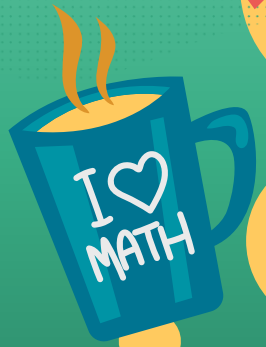
MULTIPLICATION
Notes



MULTIPLICATION TABLES

Multiplication tables are very helpful in division and multiplication. Now, let us learn multiplication tables of 11 to 20.

Multiplication Table of 11

1 × 11 = 11	➞ 1 time 11 = 11
2 × 11 = 22	➞ 2 times 11 = 11 + 11
3 × 11 = 33	➞ 3 times 11 = 11 + 11 + 11
4 × 11 = 44	➞ 4 times 11 = 11 + 11 + 11 + 11
5 × 11 = 55	➞ 5 times 11 = 11 + 11 + 11 + 11 + 11
6 × 11 = 66	➞ 6 times 11 = 11 + 11 + 11 + 11 + 11 + 11
7 × 11 = 77	➞ 7 times 11 = 11 + 11 + 11 + 11 + 11 + 11 + 11
8 × 11 = 88	➞ 8 times 11 = 11 + 11 + 11 + 11 + 11 + 11 + 11 + 11
9 × 11 = 99	➞ 9 times 11 = 11 + 11 + 11 + 11 + 11 + 11 + 11 + 11 + 11
10 × 11 = 110	➞10 times 11 = 11 + 11 + 11 + 11 + 11 + 11 + 11 + 11 + 11 + 11

Multiplication Table of 12

1 × 12 = 12	➞ 1 time 12 = 12
2 × 12 = 24	➞ 2 times 12 = 12 +12
3 × 12 = 36	➞ 3 times 12 = 12 +12 + 12
4 × 12 = 48	➞ 4 times 12 = 12 +12 + 12 + 12
5 × 12 = 60	➞ 5 times 12 = 12 + 12 + 12 + 12 + 12
6 × 12 = 72	➞ 6 times 12 = 12 + 12 + 12 + 12 + 12 + 12
7 × 12 = 84	➞ 7 times 12 = 12 + 12 + 12 + 12 + 12 + 12 + 12
8 × 12 = 96	➞ 8 times 12 = 12 + 12 + 12 + 12 + 12 + 12 + 12 +12
9 × 12 = 108	➞ 9 times 12 = 12 + 12 + 12 + 12 + 12 + 12 + 12 +12 + 12
10 × 12 = 120	➞ 10 times 12 = 12 + 12 + 12 + 12 + 12 + 12 + 12 + 12 + 12 + 12

Multiplication Table of 13

1 × 13 = 13 → 1 time 13 = 13
2 × 13 = 26 → 2 times 13 = 13 +13
3 × 13 = 39 → 3 times 13 = 13 + 13 + 13
4 × 13 = 52 → 4 times 13 = 13 + 13 + 13 + 13
5 × 13 = 65 → 5 times 13 = 13 + 13 + 13 + 13 + 13
6 × 13 = 78 → 6 times 13 = 13 + 13 + 13 + 13 + 13 + 13
7 × 13 = 91 → 7 times 13 = 13 + 13 + 13 + 13 + 13 + 13 + 13
8 × 13 = 104 → 8 times 13 = 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13
9 × 13 = 117 → 9 times 13 = 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13
10 × 13 = 130 →10 times 13 = 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13

Multiplication Table of 14

1 × 14 = 14 ➞ 1 time 14 = 14
2 × 14 = 28 ➞ 2 times 14 = 14 + 14
3 × 14 = 42 ➞ 3 times 14 = 14 + 14 + 14
4 × 14 = 56 ➞ 4 times 14 = 14 + 14 + 14 + 14
5 × 14 = 70 ➞ 5 times 14 = 14 + 14 + 14 + 14 + 14
6 × 14 = 84 ➞ 6 times 14 = 14 + 14 + 14 + 14 + 14 + 14
7 × 14 = 98 ➞ 7 times 14 = 14 + 14 + 14 + 14 + 14 + 14 + 14
8 × 14 = 112 ➞ 8 times 14 = 14 + 14 + 14 + 14 + 14 + 14 + 14 + 14
9 × 14 = 126 ➞ 9 times 14 = 14 + 14 + 14 + 14 + 14 + 14 + 14 + 14 + 14
10 × 14 = 140 ➞10 times 14 = 14 + 14 + 14 + 14 + 14 + 14 + 14 + 14 + 14 + 14

Multiplication Table of 15

1 × 15 = 15 → 1 time 15 = 15
2 × 15 = 30 → 2 times 15 = 15 + 15
3 × 15 = 45 → 3 times 15 = 15 + 15 + 15
4 × 15 = 60 → 4 times 15 = 15 + 15 + 15 + 15
5 × 15 = 75 → 5 times 15 = 15 + 15 + 15 + 15 + 15
6 × 15 = 90 → 6 times 15 = 15 + 15 + 15 + 15 + 15 + 15
7 × 15 = 105 → 7 times 15 = 15 + 15 + 15 + 15 + 15 + 15 + 15
8 × 15 = 120 → 8 times 15 = 15 + 15 + 15 + 15 + 15 + 15 + 15 + 15
9 × 15 = 135 → 9 times 15 = 15 + 15 + 15 + 15 + 15 + 15 + 15 + 15 + 15
10 × 15 = 150 →10 times 15 = 15 + 15 + 15 + 15 + 15 + 15 + 15 + 15 + 15 + 15

Multiplication Table of 16

1 × 16 = 16 ➞ 1 time 16 = 16
2 × 16 = 32 ➞ 2 times 16 = 16 + 16
3 × 16 = 48 ➞ 3 times 16 = 16 + 16 + 16
4 × 16 = 64 ➞ 4 times 16 = 16 + 16 + 16 + 16
5 × 16 = 80 ➞ 5 times 16 = 16 + 16 + 16 + 16 + 16
6 × 16 = 96 ➞ 6 times 16 = 16 + 16 + 16 + 16 + 16 + 16
7 × 16 = 112 ➞ 7 times 16 = 16 + 16 + 16 + 16 + 16 + 16 + 16
8 × 16 = 128 ➞ 8 times 16 = 16 + 16 + 16 + 16 + 16 + 16 + 16 + 16
9 × 16 = 144 ➞ 9 times 16 = 16 + 16 + 16 + 16 + 16 + 16 + 16 + 16 + 16
10 × 16 = 160 ➞10 times 16 = 16 + 16 + 16 + 16 + 16 + 16 + 16 + 16 + 16 + 16

Multiplication Table of 17

1 × 17 = 17 → 1 time 17 = 17
2 × 17 = 34 → 2 times 17 = 17 + 17
3 × 17 = 51 → 3 times 17 = 17 + 17 + 17
4 × 17 = 68 → 4 times 17 = 17 + 17 + 17 + 17
5 × 17 = 85 → 5 times 17 = 17 + 17 + 17 + 17 + 17
6 × 17 = 102 → 6 times 17 = 17 + 17 + 17 + 17 + 17 + 17
7 × 17 = 119 → 7 times 17 = 17 + 17 + 17 + 17 + 17 + 17 + 17
8 × 17 = 136 → 8 times 17 = 17 + 17 + 17 + 17 + 17 + 17 + 17 + 17
9 × 17 = 153 → 9 times 17 = 17 + 17 + 17 + 17 + 17 + 17 + 17 + 17 + 17
10 × 17 = 170 →10 times 17 = 17 + 17 + 17 + 17 + 17 + 17 + 17 + 17 + 17 + 17

Multiplication Table of 18

1 × 18 = 18 ➞ 1 time 18 = 18
2 × 18 = 36 ➞ 2 times 18 = 18 + 18
3 × 18 = 54 ➞ 3 times 18 = 18 + 18 + 18
4 × 18 = 72 ➞ 4 times 18 = 18 + 18 + 18 + 18
5 × 18 = 90 ➞ 5 times 18 = 18 + 18 + 18 + 18 + 18
6 × 18 = 108 ➞ 6 times 18 = 18 + 18 + 18 + 18 + 18 + 18
7 × 18 = 126 ➞ 7 times 18 = 18 + 18 + 18 + 18 + 18 + 18 + 18
8 × 18 = 144 ➞ 8 times 18 = 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18
9 × 18 = 162 ➞ 9 times 18 = 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18
10 × 18 = 180 ➞10 times 18 = 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18

Multiplication Table of 18

1 × 18 = 18 ➞ 1 time 18 = 18
2 × 18 = 36 ➞ 2 times 18 = 18 + 18
3 × 18 = 54 ➞ 3 times 18 = 18 + 18 + 18
4 × 18 = 72 ➞ 4 times 18 = 18 + 18 + 18 + 18
5 × 18 = 90 ➞ 5 times 18 = 18 + 18 + 18 + 18 + 18
6 × 18 = 108 ➞ 6 times 18 = 18 + 18 + 18 + 18 + 18 + 18
7 × 18 = 126 ➞ 7 times 18 = 18 + 18 + 18 + 18 + 18 + 18 + 18
8 × 18 = 144 ➞ 8 times 18 = 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18
9 × 18 = 162 ➞ 9 times 18 = 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18
10 × 18 = 180 ➞10 times 18 = 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18 + 18

Multiplication Table of 19

1 × 19 = 19 → 1 time 19 = 19
2 × 19 = 38 → 2 times 19 = 19 + 19
3 × 19 = 57 → 3 times 19 = 19 + 19 + 19
4 × 19 = 76 → 4 times 19 = 19 + 19 + 19 + 19
5 × 19 = 95 → 5 times 19 = 19 + 19 + 19 + 19 + 19
6 × 19 = 114 → 6 times 19 = 19 + 19 + 19 + 19 + 19 + 19
7 × 19 = 133 → 7 times 19 = 19 + 19 + 19 + 19 + 19 + 19 + 19
8 × 19 = 152 → 8 times 19 = 19 + 19 + 19 + 19 + 19 + 19 + 19 + 19
9 × 19 = 171 → 9 times 19 = 19 + 19 + 19 + 19 + 19 + 19 + 19 + 19 + 19
10 × 19 = 190 →10 times 19 = 19 + 19 + 19 + 19 + 19 + 19 + 19 + 19 + 19 + 19

Multiplication Table of 20

$1 \times 20 = 20$ → 1 time 20 = 20
$2 \times 20 = 40$ → 2 times 20 = 20 + 20
$3 \times 20 = 60$ → 3 times 20 = 20 + 20 + 20
$4 \times 20 = 80$ → 4 times 20 = 20 + 20 + 20 + 20
$5 \times 20 = 100$ → 5 times 20 = 20 + 20 + 20 + 20 + 20
$6 \times 20 = 120$ → 6 times 20 = 20 + 20 + 20 + 20 + 20 + 20
$7 \times 20 = 140$ → 7 times 20 = 20 + 20 + 20 + 20 + 20 + 20 + 20
$8 \times 20 = 160$ → 8 times 20 = 20 + 20 + 20 + 20 + 20 + 20 + 20 + 20
$9 \times 20 = 180$ → 9 times 20 = 20 + 20 + 20 + 20 + 20 + 20 + 20 + 20 + 20
$10 \times 20 = 200$ →10 times 20 = 20 + 20 + 20 + 20 + 20 + 20 + 20 + 20 + 20 + 20

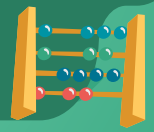
Multiplication Table (11 to 20)

	11	12	13	14	15	16	17	18	19	20
1	11	12	13	14	15	16	17	18	19	20
2	22	24	26	28	30	32	34	36	38	40
3	33	36	39	42	45	48	51	54	57	60
4	44	48	52	56	60	64	68	72	76	80
5	55	60	65	70	75	80	85	90	95	100
6	66	72	78	84	90	96	102	108	114	120
7	77	84	91	98	105	112	119	126	133	140
8	88	96	104	112	120	128	136	144	152	160
9	99	108	117	126	135	144	153	162	171	180
10	110	120	130	140	150	160	170	180	190	200

Multiplication Table (11 to 20)

11									





Method to Obtain Multiplication Table of 12

		Table of 10		Table of 2		Table of 12
1	time	10	+	2	=	12
2	times	20	+	4	=	24
3	times	30	+	6	=	36
4	times	40	+	8	=	48
5	times	50	+	10	=	60
6	times	60	+	12	=	72
7	times	70	+	14	=	84
8	times	80	+	16	=	96
9	times	90	+	18	=	108
10	times	100	+	20	=	120

MULTIPLICATION BY 1-DIGIT NUMBER

EXAMPLE 1 : ***Multiply 2132 by 3.***

SOLUTION :

Th	H	T	O
2	1	3	2
			× 3
6	3	9	6

SOLUTION :

Th	H	T	O
2	1	3	2
		×	3
6	3	9	6

Steps :

- 3 × 2 ones = 6 ones
- 3 × 3 tens = 9 tens
- 3 × 1 hundred = 3 hundreds
- 3 × 2 thousands = 6 thousands

Hence, 2132 × 3 = 6396.

EXAMPLE 2 : ***Multiply 568 by 4.***

SOLUTION :

Th	H	T	O
	5	6	8
			× 4
2	2	7	2

Steps :

4 × 8 ones

4 × 6 tens

4 x 5 hundreds

Steps :

4 × 8 ones = 32 ones = 3 tens + 2 ones

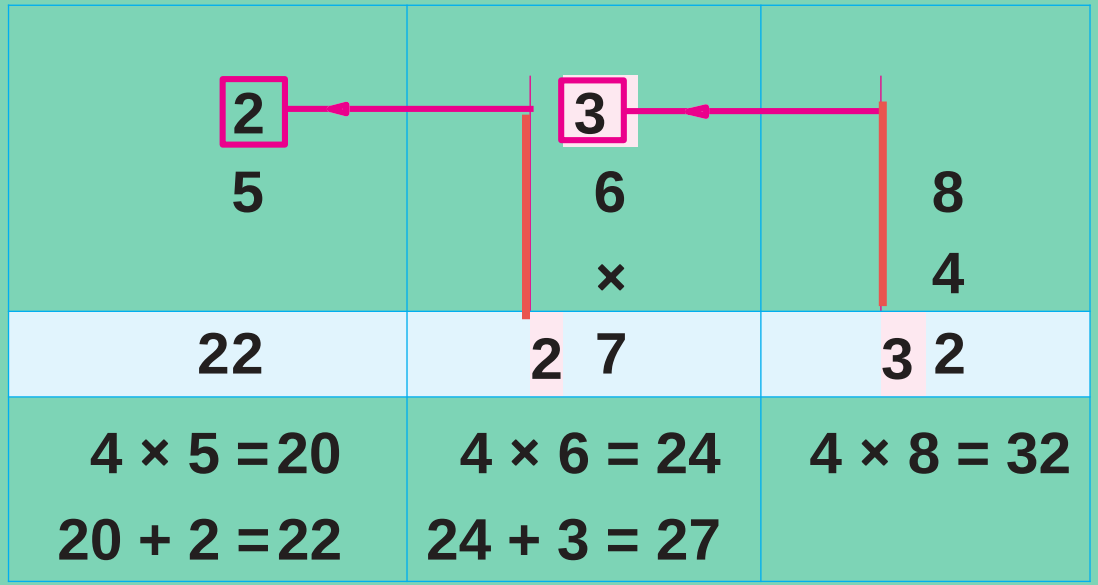
4 × 6 tens = 24 tens + 3 tens = 27 tens = 2 hundreds

+ 7 tens

4 x 5 hundreds = 20 hundreds + 2 hundreds

= 22 hundreds

= 2 thousands + 2 hundreds



Hence, 568 × 4 = 2272.

PROPERTIES OF MULTIPLICATION

EXAMPLE 3 : Multiply : (i) 8 × 6 (ii) 6 × 8

SOLUTION :

(i)

$$\begin{array}{r} 8 \\ \times\ 6 \\ \hline 48 \\ \hline \end{array}$$

PROPERTIES OF MULTIPLICATION

(ii)
$$\begin{array}{r} 6 \\ \times\ 8 \\ \hline 48 \\ \hline \end{array}$$

Above two products are same. Now, we can say that

if two numbers multiply by either order, the product remains same.

EXAMPLE 4 : Find the product of 18 × 4 × 2.

SOLUTION : We can multiply in the following two ways :

(i) $18 \times 4 \times 2$

$= 72 \times 2$

$= 144$

(ii) $18 \times 2 \times 4$

$= 36 \times 4$

$= 144$

(i) $18 \times 4 \times 2$

$= 72 \times 2$

$= 144$

(ii) $18 \times 2 \times 4$

$= 36 \times 4$

$= 144$

Now, we can say that the product of three numbers remain same, even if the groupings of the numbers are changed.

EXAMPLE 5 : Multiply 230, 264 and 370 by 1.

SOLUTION : $230 \times 1 = 230$

$264 \times 1 = 264$

$370 \times 1 = 370$

When we multiply any number by 1, there is no change in number.

Now, we can say that the product of a number and 1 is the number itself.

EXAMPLE 6 : Multiply 240, 300 and 403 by 0.

SOLUTION : $240 \times 0 = 0$

$300 \times 0 = 0$

$403 \times 0 = 0$

Now, we can say that the product of a number and zero is always zero.

MULTIPLICATION BY 10, 20, 30,....., 90

EXAMPLE : Multiply : (i) 6 by 10
(ii) 14 by 30

SOLUTION :

First Method

(i) 6 × 10 = 6 × 1 ten
= 6 tens
= 60

(ii) 14 by 30

SOLUTION :

First Method

(ii) $14 \times 30 = 14 \times 3$ tens

$= 42$ tens

$= 420$

Second Method

(i) We know that 10 = 1 × 10

Therefore,6 × 10 = 6 × 1 × 10

= 6 × 10

= 60

Second Method

(ii) We know that $30 = 3 \times 10$

Therefore, $14 \times 30 = 14 \times 3 \times 10$

$= 42 \times 10$

$= 420$

We observe in the second method of the above Example that when we multiply a 1-digit or 2-digit number by 10, 20, 30, ... 90, we multiply number by 1, 2, 3, ..., 9 respectively and insert one zero to the right of the product.

MULTIPLYING BY 100, 200,....., 900

EXAMPLE : Multiply : (i) 16 by 200 (ii) 26 by 300.

SOLUTION :

First Method

(i) 16 × 200

= 16 × 2 hundreds

= 32 hundreds = 3200

(ii) 26×300

$= 26 \times 3$ hundreds

$= 78$ hundreds $= 7800$

Second Method

(i) 16×200

$= 16 \times 2 \times 100$

$= 32 \times 100 = 3200$

(ii) 26×300

$= 26 \times 3 \times 100$

$= 78 \times 100 = 7800$

We observe in the second method of the above Example that to multiply a number by 100, 200, 300....., 900, we multiply the given number by 1, 2, 3....., 9 respectively and insert two zeroes on the right of product.

MULTIPLICATION BY 2-DIGIT NUMBER

EXAMPLE : Multiply 24 by 34.

SOLUTION :

We know that 34 = 30 + 4

Now, 24 × 34 = 24 × (30 + 4)

= (24 × 30) + (24 × 4)

= 720 + 96 = 816

MULTIPLICATION BY 2-DIGIT NUMBER

It can also be arranged as follows :

$$\begin{array}{r} 24 \\ \times\ 34 \\ \hline 96 \\ 720 \\ \hline 816 \\ \hline \end{array}$$

$24 \times 4 = 96$

$24 \times 30 = 720$

Thus, 24 × 34 = 816.

EXAMPLE : Multiply 27 by 43.

SOLUTION :

$$\begin{array}{r} 27 \\ \times\ 43 \\ \hline 81 \\ 1080 \\ \hline 1161 \end{array}$$

27 x 3

27 x 40

27 x 40

Steps

We know that 43 = 40 + 3.

First, multiply 27 by 3.

Then, multiply 27 by 40.

To multiply 27 by 40, put 0 in the ones column and then multiply by 4.

PROBLEMS ON MULTIPLICATION

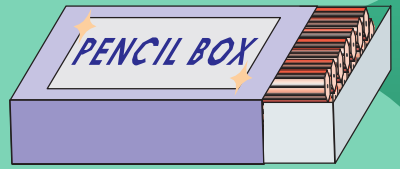
EXAMPLE : A pencil box has 18 pencils. How many pencils are there In such 107 boxes ?

SOLUTION :

Number of pencils in 1 box = 18

Number of pencils in 107 boxes

= 18 × 107 or 107 × 18



$$
\begin{array}{r}
107 \\
\times\ 18 \\
\hline
856 \\
+1070 \\
\hline
1926
\end{array}
$$

107 x 8

107 x 10

107 x 18

Thus, 107 boxes have 1926 pencils.

EXAMPLE : A box contains 215 balls.

How many balls are contained in 21 such boxes ?

SOLUTION :

Number of balls in 1 box = 215

Number of balls in 21 boxes = 215 × 21

$$\begin{array}{r} 215 \\ \times\ 21 \\ \hline 215 \\ 4300 \\ \hline 4515 \end{array}$$

215 x 1

215 x 20

215 x 21

Thus, 21 boxes contain 4515 balls.