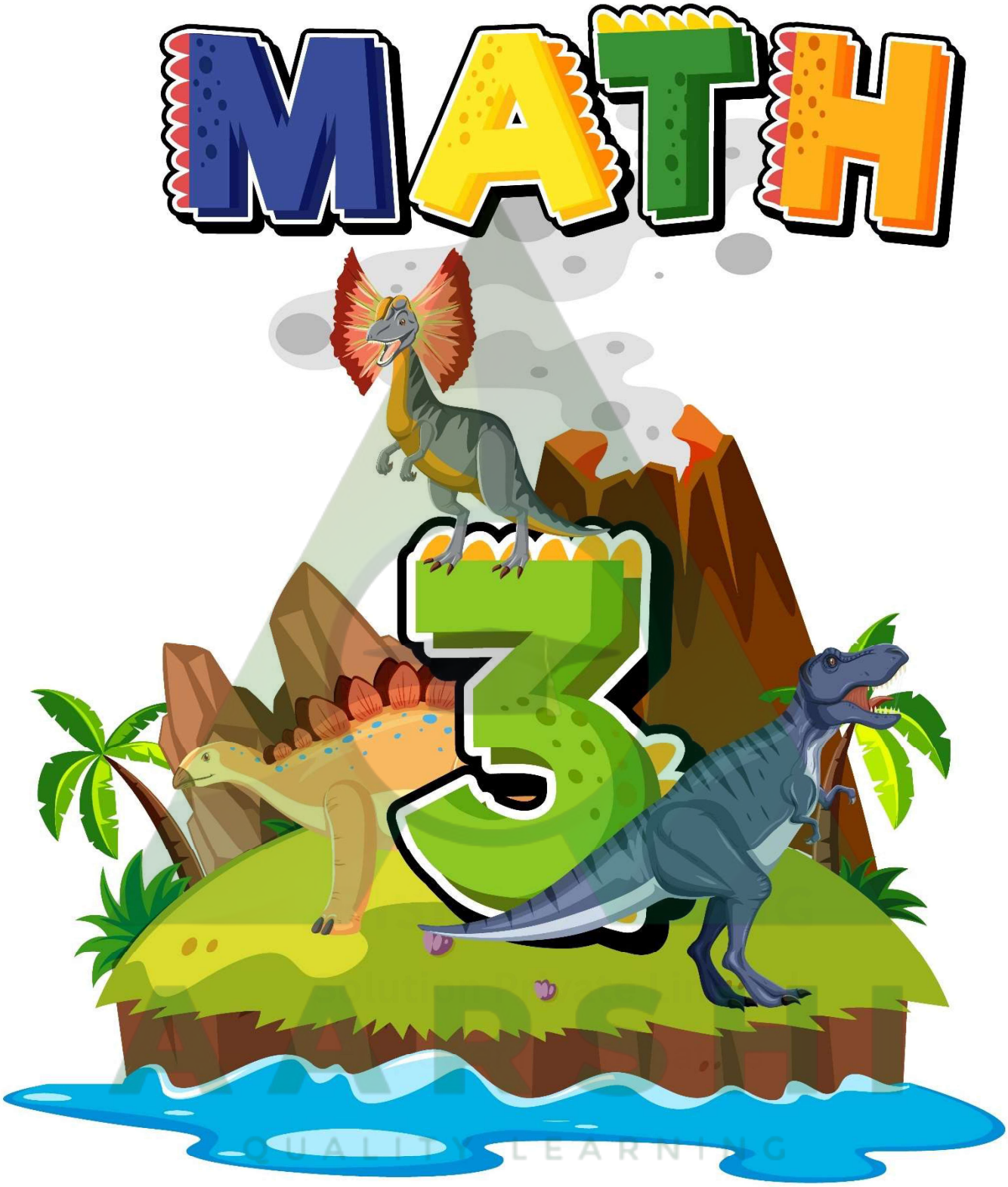


CHAPTER 6: MULTIPLICATION

MULTIPLICATION

➢ MULTIPLICATION AND ITS PROPERTIES

❖ INTRODUCTION

Multiplication means repeated addition. The symbol for the notation of multiplication is x. Sometime a dot mark (.) is used for the notation of multiplication. If there is no sign between two or more numbers then the product sign is considered. Two variables x and y when written as ***xy*** there is a product sign between x and y. In this chapter we will learn about the multiplication or product of numbers.

❖ MULTIPLICATION

- Multiplication is a repeated addition.
- The number to be multiplied is called the MULTIPLICAND.
- The number by which we multiply is called the MULTIPLIER.
- The **Answer:** is called the PRODUCT.

❖ MULTIPLICATION AND ITS PROPERTIES

The multiplication of 3 and 4 is the addition of 4 times 3 = 3 + 3 + 3 + 3 = 12 or it is the addition of 3 times of 4 = 4 + 4 + 4 = 12. The resulting numbers of both the addition are same. In the short form, the multiplication of 3 and 4 is written as 3 × 4 or 4 × 3. In 4 × 3, 4 and 3 are multiplicand and multiplier respectively and their multiplication 12 is called product. Therefore, in a multiplication the number which is multiplied is known as multiplicand, the number by which it is multiplied is known as multiplier and the **Answer:** or the result of multiplication is known as product. The multiplication of a number with zero is always zero. e.g. 4252 × 0 = 0 and the product of a number by 1 is the number itself, e.g. 6240 × 1 = 6240.

❖ MULTIPLICATION OF A NUMBER BY 10, 100 AND 1000

The product of 7456 by 10 is obtained by placing one zero after the multiplicand or 7456 = 7456 × 10 = 74560. The product of a number by 100 is obtained by simply placing 2 zeroes after the number. Therefore, the product of the number 8765 by 100 = 8765 × 100 = 876500. The product of a number by 1000 is obtained by simply placing 3 zeroes after the number. Therefore, the product of the number 56438 by 1000 = 56438 × 1000 = 56438000. So, in order to multiply the number by 1,000, 2,000, 5,000, etc. The given number of thousands (i.e. by 1, 2, 5, etc.) should be multiplied to the number and then put three zeroes at the end from left, i.e. 5000 × 7 ⇒ 5 × 7 = 35 and put 3 zeroes = 35000.

Example:

A train travels a distance of 90 kilometres in 1 hour. The distance covered by the train in 10 hours is:

(a) 900km

(b) 1000km

(c) 1090km

(d) All of these

(e) None of these

Answer: (a)

Explanation 90 × 10 = 900 km (Multiplying 90 and I and putting the number of zeroes that multiplier containing).

❖ MULTIPLICATION OF THREE DIGIT NUMBERS WITH ONE DIGIT NUMBER

The following steps are used for the multiplication of three digit numbers (236) with one digit number (4):

Step 1: Multiplication always starts with ones.

Step 2: Multiply the ones 6 × 4 = 24. 2 tens and 4 ones. Write 4 under ones column and carry 2 tens in the tens column.

Step 3: Multiply the tens 4 × 3 = 12 + 2 (carry over) = 14 tens = 1 hundred + 4 tens. Write 4 under tens column and carry 1 hundred to the hundreds column.

Step 4: Multiply the hundreds 4 × 2 = 8 + 1 (carry over) = 9 hundreds. Write 9 under hundreds column.

$$\begin{array}{r} 2\ 3\ 6 \\ \times\quad 4 \\ \hline 9\ 4\ 4 \\ \hline \end{array}$$

Example:

The price of an article is Rs 576. What is total price of 16 such articles?

(a) Rs 9200

(b) Rs 9216

(c) Rs 9250

(d) Rs 9876

(e) None of these

Answer: (b)

Explanation

$$\begin{array}{r} 576 \\ \times 16 \\ \hline 3456 \\ 576\times \\ \hline 9216 \end{array}$$

❖ MULTIPLICATION OF FOUR DIGIT NUMBERS WITH TWO DIGIT NUMBERS

The following steps are used for the multiplication of 4526 and 56:

Step 1: Arrange the multiplicand and multiplier as shown below.

Step 2: Multiply 4526 by 6 ones of 56 = 4526 × 6 = 27156.

Step 3: Multiply 4526 by 5 tens of 56 = 4526 × 50 = 226300.

Step 4: Add 27156 + 226300 to obtain the resulting product = 253456.

$$\begin{array}{r} 4526 \\ \times 56 \\ \hline 27156 \\ 22630\times \\ \hline 253456 \end{array}$$

Example:

A big container contains 7865 small containers. Each small container has 19 pieces of folded cots. The total number of folded cots in the big container is?

(a) 108675

(b) 140035

(c) 149435

(d) All of these

(e) None of these

Answer: (c)

Explanation

$$\begin{array}{r} 7\ 8\ 6\ 5 \\ \times\ 1\ 9 \\ \hline 7\ 0\ 7\ 8\ 5 \\ 7\ 8\ 6\ 5\ \times \\ \hline 1\ 4\ 9\ 4\ 3\ 5 \end{array}$$

➢ COMMUTATIVE OR ORDER PROPERTY OF MULTIPLICATION

The numbers can be multiplied in either order or on changing the order of the numbers then the resulting product of the numbers does not change. The product of 56 and 67, 67 × 56 = 3752. The product of the numbers 56 and 67 on changing their order = 56 × 67 = 3752 is same as the product in the previous order. Therefore, multiplication is commutative.

Example:

The product of two numbers M and N is same as the product of the numbers A and B. Which one of the following options is correct about the above statement?

(a) M × N = A × B

(b) M × A = N × B

(c) Both A and B

(d) M × B = N × A

(e) None of these

Answer: (a)

Explanation

Explications Product of M and N is equal to the product of A and B. Hence,

M × M = A × B.

❖ ASSOCIATIVE OR GROUPING PROPERTY OF MULTIPLICATION

The product of three numbers remains same even if the group of the numbers is changed. The product of the numbers 21, 4 and 25 when written in the order of (21 × 4) × 25 = 84 × 25 = 2100 and the product of the same numbers 21, 4 and 25 is same when written in

the order of 21 × (4 × 25) = 21 × 100 = 2100. If three numbers are denoted by a, b and c then their product (a × b) × c = a × (b × c).

Example:

The product of group of the numbers A and B with a number C is same as the another group of A and C with B. Which one of the following options is correct about the above statement?

(a)(A×B)×C ≠ (A×C)×B

(b) (A×B)×C = (A×C)×B

(c) (A×B)×C > (A×C)×B

(d) All of these

(e) None of these

Answer: (b)

Explanation According to the associative property of multiplication (A × B) × C = (A × C) × B is a true statement.

❖ MULTIPLICATIVE PROPERTY OF ZERO (OR NULL PROPERTY)

The product of a number and zero is always zero. Therefore, 34 × 0 = 0, 0 × 45 = 0.

For a number N, the product of N by zero is zero or N × 0 = 0, 0 × N = 0.

Example:

What should be multiplied with the number 58765 to get zero?

(a) 2

(b) 1

(c) 0

(d) All of these

(e) None of these

Answer: (c)

Explanations: The given number should be multiplied with zero to get zero as their product.

❖ MULTIPLICATIVE PROPERTY OF 1 OR MULTIPLICATIVE IDENTITY PROPERTY

The product of a number with 1 is the number itself. Therefore, 34 × 1 = 31. For a number N, the product of N and 1 is the number itself or N × l = N, 1 × N = N.

Example:

What should be multiplied with the number 10876 to get the number itself?

(a) 1

(b) 2

(c) 0

(d) All of these

(e) None of these

Answer: (a)

Explication To get the multiplicand itself the multiplicand should be multiplied with 1.

❖ MULTIPLICATIVE SERIES

When a group of numbers is arranged in such a way that there are some common relation between the numbers are obtained, the numbers in the group are called in series. In the group of numbers: 2, 4, 6, 8, 10, 12, the group of the numbers are starting from 2 and every next number is 2 more than the previous number. Therefore, the next number after 12 is 12 + 2 = 14.

Example:

Find odd one out from the numbers: 16, 48, 8, 26, 64-

(a) 16

(b) 48

(c) 26

(d) 64

(e) None of these

Answer: (c)

Explanation 26 is odd because except 26 all the numbers are the multiples of 8.

❖ MULTIPLICATION OF DECIMAL NUMBERS

The following steps are used for the multiplication of the decimal numbers by decimal numbers (345.67 and 234.54):

Step 1: Convert the decimal numbers into whole numbers, 5.67 into 567 and 4.54 into 454.

Step 2: Multiply the converted numbers by simple multiplication method, 567 × 454 = 257418

Step 3: Put the decimal point in the resulting product by counting the number of digits form left which is equal to the sum of number of decimal digits of multiplicand and multiplier = 2 + 2 = 4. Therefore, the decimal point will be placed in the product of both decimal numbers by counting 4 from ones or right = 25.7418

Example:

What is the product of the decimal numbers 638.23 and 0.76?

(a) 485.0548

(b) 485.4805

(c) 4.8548

(d) All of these

(e) None of these

Answer: (a)

Questions:

1. **Radhika bought two burgers and a small coke. The burgers cost Rs. 24 each and the coke costs Rs.12. How much did her meal cost?**

(a) Rs. 48

(b) Rs. 50

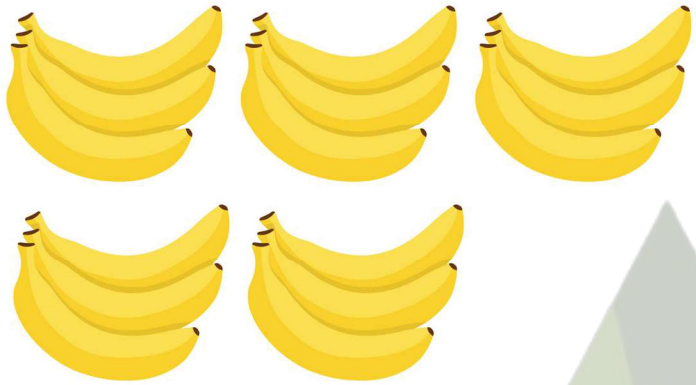
(c) Rs. 60

(d) Rs. 72

Answer (c)

Explanation: 2 × 24 + 12 = 48 + 12 = Rs. 60

2. Which of the following is the multiplication sentence for.



(a) 5 × 1 = 5

(b) 5 × 2 = 10

(c) 5 × 4 = 20

(d) 5 × 3 = 15

Answer (d)

Explanation: 5 × 3 = 15

3. Which pair of numbers best completes the equation?

(a) 65 and 650

(b) 10 and 1000

(c) 7 and 70

(d) 1 and 101

Answer (b)

Explanation: 10 × 100 = 1000

4. At the craft fair, Gopal sold toy trains like the one shown below.

He sold each train for Rs. 28. How much did Gopal make by selling 4 trains?

(a) Rs. 24

(b) Rs. 32

(c) Rs. 112

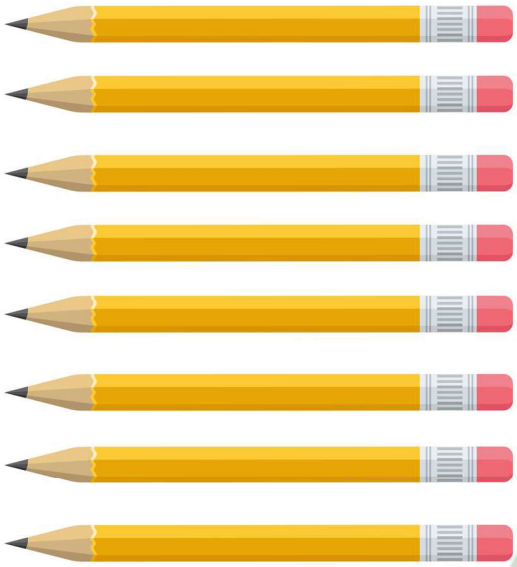
(d) Rs. 832

Answer (c)

Explanation:

$$\begin{array}{r} 28 \\ \times\ 4 \\ \hline 112 \end{array}$$

5. **Raj a bought these pencils. Each pencil cost Rs.2. How much did the pencils cost all together?**



(a) Rs. 15

(b) Rs. 30

(c) Rs. 45

(d) Rs. 60

Answer (b)

Explanation: 15 × 2 = Rs. 30

6. **7 pens are put in a pen stand and there are 9 such pen stands. How many pens are there in all?**

(a) 63

(b) 64

(c) 65

(d) 69

Answer (a)

7. A basket has 10 apples in it. How many apples are there in 7 such baskets?

(a) 60

(b) 70

(c) 80

(d) 90

Answer (b)

8. Multiply 985 by 8. The answer is the same as _____.

(a) 788 + 10 + 8

(b) 700 + 80 + 8

(c) 7000 + 80 + 8

(d) 7000 + 800 + 80

Answer (d)

9. **What is (275 x 8)?**

(a) (170 x 8) + (5 x 8)

(b) (270 x 5) + (5 x 8)

(c) (270 x 5) + (50 x 8)

(d) (270 x 8) + (5 x 8)

Answer (d)

10. **7990 x 0 = _____.**

(a) 7,990

(b) 1

(c) 0

(d) None of these

Answer (c)