ten's digit of the number is less than 10 (i.e. 0 to 9)

For example: 43×11 where the sum of the digits is less than 10, $[4+3=7]$ this method can be used.

Now
$$\begin{array}{r} 43 \times 11 \\ 4 _ 3 \end{array}$$

The one's and the ten's digit of the number will be the last and the first digit of the product respectively.

$$\begin{array}{r} 43 \times 11 \\ 4 \ 7 \ 3 \end{array}$$

The ten's digit of the product will be sum of the digits of the number, here $[4+3=7]$

Therefore, $43 \times 11 = 473$.

Similarly, $36 \times 11 = 396$, where $[3+6=9]$

$$53 \times 11 = 583, \text{ where } [5+3=8]$$

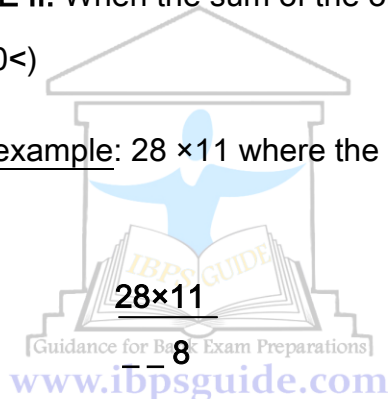


Important Tricks to Solve Numerical Problems

TYPE II: When the sum of the one's and ten's digit of the number is either 10 or more than 10 (i.e. 10 or 10<)

For example: 28×11 where the sum of the digits is 10, $[2+8=10]$ this method can be used.

Now



$$\begin{array}{r} 28 \times 11 \\ \underline{\quad} \end{array}$$

$$\underline{\quad} \underline{\quad} 8$$

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The one's digit of the number will be the one's digit of the product.

$$\begin{array}{r} 28 \times 11 \\ \underline{\quad} \end{array}$$

$$\underline{\quad} \underline{0} 8$$

The ten's digit of the product will be sum of the digits of the number, here $[2 + 8 = \underline{1} 0]$



Carry over

The hundredth digit of the product will be the sum of ten's digit of the number and the carry over.

$$[2 + \underline{1} = 3]$$

Therefore, 28×11

$$\underline{3} \underline{0} 8$$

Similarly, $85 \times 11 = 935 \longrightarrow \{9[8+1] \quad 3[8+5=\underline{1}3] \quad 5\}$

$$99 \times 11 = 1089 \longrightarrow \{10[9+1] \quad 8[9+9=\underline{1}8] \quad 9\}$$

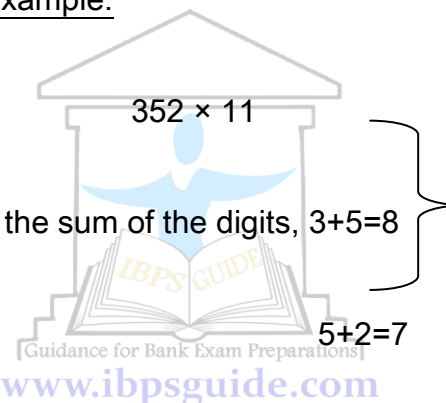
THREE DIGIT NUMBERS:

TYPE I (Sum of digits < 10):



Important Tricks to Solve Numerical Problems

For example:



Here the sum of the digits, $3+5=8$

$5+2=7$

Both the sums are less than 10

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Now, 352×11

3 _ _ 2

Similar to 2-digit multiplication the first and the last digit of the number will be the first and the last digit of the product.

The ten's digit of the product = [One's digit of the no. + Ten's digit of the no.]

$$= [5 + 2 = 7]$$

$$\underline{352 \times 11}$$

$$3 \underline{7} 2$$

The hundredth digit of the product = [Hundredth digit of the no. + Ten's digit of the no.]

$$= [3 + 5 = 8]$$

$$\underline{352 \times 11}$$

$$3 \underline{8} \underline{7} 2$$

Therefore, $352 \times 11 = 3872$.

Similarly, $236 \times 11 = 2596 \rightarrow \{2 \ 5[2+3=5] \ 9[3+6] \ 6\}$

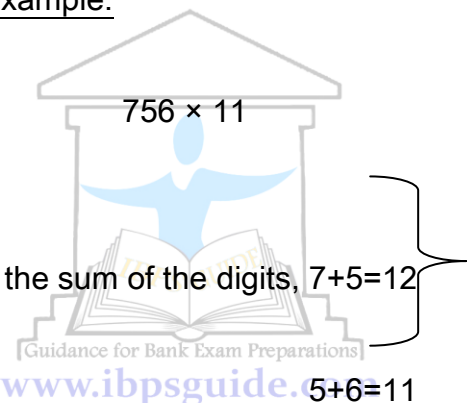
$123 \times 11 = 1353 \rightarrow \{1 \ 3[1+2=3] \ 5[2+3] \ 3\}$

TYPE II (Sum of digits >10):



Important Tricks to Solve Numerical Problems

For example:



Here the sum of the digits, $7+5=12$

Both the sums are more than 10

$5+6=11$

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Now, 756×11

— — — 6

The one's digit of the product is same as the one's digit of the number.

Ten's digit of the product = [One's digit of no. + Ten's digit of no.]

$$= [5 + 6 = \underline{11}]$$



Carry over 1

756×11

— — 1 6

Hundredth digit of the product = [Ten's digit of no. + Hundredth digit of no.] + Carry over 1

$$= [7 + 5] + 1 = \underline{13}$$



Carry over 2

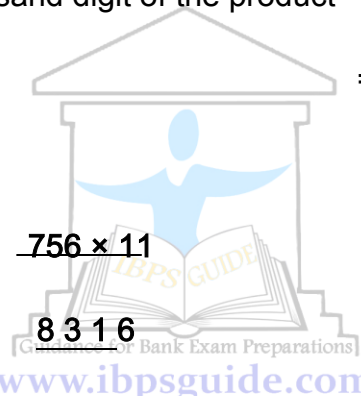
756×11

— 3 1 6



Important Tricks to Solve Numerical Problems

Thousand digit of the product = [Hundredth digit of the number + Carry over 2]



$$756 \times 11 = 8316$$

[Carry over 2]

Therefore, $756 \times 11 = 8316$

Similarly, $999 \times 11 = 10989 \rightarrow \{10[9+1] \ 9[9+9+1=\underline{19}] \ 8[9+9=\underline{18}] \ 9\}$

Shortcut Rules for Basic Subtraction

Rule-I: Borrowing and Paying Back Method:

This method is the quickest method of subtraction. This method is also called equal additions method.

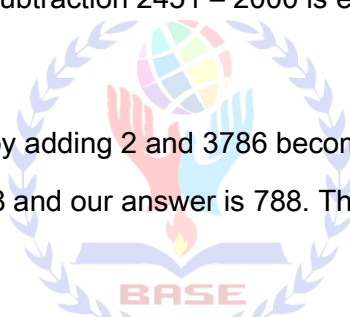
Example (1): Suppose we have to subtract 55 from 91. Mentally we have to increase the number to be subtracted to the nearest multiple of 10 i.e., increase 55 to 60 by adding 5 to it. Mentally increase the other quantity by the same amount i.e., by 5. Therefore, the problem is 96 minus 60 i.e., our answer is $96 - 60 = 36$.

Example (2): Sometimes it is useful to increase the number to be subtracted to the nearest multiple of 100 for example $442 - 179$. Therefore 179 becomes 200 by adding 21 and 442 becomes 463 by adding 21. Then the problem becomes $463 - 200 = 263$. Now we see that $463 - 200$ is easier than $442 - 179$. The result is same as 263.

Example (3): Another example is $2326 - 1875$. Here 1875 becomes 2000 by adding 125 and 2326 becomes 2451 by adding 125. The number becomes $2451 - 2000 = 451$. Here the subtraction $2451 - 2000$ is easier than the subtraction $2326 - 1875$. The answer of both is same 451.

Example (4): The subtraction of $3786 - 2998$. Here 2998 becomes 3000 by adding 2 and 3786 becomes 3788 by adding 2. The problem of $3788 - 3000$ is easier than $3786 - 2998$ and our answer is 788. This answer is same for both the problems.

Rule: II. Double Column Addition and Subtraction Method:



Important Tricks to Solve Numerical Problems

This following method is works when there is a series of additions and subtractions are to be performed in a line.

Example (1):

$$\begin{array}{r}
 1026 \\
 - 4572 \\
 + 5263 \\
 - 2763 \\
 + 8294 \\
 \hline
 \end{array}$$

Explanation: We have to look the signs given before the numbers and then start adding and adding and subtracting from the top right position.

Step I: First Double Column

$$26 - 72 = -46, -46 + 63 = 17,$$

$$17 - 63 = -46, -46 + 94 = 48.$$

Answer is 48 → Step-I

Step II: Second Double Column:

$$10 - 45 = -35, -35 + 52 = 17,$$

$$17 - 27 = -10, -10 + 82 = 72.$$

Answer is 72 → Step-II

Now Combine the Step II and Step I.

Answer will be 7248.

You will get the same answer if you also use the normal method.

Example (2):

$$\begin{array}{r}
 7676 \\
 - 1431 \\
 + 5276 \\
 - 3489 \\
 + 1546 \\
 \hline
 \end{array}$$



Important Tricks to Solve Numerical Problems

Explanation: We have to look the signs given before the numbers and then start adding and adding and subtracting from the top right position.

Step I: First Double Column

$76 - 31 = 45$, $45 + 76 = 121$ (here in the 121 take the last two digits from 121 i.e., 21)

$21 - 89 = -68$, $-68 + 46 = -22$ (Here the answer comes in minus so add 100 with the answer)

$100 + (-22) = 78$.

Answer is 78 → Step I

Step II: Second Double Column

$76 - 14 = 62$, $62 + 52 = 114$ (Take the last two digits from 114 i.e., 14)

$14 - 34 = -20$, $-20 + 15 = -5$ (Here the answer comes in minus so add 100 with the answer)

$100 + (-5) = 95$

Answer is 95 → Step II.

Now Combine the Step II and Step I.

Answer will be 9578.

Shortcut Rules for Basic Division

1.) DIVISIBLE BY 2:

A number will be divisible by 2, if the unit digit in the number is 0, 2, 4, 6 and 8.

Example: Numbers like, 56456, 32658, 89846 are divisible by 2.

2.) DIVISIBLE BY 4:

A number will be divisible by 4, if the last two digits of the number is divisible by 4.

Example: Numbers like 56536 is divisible by 4, because the last two digits of this number is divisible by 4 and the number 546642 is not divisible by 4 because the last two digits of this number is not divisible by 4.

3.) DIVISIBLE BY 6:

A number will be divisible by 6, if that number is divisible by both 2 and 3.

Example: 36 is divisible by 6 because 36 is divisible by both 2 and 3.

4.) DIVISIBLE BY 8:



Important Tricks to Solve Numerical Problems

A number will be divisible by 8, if the last three digits of that number are divisible by 8.

Example: 565144 is divisible by 8 because the last three digits 144 is divisible by 8. And the number 554314 is not divisible by 8 because the last three digits 314 is not divisible by 8.

5.) DIVISIBLE BY 5:

A number will be divisible by 5 if the unit digit is either 0 or 5.

Example: Numbers like 565520 and 898935 are divisible by 5.

6.) DIVISIBLE BY 3:

A number will be divisible by 3, if the sum of the digits in the number is divisible by 3.

Example: 658452 is divisible by 3 because the sum of the numbers is divisible by 3, $6+5+8+4+5+2=30$, which is divisible by 3.

The number 456455 is not divisible by 3, because the sum of the number is not divisible by 3.
 $4+5+6+4+5+5=29$ this is not divisible by 29.

7.) DIVISIBLE BY 9:

A number will be divisible by 9, if the sum of the digits in the number is divisible by 9.

Example: 898686 is divisible by 9 because the sum of the numbers is divisible by 9,

$8+9+8+6+8+6=45$, this is divisible by 9.

8.) DIVISIBLE BY 11:

A number will be divisible by 11, if the difference of the sum of the digits in the Odd places and Sum of the digits in the Even places, is either zero or divisible by 11.

Example: 502678 is divisible by 11 because, the sum of the digits of the odd places, $5+2+7=14$, sum of the digits in the even places, $0+6+8=14$, the difference is $14-14=0$, so this number is divisible by 11.

9.) DIVISIBLE BY 12:

A number is divisible by 12, if the number is divisible by both 3 and 4.

Example: 144 is divisible by 12, because it is divisible by both 3 and 4.



Important Tricks to Solve Numerical Problems

10.) DIVISIBLE BY 10:

Any number that ends with zero will be divisible by 10.

