

VEDIC MATHS.

* UNIT - 2 (Multiplications of the Numbers Near the base).

Case I : Multiplying numbers below the same base :)

(1) 95×94

$$\begin{array}{r} 95 \rightarrow -5 \\ 94 \rightarrow -6 \end{array} (100 - 95 = 5)$$

$$\begin{array}{r} 95 \\ 94 \\ \hline \end{array}$$

LHS / RHS

$$\begin{array}{r} 89 \\ \cancel{+} \\ 30 \end{array}$$

S₁ : LHS

$$\begin{cases} 95 - 6 = 89 \\ 94 - 5 = 89 \end{cases}$$

↓
Should be same

Ans = 8930

No. of digits should

be equal to the

no. of zeros in

the nearest base.

S₂ : RHS

$$(-5)(-6) = 30$$

(2) 98×97

$$98 \rightarrow -2$$

$$97 \rightarrow -3$$

LHS / RHS

$$\begin{array}{r} 95 \\ \cancel{+} \\ 06 \end{array}$$

$$98 \times 97 \rightarrow 9506 \quad \underline{\text{Ans}}$$

(3) 89×88

$$89 \rightarrow -11$$

$$88 \rightarrow -12$$

LHS / RHS

$$\begin{array}{r} 77 \\ \cancel{+} \\ 132 \end{array}$$

$$(-11)(-12) = 132$$

$$77 + 1 \sqrt{132} \rightarrow 7832$$

The digit on RHS of answer should be equal to the no. of zeros in the base.

Q. 1 994×992

$$994 \rightarrow -6$$

$$992 \rightarrow -8$$

$$\underline{986} \quad | \quad 048$$

$$994 \times 992 \rightarrow 986048$$

2) $9989 \times 9888 = 98771232$

3) $99987 \times 99999 = 9997800117$

4) $99999995 \times 99999989 = 9999998400000055$

5) $9999999997 \times 9999999993 = 9999999990000000000021$

Case II : Multiplying numbers above the same base:

① 102×105

$$102 \rightarrow +2$$

$$105 \rightarrow +5$$

$$\begin{array}{r} \text{RHS} \\ \hline \text{107} \end{array} \quad | \quad \begin{array}{r} \text{LHS} \\ \hline \text{10} \end{array}$$

$$102 \times 105 \Rightarrow 10710$$

(2) 10007×10008

<u>10007</u>	$\rightarrow +7$
<u>10008</u>	$\rightarrow +8$
LHS	RHS
10015	0056

$$10007 \times 10008 = 100150056$$

$$Q.1) \quad 106 \times 109 = \quad 11554$$

$$2) \quad 112 \times 109 = 12208$$

$$3) \quad 1011 \times 1012 = 1023132$$

$$4) \quad 10008 \times 10012 = 100200096$$

$$6) \quad 100000003 \times 10000009 = 10000001200000027$$

Case III : Multiplying numbers mixed with same base

96 X 106

$$96 \rightarrow -4$$

$$\frac{102 - 1}{76}$$

$$10^6 \rightarrow +6$$

$$\begin{array}{c|c} \text{LHS} & \text{RHS} \\ \hline 102 & 24 \end{array}$$

$$\underline{96 \times 106 = 10176}$$

1) $92 \times 104 = 9568$

2) $989 \times 1011 = 999879$

3) $111 \times 88 = 96868$

4) $9997 \times 10008 = 100049976$

5) $10102 \times 9997 = 10098694$

6) $999998 \times 1000005 = 1000002999990$

$111 \rightarrow +11$

$88 \rightarrow -12$

LHS | RHS

99 | $\overline{32}$

$$98 / \overline{32} \Rightarrow \frac{(98-1)}{32} = 9768$$

7) $89 \times 111 = 9879$

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$$8.) \quad 999997 \times 999994 = 999991000018$$

$$2) \quad 1000003 \times 1000009 = 1000012000027$$

$$3) \quad 99995 \times 100008 = 100003\overline{00040}$$
$$= 10000299960$$

$$4) \quad 9998 \times 999.2 = \frac{9998 \times 9992}{10} = \frac{9990}{10} / 0016$$
$$= 9990001.6$$

$$5) \quad 999993 \times 9.99997 = 999990.00021$$

$$6) \quad 99997 \times 0.99993 = 99990.00021$$

$$7) \quad 97.9 \times 1005 = \cancel{97900} \quad 98389.5$$

$$8) \quad 87 \times 1.02 = \frac{89}{26} = 88.74$$

$$9) \quad 9.989 \times 10013 = 100019.857$$

$$10) \quad 99.991 \times 9.9989 = 999.8000099$$

$$11) \quad 1.0005 \times 999.7 = 1000.19985$$

* Type - 2 : Multiplication of a number near different base :)

Case - I : Below the base :)

$$\text{eg: } 9996 \times 93 \quad R = \frac{10000}{100}$$

$$= \frac{9996 \times 9300}{100} \quad R = 100$$

$$9996 \rightarrow -4$$

$$9300 \rightarrow -700$$

$$\begin{array}{r} \\ \hline \text{LHS} & \text{RHS} \\ \hline 9296 & 2800 \end{array}$$

$$= \frac{92962800}{100}$$

$$= 929628$$

Case - II : Above the base :)

$$\text{eg: } 1000003 \times 10.5$$

$$= \frac{1000003 \times 1050000}{10000}$$

$$\begin{array}{r}
 1000003 \rightarrow +3 \\
 1050000 \rightarrow +50000 \\
 \hline
 \text{LHS} & \text{RHS} \\
 1050003 & 150000 \\
 \hline
 = & 1050003150000 \\
 \hline
 & 10000 \\
 \hline
 = & 105000315
 \end{array}$$

$$Q. 1) \quad 999999_2 \times 89 = 889999_2 888$$

$$10000B \times 10009 = 10009B\ 0072$$

$$3) \quad 99999994 \times 999989 = 99998894000066$$

$$4) \quad 1000002 \times 100004 = 100004200008$$

$$5) \quad 10099 \times 1001 = 10009/\overline{010} = 10008990 \\ = 10109099$$

$$6) \quad 11001 \times 109 = 1199109$$

Case - III : Different Base

$$\text{Eg: } 95 \times 10014$$

$$\underline{9500} \rightarrow -500$$

$$\underline{10014} \rightarrow +14$$

$$\begin{array}{c|c} \text{LHS} & \text{RHS} \\ \hline 9514 & 7000 \end{array}$$

$$= \frac{95133000}{100}$$

Q.1) $9989 \times \overbrace{1005}^{+50} = \cancel{9989}^{-11} = 10038945$

2) $112 \times 9988 = 1118656$

3) $109 \times 1112 = 121208$

4) $1008 \times 92 = 92736$

5) $9888 \times 102 = 1008576$

6) $10021 \times 997 = 9990937$

7) $10032 \times 96 = 963072$

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Q.1) $99.997 \times 9.95 = 994.97015$

2) $1000.11 \times 111 = 111012.21$

3) $8.8 \times 1.12 = 9.856$

4) $999.987 \times 1.0045 =$

$$\begin{array}{r} \cancel{999987} \times \cancel{100500} \\ \hline 100000000 \end{array}$$

= $\cancel{1100487}/\cancel{6500}$

= $\cancel{110048645}$

= 1004.986935

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* Type - 3: Multiplication of 3 numbers near the base:

Case - I: Above the same base :)

$$102 \times 103 \times 105$$

$$102 \rightarrow +2$$

$$103 \rightarrow +3$$

$$105 \rightarrow +5$$

L.H.S

M.T.

R.H.S

$$110$$

$$(31)$$

$$(30)$$

no. in digit
= no. of zeros

S₁ : L.H.S

$$102 + 3 + 5$$

or

$$103 + 2 + 5$$

or

$$105 + 2 + 3$$

= 110

S₂ : M.T

$$(2 \times 3) + (2 \times 5) + (3 \times 5)$$

= 31

$$102 \times 103 \times 105 = 1103130$$

S₃ : R.H.S

$$2 \times 3 \times 5 = 30$$

Note :)

In the middle part and the right hand side of the answer the digits are always equal to the no. of zeros in the base.

Q. 1)

$$10005 \times 10003 \times 10002$$

$$+5$$

$$+3$$

$$+2$$

$$= 1001000310030$$

2)

$$111 \times 109 \times 112$$

$$+11$$

$$+9$$

$$+12$$

$$\begin{array}{r} & & \text{carry} & \text{carry} \\ & 132 & | & 339 & | & 188 \\ = & 132 & | & 1150 & | & 88 \\ = & 135088 \end{array}$$

Case - II : Below the base :-

Q. $97 \times 98 \times 96$

$$\begin{array}{c}
 97 \rightarrow -3 \\
 98 \rightarrow -2 \\
 96 \rightarrow -4 \\
 \hline
 \text{LHS} \quad | \quad \text{MT} \quad | \quad \text{RHS} \\
 91 \quad | \quad 26 \quad | \quad \overline{24} \\
 = \quad 912576
 \end{array}$$

Q. 1) $97 \times 91 \times 88$
 $-3 \quad -9 \quad -12$

$$\begin{array}{c}
 76 / 171 / \overline{324} = 76 / 168 / \overline{24} \\
 = \cancel{76} \quad 77 / 74 / \overline{24} = 77 / 68 / \overline{24} \\
 = 7773\cancel{76} \quad = 77676
 \end{array}$$

2) $99995 \times 99991 \times 99992$
 $-5 \quad -9 \quad -8$

$$99978 / 157 / +\overline{60}$$

$$99978 / 154 / \overline{60} = 999795340$$

$$= 999780015699640$$

* Type - 3 : Mixed multiplication with same base :-

Eg: $998 \times 997 \times 1006$

$$998 \rightarrow -2$$

$$997 \rightarrow -3$$

$$1006 \rightarrow +6$$

LHS	M.T.	RHS
1001	024	036
= 1000976036		

Q.1) $\begin{array}{r} 106 \times 109 \times 96 \\ \swarrow +6 \quad \swarrow +9 \quad \swarrow -4 \\ = 111 / \overline{06} / \overline{296} \\ = 111 / \overline{04} / \overline{16} = 111/\overline{03} / 84 = 1109784 \end{array}$

2) $989 \times 996 \times 1011 = 995879484$

3) $106 \times 96 \times 102 = 1037952$

4) $10005 \times 9997 \times 9991 = 999299670135$

5) $10000011 \times 9999989 \times 10000009 =$
 1000000899998
 789998911

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Q.1) $10.2 \times 103 \times 0.104 = 1.092624$

2) $99.7 \times 9.98 \times 9.89 = 9840.60934$

3) $1000.1 \times 998.8 \times 100.07 = 9996 / \overline{0089}$
 $= 999599 \cancel{20} \overline{.99160084}$

4) $9999.7 \times 9.9992 \times 10.0009$
 $= 999979.992500216$

Case III :> Different base :

Q. $1005 \times 104 \times 14$

$$= \frac{1005 \times 1040 \times 1400}{1000} (+5, +40, +400)$$

~~$= 1445 / 18200 / 80000$~~

~~$= 1446 \cancel{X} 18200 / 80000$~~

~~$= 1445 / 18200 / 80000$~~

~~$= 1445 / 18280 / 000$~~

$= 1463280$

Q.1) $97 \times 9993 \times 991$

$$= \frac{9700 \times 9993 \times 9910}{1000} \quad (-300, -7, -10)$$

$$= 9603 / 29730 / 18900$$

$$= 9603 / 2 \cancel{9730} / \cancel{18} \overline{89000}$$

$$= 9603 / 2 \cancel{9729} / \cancel{18} \overline{89000}$$

$$= 9603 / 2 \cancel{9728} / \cdot 1100$$

$$= 960597 \cancel{28} \overline{11000}$$

Q.2) $91 \times 989 \times 10011 = 900979989$

Q.3) $15 \times 98 \times 9989 = 14683830$

* Working Base Multiplications :

Eg: 48×42

Case - I : 50 as a working base (WB)

$$48 \rightarrow -2$$

$$42 \rightarrow -8$$

$$\begin{array}{r} 48 \times 42 \\ \hline \text{LHS} & \text{RHS} \\ 40 & 60 \end{array}$$

1 Method

when using 100
actual base (AB)

$$\begin{aligned} R &= WB/AB \\ &= 50/10 = 5 \end{aligned}$$

$$\begin{array}{r} 40 \times 5 \\ \hline 16 \\ = 2016 \end{array}$$

2 Method

using 100 as AB.

$$R = 50/100 = 1/2$$

$$\begin{array}{r} 40 \times 1/2 \\ \hline 16 \\ = 2016 \end{array}$$

$$\begin{array}{r} 50 \\ \hline 10 \quad 100 \\ 1000 \end{array}$$

Case - II : 40 as WB

$$48 \rightarrow +8$$

$$42 \rightarrow +2$$

$$\begin{array}{r} 48 \times 42 \\ \hline \text{LHS} & \text{RHS} \\ 50 & 16 \\ 50 \times 4 & 16 \\ \hline = 2016 & \end{array}$$