1. Criss Cross Multiplication (VT - Urdhava - Tiryak)

a. Two digits Multiplication

principle 1-2-1

①

S1 4

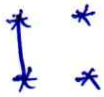
S2 $(3 \times 2) + (1 \times 2) = 8$

S1 $3 \times 1 = 3$.

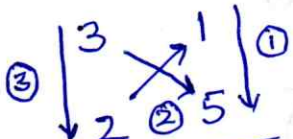
$$\begin{array}{cc} 3 & 2 \\ 1 & 2 \\ \hline 3 & 8 & 4 \end{array}$$

a. 

b. 

c. 

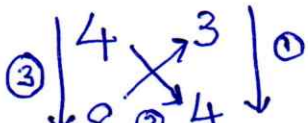
② 31×25



$6 \; (17) \; 5$

775.

③ 43×84.



$(32) \; (40) \; (12)$

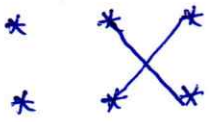
$32 \; 41 \; 2$

3612.

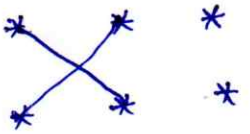
b. Three Digit Multiplication

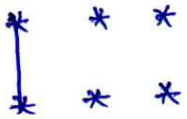
principle 1-2-3-2-1.

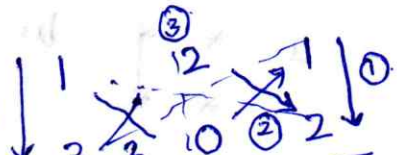
(1) 

(2) 

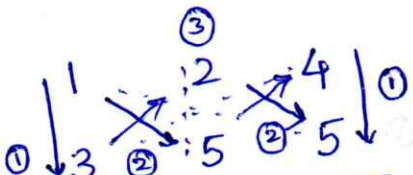
(3) 

(4) 

(5) 

Eg: ① 

3 15 5 4 2

Eg: ② 

3 11 27 30 20

3 11 27 32 0

3 11 30 2 0

3 14 0 2 0

44020

a. 342 × 506 = 173052

b. 412 × 903 = 372036

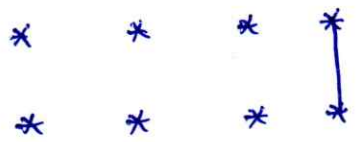
c. 555 × 222 = 123210

d. 391 × 274 = 107134

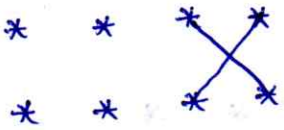
c. Four digit Multiplication

principle 1-2-3-4-3-2-1

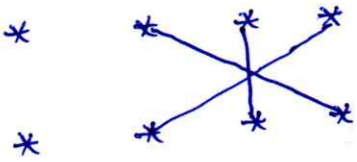
a.



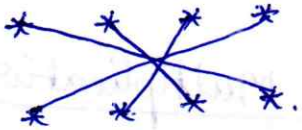
b.



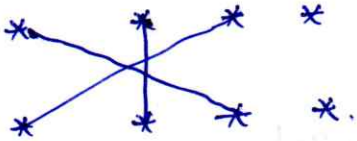
c.



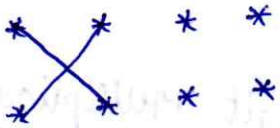
d.



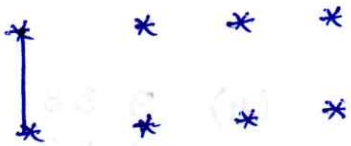
e.



f.



g.

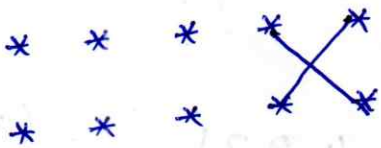


d. Five digit Multiplication

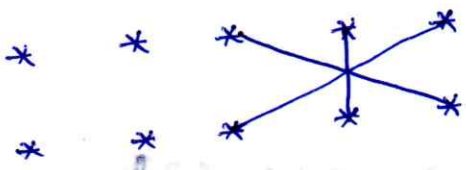
principle. 1-2-3-4-5-4-3-2-1.

a.

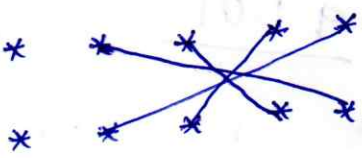
b.



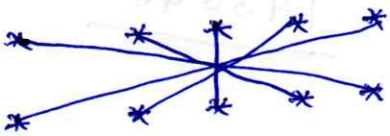
c.



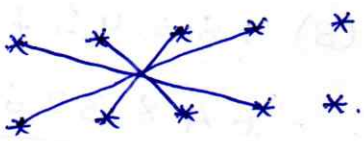
d.

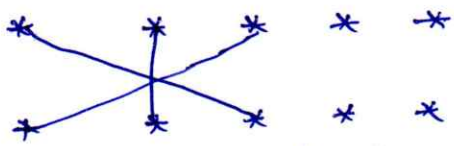


e.

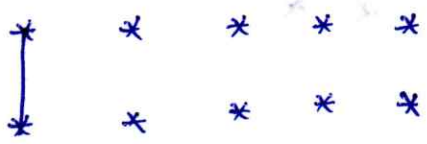


f.



g. 

h. 

i. 

e. Six digit Multiplication

principle 1-2-3-4-5-6-5-4-3-2-1

f. Seven digit Multiplication

principle 1-2-3-4-5-6-7-6-5-4-3-2-1

EXERCISE

(1) 23 × 12

(2) 41 × 13

(3) 423 × 202

(4) 358 × 132

(5) 4321 × 9101

(6) 94386 × 47257

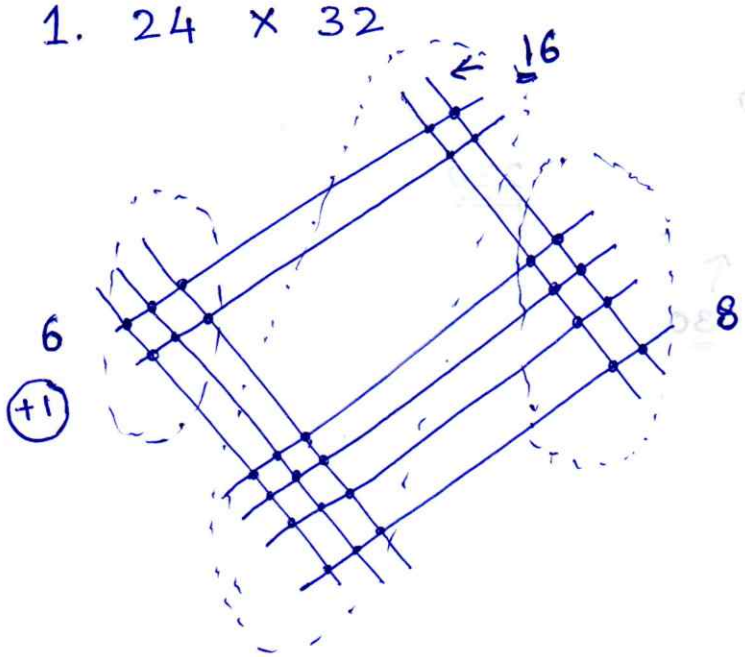
(7) 3867345 × 923687

(8) 1854375 × 6483268

(9) 9483621 × 143648

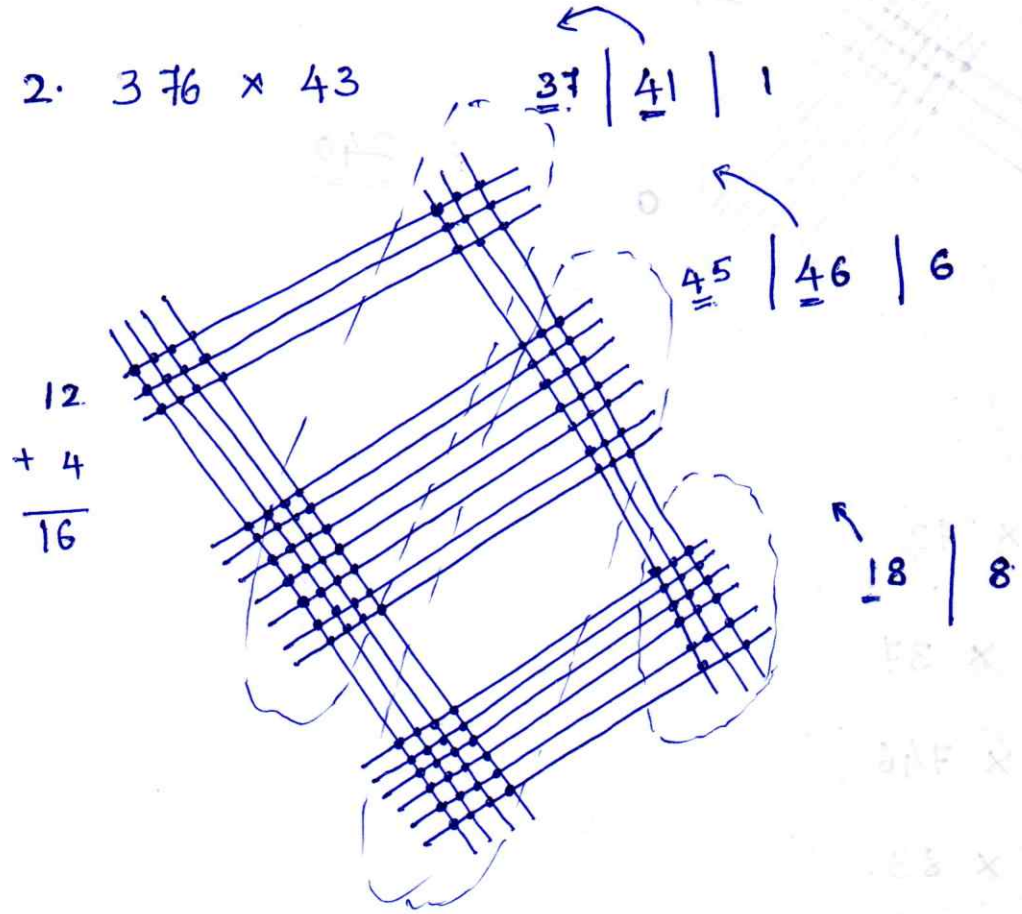
2. Multiplication Technique (Line method)

1. 24 × 32



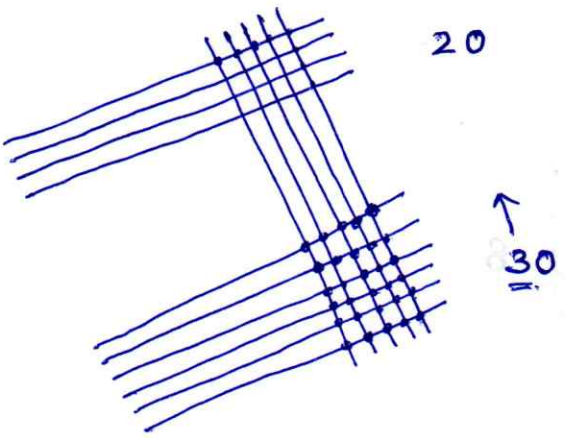
= 768

2. 376 × 43



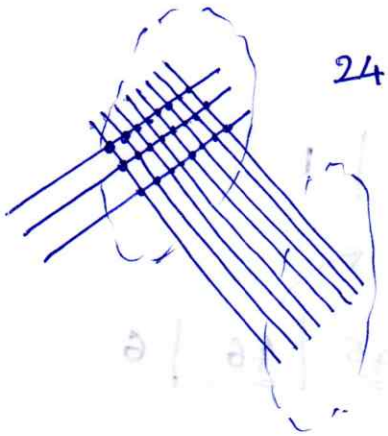
= 16168

3. 46 × 5



= 230

4. 30 × 8



= 240

EXERCISE.

1. 48 × 72

2. 246 × 37

3. 482 × 746

4. 400 × 83.

5. 47 × 4

6. 760 × 32

3. Base Method (Nikhilam)

* powers of 10.

a. condition : Numbers close to base Numbers

Eg:- close to 10, 100, 1000 etc.

We Find the answer in two parts
LHS & RHS.

Suppose 97 & 99 to be multiplied.
These Numbers are close to 100

Diff. 97 → -3 (base)
99 → -1

Steps : ① Find the base & difference
② No. of digits on the RHS = No. of zeros in the base
③ Multiply the differences on the RHS.
④ Put the cross Answer on the LHS.

Eg: ①

97
99

S①: Base = 100.
Diff 97 - 3.
99 - 1

S②

LHS	RHS.
	— —

S③

97 - 3 ×
99 - 1 ↓

LHS	RHS.
	03

S④: 97 -3
99 -1

LHS	RHS
(99-3) or (97-1) ↓ 96	03

ANS: 9603

Eg: ② 9989
9995

S1 ① Base - 10000
Diff: 9981 - 11
9995 - 5

S2 ② 9989 - 11
9995 - 5

LHS	RHS.

S3 ③ 9989 - 11
9995 - 5 ↓

LHS	RHS
	0055

S4 ④ (9989-5 or 9995-11)

LHS.	RHS
9984	0055

= 99840055

Eg. ③ 9999999
9999998

Sl ① B - 10000000
Diff - -1
-2 ↓

②

LHS	RHS
	③

③ 9999997 0000002
④

Eg. ④ 9750 × 9998.

→ 10000
→ -250
-2

→

LHS.	RHS.
9748	0500

97480500.

⑤ 1007 by 1010.

→ 10000
→ +7
+10

→

LHS	RHS
1017	0070.

1007+10
1010+7

10170070

EXERCISE

667 - 333
997 - 3
664 | 999.

9988 - 12
9996 - 4
9984 | 0048.

9500 - 500
9991 - 9
9491 | 4500

808 - 192
999 - 1
807 | 192

997 - 23
980 - 20
957 | 460.

10020 + 20
10020 + 20
10040 | 0400.

1230 + 230
1003 + 3
1233 | 690

123456 + 23456.
100001 + 1
123457 | 23456.

6. Condition:
When the No. of digits exceed in RHS.

Eg: ① 950 × 950

→ 1000.
−50
−50.

→

LHS	RHS
900	2500.

⇒ 902500

② 1200 × 1020

→ 1000.
+200
+ 20

→

LHS	RHS
1220	4000

= 1224000.

③. 150 × 140.

100
+ 50
+ 40

LHS	RHS
190	2000

= 21000

④ 112 + 12
110 + 10

122	120

12320

⑤ 1300 + 300
1020 + 20

1320	6000

1326000

⑥ 9200 - 800
9200 - 800

8400	64 0000

84640000

⑦ 17 + 7
18 + 8

25	56

306

⑧ 850 - 150
993 - 7

843	1050

844050

⑨ 75 - 25
95 - 5

70	125

7125

c. Multiplying a number above base with below base.

Eg: ① 95 × 115

100
95 - 5
105 + 15

RHS	RHS
110	(-75)

= (110 × 100) - 75
= 11000 - 75 = 10925

imp:
LHS × Base

Eg: ② Multiply 1044 by 998.

1000.
1044 + 44
998 − 2
1042 | −088.

$= (1042 \times 1000) - 088$

$= 1042000 - 088$

$= \underline{1041912}$

Eg: ③ 100032 by 99990.

100000.
+32
−10
(−00320).

100022 |.

$= 100022 \times 100000 - 00320$

$= 10002200000 - 00320$

$= \underline{10002199680}$

④ 800 − 200.
1004 + 4
(−800)

804

$= 804 \times 1000 - 800$.

$= 804000 - 800$.

$= \underline{803200}$

⑤ 120 + 20
97 − 3
117 | (−060)

$= 117 \times 100 - 60$

$= 11700 - 60$

$= \underline{11640}$.

⑥ 14 + 4
9 − 1
13 | −04

$= 13 \times 10 - 04$

$= 130 - 04$

$= \underline{126}$.

d. Multiplying Numbers by different bases

Eg: ① 85 × 995

* Convert the Numbers to same base.
  i.e. 85 to 850.
* In the Result divided by multiplied by (the value) Eg: 10 in this case.

850 - 150.
995 - 5

845 | RHS.
•750

= 845750

Divide by 10 → 84575

Eg: ② ~~995~~ 102 by 999.

* Multiply 102 by 10.

1020 + 20.
999 - 1

1019 | (-020)

= 1019 × 1000 - 020.
= 1019000 - 020
= 1018980

÷ by 10 = 101898

Eg: ③ 9995 × 86.

x - 86 × 100 = 8600.

9995 - 5
8600 - 1400

8595 | 7000.

~~8600000~~. 85957000.

÷ 100 = ~~860000~~ 859570

Eg: ④ 73×997.

× 73 by 10 = 730.

730 − 270.

997 − 3

727 | 810

= 727810

÷ 10 = 72781

Eg: ⑤ 73×990.

⇒ 990/10 = 99.

73 − 27

99 − 1

72. 27.

= 7227 × 10

= 72270

Eg: ⑥ 99×1005

→ 99 × 10 = 990.

990 − 10.

1005 + 5

995 | −050

= 995 × 1000 − 50.

= 995000 − 50

= 994950

÷ by 10. = 99495

e. When Base is not power of 10.

In Base Method we take 10, 100, 1000 etc. as bases. which are called as Actual base.

But, Here we will use 40, 50, 600 etc. as the bases, which are called as Working base

Eg: ① 48×48.

Actual base - 100.

Working base - $100/2 = 50$.

$48 - 2$

$48 - 2$

$2)\ 46 \mid 04$

2304

Since 50 (working base is obtained by dividing $100/2$)

* We divided LHS by 2 (i.e. $46/2 = 23$).

Alternative :-

Actual base - 10.

Working base - $10 \times 5 = 50$

$48 - 2$

$48 - 2$

$46 \mid 4$

$= 46 \times 5 \mid 4$

230

$= 2304$.

Eg: ② 27×28.

Actual base = 100

Working base = $\frac{100}{5} = 20$.

$27 + 7$

$28 + 8$

$5)\ 35 \mid 56$

7

$= 756$.

Eg. ③ 59×58

Actual base = 100.
Working base = 50. = $\frac{100}{2}$

$59 + 9$
$58 + 8$
$67 \mid 72$

Actual base = 10.
working base = $10 \times 6 = 60$.

$59 - 1$
$58 - 2$
$57 \quad 2$
$\times 6$
3402

Eg. ④ 31×32.

AB = 10.
WB = $10 \times 3 = 30$.

$31 + 1$
$32 + 2$
$33 \mid 2$
$\times 3$
992

Eg. ⑤ 57×57

AB - 10, WB - $10 \times 6 = 60$,

$57 - 3$
$57 - 3$
$54 \quad 9$
$\times 6$
3249

Eg: ⑥ 395 × 396.

AB = 100.

WB = 100 × 4 = 400.

395 − 5

396 − 4

394	20
× 4	
1576	20

Eg: ⑦ 228 × 246.

AB = 1000.

WB = 1000/4 = 250.

228 − 22.

246 − 4

224	088

÷ 4

5 6088

Eg: ⑧ 45 × 45

AB = 100. ; WB = 100 × 5 = 50.

45 − 5

45 − 5

40	25
× 5	
200	25.

= 2025

AB = 10 ; WB = 10 × 4 = 40.

45 + 5

45 + 5

50	25.
× 4	
200	25

= 2025.

Eg: ⑨ 58×42.

$AB = 10$

$WB = 10 \times 5 = 50$.

$58 + 8$

$42 - 8$

$50 \mid -6\frac{4}{}$

$\times \quad 5 \mid$

$250 \mid (-64)$

$= 250 \times 10 - 64$

$= 2500 - 64$

$= 2436$

Eg: ⑩ 55×45

$AB = 10$; $WB = 10 \times 5 = 50$.

$55 + 5$

$45 - 5$

$50 \mid -25$

$\times \quad 5 \mid$

$250 \mid -25$

$= 250 \times 10 - 25$

$= 2500 - 25$

$= 2475$

Eg: (11) 45×42

$AB = 100$; $WB = \frac{100}{2} = 50$.

$45 - 5$
$42 - 8$

$2) 37 \cdot | 40$

$18\frac{1}{2} | 40 \cdot$

$= 18/(50+40)$

$= \underline{1890}$

$AB = 10$; $WB = 10 \times 4$

$45 + 5$
$42 + 2$

$47 | 10$
$\times 4 |$

$188 | 10 \cdot$

$= \underline{1890}$

Eg: (12) 245×248

$AB = 100$; $WB = 1000/4 = 250$.

$245 - 5$
$248 - 2$

$4) 243 | 10$
~~4~~

$60\frac{3}{4} | 10 \cdot$

$= 60(3/4 \times 1000 + 10)$

$= 60(750 + 10)$

$= \underline{60760}$

EXERCISE

Q 1. Multiply the following Numbers:

a. 990×994

b. 999993×999999

c. 1002×10100

d. 1050×1005

Q. 2. Multiply the following Numbers where the answers in RHS exceeds the No. of zeros in the base.

a. 16 × 17

b. 1500 × 1040.

c. 9300 × 9500.

d. 860 × 997.

50 100.
4
154 | 200
1560000

Q. 3. Calculate the product of the following (one number is above the base & the other number is below the base).

a. 96 × 104

b. 890 × 1004

c. 10080 × 9960.

d. 970 × 1010.

Q. 4. Multiply the following numbers using different bases.

a. 73 × 997

b. 94 × 990.

c. 82 × 9995

d. 102 × 1010.

Q. 5. Multiple the numbers using actual & working bases.

a. 49 × 48.

b. 22 × 22

c. 53 × 49.

d. 18 × 17

e. 499 × 496.

484.
+2
+12
24 4
2
2484