

It is fast , efficient and easy to learn and use.

How important is Speed?

How fast your can solve a problem is very important. There is a race against time in all the competitions. Only those people having fast calculation ability will be able to win the race. Time saved can be used to solve more problems or used for difficult problems. So if you can improve your calculation speed 4X (4 times) you would require to do the same problem come down to $\frac{1}{4}^{\text{th}}$ of your original time. In other words 20 minute come down to 5 minute just by improving your speed.

SHORT METHOD 1

Multiplication by 11

e.g.

$$\begin{array}{r} 62 \\ \times 11 \\ \hline \end{array}$$

$$62 \times 11$$

$$62 \times 11 = 6 _ (6+2) _ 2 = 6 \ 8 \ 2$$

62 X 11 is [6 and 6+2=8 and 2], answer is 682

e.g.

MULTIPLICATIONS

SHORT METHOD 6

STRAIGHT LINE METHOD OF MULTILPLYING TWO NUMBERS

(FROM VEDIC AND ALSO FROM TRACHTENBERG SYSTEM OF SPEED MATHMATICS)

STEP 1

FINDING THE UNIT DIGIT

STEP 2

FINDING THE TENS PLACE DIGIT

STEP 3

FINDING THE HUNDREDS PLACE DIGIT

FINAL STEP

The value of each step put as follows

STEP3 STEP2(IF ANY CARRY THEN FORWARD STEP 2) STEP 1(IF ANY CARRY FORWARD TO STEP 2)

More than 3 step if the digit more than hundred

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Page 10 of 42

$$a^2 - b^2 = (a-b)(a+b)$$

for example $14 \times 16 = ?$

$$= 14 \times 16 = (15-1)(15+1)$$

$$= 15^2 - 1^2 = 225 - 1 = 224$$

In this method the key point is value of b, for finding the value of b use the difference of multiplier divide by 2

$$\text{i.e. } (16-14)/2 = 1$$

then directly find $(15-1) \times (15+1)$

another example $13 \times 17 = ?$

$$B = (17-13)/2 = 2$$

$$\text{Then } 15^2 - 2^2 = 225 - 4 = 221$$

Note :-

- 1 It is applicable only if both multiplier is even or odd, but if one multiplier is even and another is odd or vice versa then this process is not applicable.
- 2 It is not applicable if the difference between them large. For example 297×341 .

Initial digit $(103+(-4))$ or $(96+3) = 99$

When you write 99 and last digit is 00 then value is

9900

Now from this subtract $+3X-4=-12$ from 9900

$9900-12=9888$

Final answer is 9888

e.g.

993

X 992

993 -7
X 992 -8

Last 3 digit $= -7X-8=56$ hence written as 056

Initial digit : cross addition $= 993+(-8) = 985 = 992+(-7)$

Thus the answer is **985056**

e.g.

104X106

multiplication by 12

$$\begin{array}{r} 62 \\ \times 12 \\ \hline \end{array}$$

62 X 12 is

Add 0 to the left and right as shown below

$$0\ 6\ 2\ 0$$

$$0\ 6\ 2\ 0 \quad [2 \times 0 + 6, 2 \times 6 + 2, 2 \times 2 + 0]$$

$$= 6_14_4 = (6+1)_14_4 = 744$$

e.g.

$$\begin{array}{r} 8541 \\ \times 12 \\ \hline \end{array}$$

8514 X 12

Add 0 to the left and ight side

$$085140 = (2 \times 0 + 8)_(8 \times 2 + 5)_(5 \times 2 + 1)_(2 \times 1 + 4)_(2 \times 4 + 0)$$

$$= 8_21_11_6_8 = 8_21_11_6_8 = (8+2)_(1+1)_1_6_8$$

$$= 102168$$

Square and cubes

Squares

When any no. is multiply itself is called squares.

First of all ,you are expected to memorise the square of first 30 no.s.

SHORT METHOD 14

Squares for finding numbers from 31 to 50

Such no. can be treated in the form of $(50-x)$.

e.g.

$$47^2=?$$

Step 1

Look at 47 $(50-3)$

Step 2

The last two digit are got by squaring of $(50-47)^2=3^2=9$

Hence last digit 09 of 47^2 .

Step 3

First digit find $25-3=22$

Hence answer is 2209

e.g. $46^2=?$

$$46^2=$$

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Page 28 of 42

$$\begin{array}{r}
 \hline
 \begin{array}{cc}
 | & | \\
 | & | \\
 | & | \\
 (8+13) & (32+64+43) \\
 || & || \\
 21 & 139 \\
 \text{Carry}=13
 \end{array}
 \end{array}
 \begin{array}{l}
 \backslash \\
 \backslash \\
 \text{Carry 51} \\
 (128+256+51=435) \\
 \text{carry 43}
 \end{array}$$

Hence cube is 21952

Divisibility Rules

A number is divisible by:

2, 4 & 8

when the number formed by the last, last two, last three digits are divisible by 2, 4 & 8 respectively.

3 & 9

when the sum of the digits of the number is divisible by 3 & 9 respectively.

6

when it is divisible by 2 and 3 respectively.

7

if the number of tens added to five times the number of units is divisible by 7.

11

when the difference between the sum of the digits in the odd places and of those in even places is 0 or a multiple of 11.

12

when it is divisible by 3 and 4 respectively.

13

if the number of tens added to four times the number of units is divisible by 13.

14

When the number is divisible by 2 and 7 respectively.

15

when it is divisible by 3 and 5 respectively.

19