# MATHEMATICS MULTIPLY AND DIVIDE

## Concepts Covered

- Multiplication, Multiplication Table, Patterns in multiplication, Division, Relation in Multiplication and division

## Multiplication

Multiplication is a method to find the result of the addition of repeated numbers.
Symbol used for multiplication is $\times$.
Think addition of the same number, say 5, 2 times $5 + 5 = 10$ but you can do multiplication as $5 \times 2 = 10$.
But if you need to add 5 for 13 times then will you add them 13 times? No. Now you will prefer an alternative of addition that is nothing but multiplication. For Example, $5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 65$ but when we multiply we have $5 \times 13 = 65$ (from the table 13).
In multiplication, the multiplication table is very important to multiply 2 or more digits with another 2 or more digits number.

## Multiplication Table

1 to 10

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 |
| 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 |
| 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

11 to 20

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

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**Example:**

**Ram is earning ₹245 per day; how much will he earn in a week?**
**Solution:** Here given that Ram is earning ₹245 in a day.
To find total earning in a week means in 7 days.
245 = 200 + 40 + 5

| | 200 | 40 | 5 |
|---|---|---|---|
| 7 | 200 × 7 = 1400 | $40 \times 7 = 280$ | $5 \times 7 = 35$ |

245 × 7 = 1400 + 280 + 35 = 1715
So, Ram will earn ₹1715 in a week.

## Multiplication of Higher Numbers by Two methods

**Method 1:** To multiply 485 by 46, we will follow the following steps:
$485 = 400 + 80 + 5$ and $46 = 40 + 6$

| | 400 | 80 | 5 |
|---|---|---|---|
| 40 | $400 \times 40 = 16000$ | $80 \times 40 = 3200$ | $5 \times 40 = 200$ |
| 6 | $400 \times 6 = 2400$ | $80 \times 6 = 480$ | $5 \times 6 = 30$ |
| Addition | 18400 | 3680 | 230 |

$485 \times 46 = 18400 + 3680 + 230 = 22310$

**Method 2:** To multiply 485 by 46, we will follow the following steps:

```
   485
 × 46
 ----
  2910     (485 × 6)
+19400     (485 × 40)
 -----
 22310
```

**Example:**

**Multiply 698 by 25.**
**Solution:** Here the given numbers are 698 and 25.
To multiply 698 by 25, we will follow the following steps:
$698 = 600 + 90 + 8$ and $25 = 20 + 5$

| | 600 | 90 | 8 |
|---|---|---|---|
| 20 | $600 \times 20 = 12000$ | $90 \times 20 = 1800$ | $8 \times 20 = 160$ |
| 5 | $600 \times 5 = 3000$ | $90 \times 5 = 450$ | $8 \times 5 = 40$ |
| Addition | 15000 | 2250 | 200 |

$698 \times 25 = 15000 + 2250 + 200 = 17450$
Or, To multiply 698 by 25, we will follow the following steps:

```
   698
 × 25
 ----
  3490     (698 × 5)
 +13960    (698 × 20)
 -----
 17450
```

## Multiplication creates Pattern

| | |
|---|---|
| $0 \times 9 + 1 =$ | 1 |
| $1 \times 9 + 2 =$ | 11 |
| $12 \times 9 + 3 =$ | 111 |
| $123 \times 9 + 4 =$ | 1111 |
| $1234 \times 9 + 5 =$ | 11111 |
| $12345 \times 9 + 6 =$ | 111111 |

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**Example:**

**Multiply 111 by 111.**
**Solution:** Given numbers are 111 and 111

$$\begin{array}{rl} 111 & \\ \times\ 111 & \\ \hline 111 & (111 \times 1) \\ 1110 & (111 \times 10) \\ +11100 & (111 \times 100) \\ \hline 12321 & \\ \hline \end{array}$$

Isn't it interesting?

## Division

Division is a method to find a number of equal parts of a number.
Symbol used for division is ÷.
Think of a number, let 36 and to divide it into 4 equal parts you will do it as $36 = 9 + 9 + 9 + 9 = 4 \times 9$. Now we have $36 \div 4 = 9$. Each equal part is 9.
Now to divide 9786 by 6

$$6)\ 9786(1000 + 600 + 30 + 1$$

$$\begin{array}{r} -\ 6000 \\ \hline 3786 \\ -\ 3600 \\ \hline 186 \\ -\ 180 \\ \hline 6 \\ -\ 6 \\ \hline 0 \end{array}$$

$1000 + 600 + 30 + 1 = 1631$
Here we can rewrite 9786 as $1631 \times 6 + 0 = 9786$

Divisor) Dividend (Quotient
$-\ \times\times\times\times\times$
Remainder

**Example:**

**Sonam has ₹500, she wants to purchase notebooks whose rate is ₹43 each. How many notebooks can she purchase?**
**Solution:** Given that Sonam has ₹ 500.
Rate of the notebook is ₹ 43 each.
To find $500 \div 43$.

$$43)500(10 + 1$$

$$\begin{array}{r} -\ 430 \\ \hline 70 \\ -\ 43 \\ \hline 27 \end{array}$$

Here, 11 notebooks she can purchase.

- In the above example you observe that at the end there is 27 instead of 0. It is called the remainder.
- Again rewrite 500 as $11 \times 43 + 27 = 473 + 27 = 500$

## Multiplication and Division are related

Multiplication and division are related to each other.
If $a \times b = c$ then $c \div a = b$ or $c \div b = a$, where $a, b, c \neq 0$.
Multiple 951 by 14 then $951 \times 14 = 13314$.

$$\begin{array}{r} 951 \\ \times 14 \\ \hline 3804 \\ +9510 \\ \hline 13314 \\ \hline \end{array}$$

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Now divide 13314 by 14 then $13314 \div 14 = 951$.

$$
\begin{array}{r}
14)13314(900+50+1 \\
-\ 12600 \\
\hline
714 \\
-\ 700 \\
\hline
14 \\
-\ 14 \\
\hline
0
\end{array}
$$

## Check Your Concept - 1

**(i)** Shibi has ₹800. She goes to the shop to purchase sweets which is ₹41 per kg. Answer the following:

a. How many kg of sweets can she buy?
b. How much money does she have left?
c. What is the total cost of sweets?

**(ii)** The rate for one book is ₹ 237. Akash wants to buy 13 books. Answer the following:

a. How much money will he have left after buying 13 books if he has ₹3500?
b. What is the total cost of 13 books?

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## Solved Examples

**(1) Use Bela's method to multiply these numbers.**
**(a)** $\mathbf{32 \times 46}$ **(b)** $\mathbf{67 \times 18}$
**Solution: (a)** $1200 + 80 + 180 + 12 = \mathbf{1472}$

| | 30 | 2 |
|---|---|---|
| 40 | 1200 | 80 |
| 6 | 180 | 12 |

**(b)** $600 + 70 + 480 + 56 = \mathbf{1206}$

| | 60 | 7 |
|---|---|---|
| 10 | 600 | 70 |
| 8 | 480 | 56 |

**(2) Shantaram is a special cook who comes only on party days. Last year he was called for only 28 days. For each day he has to be paid Rs. 165.**
**(a) Find out how much money he will get in all?**
**(b) If he called for all days for the year, how much salary will he get?**
**Solution: (a)** Shantaram's one day wages = Rs. 165
Shantaram's 28 days wages = Rs. (165 × 28)
Hence, Shantaram will be paid **Rs. 4620.**
**(b)** Shantaram's one day salary = Rs. 165
Shantaram's one year i.e. 365 days salary = Rs. (165 × 365)
Hence, Shantaram gets a salary of **Rs. 60225**

**(3) Sohan drink 8 glass of water everyday**
**(a) How many glasses will he drink in one month?**
**(b) How many glasses will he drink in one year?**
**(c) If 125 people living in a colony and each drink 8 glasses of water in a day, how much water will they drink in a year.**
**Solution: (a)** Number of glasses of water Sohan drinks in one month i.e. 30 days = (8 × 30) = **240**
**(b)** Number of glasses of water Sohan drinks in one year i.e. 365 days = (8 × 365) = **2920**
**(c)** Number of glasses of water a person drink in 1 day = 8
Number of glasses of water 125 persons drink in one day = (8 × 125) = 1000
Number of glasses of water 125 persons drink in one year = (365 × 1000) = **365000**

**(4) If Soha's heart beats 72 times in one minute.**
**(a) Now find out how many times it beats in one day.**
**(b) Now find out how many times her heart beats in one week?**
**Solution: (a)** Number of times of Soha's heart beats in 1 minute = 72
Number of times Soha's heart beats in one hour i.e. in 60 minutes = (72 × 60) = 4320
And Number of times Soha's heart beats in one day i.e. in 24 hours = (4320 × 24) = **103680**
**(b)** From previous solution we got that Soha's heart beats in 1 day is 103680
Now Number of times Soha's heart beats in 1 week = (103680 × 7) = 725760

**(5) Isha has Rs 1000 with her. She wants to buy petrol. One litre of petrol costs Rs. 47. How many litres can she buy?**
**Solution:** Money with Isha = Rs. 1000,
Cost of one litre = Rs. 47

$$\begin{array}{l} 47\overline{)1000}\ (21 \\ \quad -94 \\ \hline \qquad 60 \\ \quad -47 \\ \hline \qquad 13 \end{array}$$

Litres of petrol she can buy = 1000 ÷ 47 = 21 (Quotient), 13 (Remainder)

**(6) 576 books are to be packed in boxes. If one box has 24 books, how many boxes are needed?**
**Solution:** Total number of books = 576
Number of books per box = 24

$$\begin{array}{l} 24\overline{)576}\ (24 \\ -48 \\ \hline \quad 96 \\ -96 \\ \hline \quad 0 \end{array}$$

Number of boxes needed or packing = 576 ÷ 24 = **24**

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# Exercise

## OBJECTIVE TYPE QUESTIONS

**(1)** Find the product 89 x 64.
(A) 5660 (B) 5696
(C) 5636 (D) 5669

**(2)** Find the product 99 x 11.
(A) 1089 (B) 1090
(C) 1990 (D) 1221

**(3)** Find the product 123 x 46.
(A) 5660 (B) 5668
(C) 5658 (D) 5568

**(4)** Find the product 36 x 111.
(A) 3996 (B) 3990
(C) 3660 (D) 3960

**(5)** Find the product 555 x 26.
(A) 14520 (B) 14203
(C) 14340 (D) 14430

**(6)** Compute 1221 ÷ 111.
(A) 21 (B) 11
(C) 22 (D) 12

**(7)** Compute 156 ÷ 12.
(A) 30 (B) 14
(C) 11 (D) 13

**(8)** Compute 975 ÷ 15.
(A) 75 (B) 65
(C) 56 (D) 45

**(9)** Compute 1157 ÷ 89.
(A) 20 (B) 13
(C) 11 (D) 15

**(10)** Compute 3564 ÷ 36.
(A) 97 (B) 90
(C) 99 (D) 95

**(11)** Find the product of the following
156 × 287 = _____
(A) 44772 (B) 45772
(C) 43772 (D) None of These

**(12)** Find the product of 78 × 6 = ?
(A) 488 (B) 468
(C) 448 (D) 438

**(13)** A baby elephant drinks around 12 L of milk every day. How much milk will it drink in two years?
(A) 8760 (B) 876
(C) 8670 (D) 8880

**(14)** A baby blue whale drinks around 200 L of milk in one day. How much milk would the baby blue whale drink in eight months?
(A) 4800 (B) 48500
(C) 48000 (D) 48800

**(15)** Tulsi and her husband work on Karunya's farm. The Government has said that farm workers should be paid at least Rs 71 for one day's work. But he pays Rs. 55 to Tulsi and Rs. 58 to her husband. If Tulsi works for 49 days, how much money does she get?
(A) 2690 (B) 2965
(C) 2600 (D) 2695

**(16)** Tulsi and her husband work on Karunya's farm. The Government has said that farm workers should be paid at least Rs 71 for one day's work. But he pays Rs. 55 to Tulsi and Rs. 58 to her husband. If her husband works for 42 days, how much money does he get?
(A) 2490 (B) 2465
(C) 2436 (D) 2495

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**(17)** In Rajasthan salary of worker per day is Rs 73. Bhairon Singh is a worker in Rajasthan? If he works for 8 weeks on the farm, how much will he earn?

(A) 4088 (B) 4880
(C) 4008 (D) 4888

**(18)** Sukhi works on a farm. He is paid Rs. 98 for one day. If he works for 52 days, how much will he earn?

(A) 5088 (B) 5080
(C) 5096 (D) 5088

**(19)** A tank is full of 300 L of water. If 15 buckets can be filled with one tank of water, how much water comes in a bucket?

(A) 30 (B) 25
(C) 15 (D) 20

**(20)** There is 336 ladduos. If 16 laddoos can be packed in 1 box, how many boxes are needed to pack all these laddoos?

(A) 30 (B) 21
(C) 36 (D) 20

# Answer Key

## CHECK YOUR CONCEPT

**(1)** **(i)** a) 19 kg b) ₹21 c) ₹779
**(ii)** a) ₹419 b) ₹3081

## OBJECTIVE TYPE QUESTIONS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **(1)** | (B) | **(6)** | (B) | **(11)** | (A) | **(16)** | (C) |
| **(2)** | (A) | **(7)** | (D) | **(12)** | (B) | **(17)** | (A) |
| **(3)** | (C) | **(8)** | (B) | **(13)** | (A) | **(18)** | (C) |
| **(4)** | (A) | **(9)** | (B) | **(14)** | (C) | **(19)** | (D) |
| **(5)** | (D) | **(10)** | (C) | **(15)** | (D) | **(20)** | (B) |

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