

## Multiplication of whole Numbers.

- ① **Closure property** - If  $a$  and  $b$  are whole numbers, then  $(a \times b)$  is also a whole no.

example -  $9 \times 8 = 72$

- ② **Commutative law** - If  $a$  and  $b$  are any two whole no. then,  
 $(a \times b) = (b \times a)$

example - ①  $7 \times 5 = 35$  and  $5 \times 7 = 35$

- ③ **Multiplicative property of zero** - For every whole number  $a$ , we have,  
 $(a \times 0) = (0 \times a) = 0$

example -  $9 \times 0 = 0 \times 9 = 0$

- ④ **Multiplicative property of 1** - For any whole no  $a$  we have,  
 $(a \times 1) = (1 \times a) = a$

example - ①  $8 \times 1 = 1 \times 8 = 8$

⑤ Associative law - If  $a, b, c$  are any whole no. then,  
 $(a \times b) \times c = a \times (b \times c)$ .

example -  $(9 \times 7) \times 10 = 63 \times 10 = 630$ .  
and  $9 \times (7 \times 10) = 9 \times 70 = 630$ .

$$\therefore (9 \times 7) \times 10 = 9 \times (7 \times 10)$$

⑥ Distributive law of multiplication over addition -  
For any whole numbers  $a, b, c$  we have,

$$a \times (b + c) = (a \times b) + (a \times c)$$

example -  $16 \times (9 + 8) = (16 \times 17) = 272$

and  $(16 \times 9) + (16 \times 8) = (144 + 128) = 272$

$$\therefore 16 \times (9 + 8) = (16 \times 9) + (16 \times 8)$$

⑦ Distributive law of multiplication over subtraction  
For any whole numbers  $a, b, c$  we have.

$$a \times (b - c) = (a \times b) - (a \times c)$$

example -

$$11 \times (6 - 4) = (11 \times 2) = 22$$

### EXERCISE 3D

1. Fill in the blanks to make each of the following a true statement:
  - (i)  $246 \times 1 = \dots\dots$
  - (ii)  $1369 \times 0 = \dots\dots$
  - (iii)  $593 \times 188 = 188 \times \dots\dots$
  - (iv)  $286 \times 753 = \dots\dots \times 286$
  - (v)  $38 \times (91 \times 37) = \dots\dots \times (38 \times 37)$
  - (vi)  $13 \times 100 \times \dots\dots = 1300000$
  - (vii)  $59 \times 66 + 59 \times 34 = 59 \times (\dots\dots + \dots\dots)$
  - (viii)  $68 \times 95 = 68 \times 100 - 68 \times \dots\dots$
2. State the property used in each of the following statements:
  - (i)  $19 \times 17 = 17 \times 19$
  - (ii)  $(16 \times 32)$  is a whole number
  - (iii)  $(29 \times 36) \times 18 = 29 \times (36 \times 18)$
  - (iv)  $1480 \times 1 = 1480$
  - (v)  $1732 \times 0 = 0$
  - (vi)  $72 \times 98 + 72 \times 2 = 72 \times (98 + 2)$
  - (vii)  $63 \times 126 - 63 \times 26 = 63 \times (126 - 26)$
3. Find the value of each of the following using various properties:
  - (i)  $647 \times 13 + 647 \times 7$
  - (ii)  $8759 \times 94 + 8759 \times 6$
  - (iii)  $7459 \times 999 + 7459$
  - (iv)  $9870 \times 561 - 9870 \times 461$
  - (v)  $569 \times 17 + 569 \times 13 + 569 \times 70$
  - (vi)  $16825 \times 16825 - 16825 \times 6825$
4. Determine each of the following products by suitable rearrangements:
  - (i)  $2 \times 1658 \times 50$
  - (ii)  $4 \times 927 \times 25$
  - (iii)  $625 \times 20 \times 8 \times 50$
  - (iv)  $574 \times 625 \times 16$
  - (v)  $250 \times 60 \times 50 \times 8$
  - (vi)  $8 \times 125 \times 40 \times 25$
5. Find each of the following products, using distributive laws:
  - (i)  $740 \times 105$
  - (ii)  $245 \times 1008$
  - (iii)  $947 \times 96$
  - (iv)  $996 \times 367$
  - (v)  $472 \times 1097$
  - (vi)  $580 \times 64$
  - (vii)  $439 \times 997$
  - (viii)  $1553 \times 198$
6. Find each of the following products, using distributive laws:
  - (i)  $3576 \times 9$
  - (ii)  $847 \times 99$
  - (iii)  $2437 \times 999$



7. Find the products:

$$\begin{array}{r} \text{(i)} \quad 458 \\ \times 67 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(ii)} \quad 3709 \\ \times 89 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(iii)} \quad 4617 \\ \times 234 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(iv)} \quad 15208 \\ \times 542 \\ \hline \end{array}$$

8. Find the product of the largest 3-digit number and the largest 5-digit number.

*Hint.*  $999 \times 99999 = 999 \times (100000 - 1)$ . Now, use distributive law.

9. A car moves at a uniform speed of 75 km per hour. How much distance will it cover in 98 hours?
10. A dealer purchased 139 VCRs. If the cost of each set is ₹ 24350, find the cost of all the sets together.
11. A housing society constructed 197 houses. If the cost of construction for each house is ₹ 450000, what is the total cost for all the houses?
12. 50 chairs and 30 blackboards were purchased for a school. If each chair costs ₹ 1065 and each blackboard costs ₹ 1645, find the total amount of the bill.
13. There are six sections of Class VI in a school and there are 45 students in each section. If the monthly charges from each student be ₹ 1650, find the total monthly collection from Class VI.
14. The product of two whole numbers is zero. What do you conclude?
15. Fill in the blanks:
- Sum of two odd numbers is an ..... number.
  - Product of two odd numbers is an ..... number.
  - $a \neq 0$  and  $a \times a \div a \Rightarrow a = ?$

Q1

**Answer :**

(i)  $246 \times 1 = 246$

(ii)  $1369 \times 0 = 0$

(iii)  $593 \times 188 = 188 \times 593$

(iv)  $286 \times 753 = 753 \times 286$

(v)  $38 \times (91 \times 37) = 91 \times (38 \times 37)$

(vi)  $13 \times 100 \times 1000 = 1300000$

(vii)  $59 \times 66 + 59 \times 34 = 59 \times (66 + 34)$

(viii)  $68 \times 95 = 68 \times 100 - 68 \times 5$

Q2

**Answer :**

(i) Commutative law in multiplication

(ii) Closure property

(iii) Associativity of multiplication

(iv) Multiplicative identity

(v) Property of zero

(vi) Distributive law of multiplication over addition

(vii) Distributive law of multiplication over subtraction

**Answer :**

$$\begin{aligned} & \text{(i) } 647 \times 13 + 647 \times 7 \\ &= 647 \times (13 + 7) \\ &= 647 \times 20 \\ &= 12940 \end{aligned} \quad \text{(By using distributive property)}$$

$$\begin{aligned} & \text{(ii) } 8759 \times 94 + 8759 \times 6 \\ &= 8759 \times (94 + 6) \\ &= 8759 \times 100 \\ &= 875900 \end{aligned} \quad \text{(By using distributive property)}$$

$$\begin{aligned} & \text{(iii) } 7459 \times 999 + 7459 \\ &= 7459 \times (999 + 1) \\ &= 7459 \times 1000 \\ &= 7459000 \end{aligned} \quad \text{(By using distributive property)}$$

$$\begin{aligned} & \text{(iv) } 9870 \times 561 - 9870 \times 461 \\ &= 9870 \times (561 - 461) \\ &= 9870 \times 100 \\ &= 987000 \end{aligned} \quad \text{(By using distributive property)}$$

$$\begin{aligned} & \text{(v) } 569 \times 17 + 569 \times 13 + 569 \times 70 \\ &= 569 \times (17 + 13 + 70) \\ &= 569 \times 100 \\ &= 56900 \end{aligned} \quad \text{(By using distributive property)}$$

$$\begin{aligned} & \text{(vi) } 16825 \times 16825 - 16825 \times 6825 \\ &= 16825 \times (16825 - 6825) \\ &= 16825 \times 10000 \\ &= 168250000 \end{aligned} \quad \text{(By using distributive property)}$$

**Q4**

**Answer :**

$$\begin{aligned} & \text{(i) } 2 \times 1658 \times 50 \\ &= (2 \times 50) \times 1658 \\ &= 100 \times 1658 \\ &= 165800 \end{aligned}$$

**Answer :**

$$\begin{aligned} \text{(i)} \quad & 647 \times 13 + 647 \times 7 \\ &= 647 \times (13 + 7) \\ &= 647 \times 20 \\ &= 12940 \end{aligned} \quad \text{(By using distributive property)}$$

$$\begin{aligned} \text{(ii)} \quad & 8759 \times 94 + 8759 \times 6 \\ &= 8759 \times (94 + 6) \\ &= 8759 \times 100 \\ &= 875900 \end{aligned} \quad \text{(By using distributive property)}$$

$$\begin{aligned} \text{(iii)} \quad & 7459 \times 999 + 7459 \\ &= 7459 \times (999 + 1) \\ &= 7459 \times 1000 \\ &= 7459000 \end{aligned} \quad \text{(By using distributive property)}$$

$$\begin{aligned} \text{(iv)} \quad & 9870 \times 561 - 9870 \times 461 \\ &= 9870 \times (561 - 461) \\ &= 9870 \times 100 \\ &= 987000 \end{aligned} \quad \text{(By using distributive property)}$$

$$\begin{aligned} \text{(v)} \quad & 569 \times 17 + 569 \times 13 + 569 \times 70 \\ &= 569 \times (17 + 13 + 70) \\ &= 569 \times 100 \\ &= 56900 \end{aligned} \quad \text{(By using distributive property)}$$

$$\begin{aligned} \text{(vi)} \quad & 16825 \times 16825 - 16825 \times 6825 \\ &= 16825 \times (16825 - 6825) \\ &= 16825 \times 10000 \\ &= 168250000 \end{aligned} \quad \text{(By using distributive property)}$$

**Q4**

**Answer :**

$$\begin{aligned} \text{(i)} \quad & 2 \times 1658 \times 50 \\ &= (2 \times 50) \times 1658 \\ &= 100 \times 1658 \\ &= 165800 \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad & 4 \times 927 \times 25 \\ &= (4 \times 25) \times 927 \\ &= 100 \times 927 \\ &= 92700 \end{aligned}$$

$$\begin{aligned} \text{(iii)} \quad & 625 \times 20 \times 8 \times 50 \\ &= (20 \times 50) \times 8 \times 625 \\ &= 1000 \times 8 \times 625 \\ &= 8000 \times 625 \\ &= 5000000 \end{aligned}$$

$$\begin{aligned} \text{(iv)} \quad & 574 \times 625 \times 16 \\ &= 574 \times (625 \times 16) \\ &= 574 \times 10000 \\ &= 5740000 \end{aligned}$$

$$\begin{aligned}
 & \text{(v)} \quad 250 \times 60 \times 50 \times 8 \\
 &= (250 \times 8) \times (60 \times 50) \\
 &= 2000 \times 3000 \\
 &= 6000000
 \end{aligned}$$

$$\begin{aligned}
 & \text{(vi)} \quad 8 \times 125 \times 40 \times 25 \\
 &= (8 \times 125) \times (40 \times 25) \\
 &= 1000 \times 1000 \\
 &= 1000000
 \end{aligned}$$

Q5

**Answer :**

$$\begin{aligned}
 & \text{(i)} \quad 740 \times 105 \\
 &= 740 \times (100 + 5) \\
 &= 740 \times 100 + 740 \times 5 && \text{(Using distributive law of multiplication over addition)} \\
 &= 74000 + 3700 \\
 &= 77700
 \end{aligned}$$

$$\begin{aligned}
 & \text{(ii)} \quad 245 \times 1008 \\
 &= 245 \times (1000 + 8) \\
 &= 245 \times 1000 + 245 \times 8 && \text{(Using distributive law of multiplication over addition)} \\
 &= 245000 + 1960 \\
 &= 246960
 \end{aligned}$$

$$\begin{aligned}
 & \text{(iii)} \quad 947 \times 96 \\
 &= 947 \times (100 - 4) \\
 &= 947 \times 100 - 947 \times 4 && \text{(Using distributive law of multiplication over subtraction)} \\
 &= 94700 - 3788 \\
 &= 90912
 \end{aligned}$$

$$\begin{aligned}
 & \text{(iv)} \quad 996 \times 367 \\
 &= 367 \times (1000 - 4) \\
 &= 367 \times 1000 - 367 \times 4 && \text{(Using distributive law of multiplication over subtraction)} \\
 &= 367000 - 1468 \\
 &= 365532
 \end{aligned}$$

Q6

**Answer :**

Distributive property of multiplication over addition states that  $a(b + c) = ab + ac$

Distributive property of multiplication over subtraction states that  $a(b - c) = ab - ac$

$$\begin{aligned}
 & \text{(i)} \quad 3576 \times 9 \\
 &= 3576 \times (10 - 1) \\
 &= 3576 \times 10 - 3576 \times 1 \\
 &= 35760 - 3576 \\
 &= 32184
 \end{aligned}$$

$$\begin{aligned}
 & \text{(ii)} \quad 847 \times 99 \\
 &= 847 \times (100 - 1) \\
 &= 847 \times 100 - 847 \times 1 \\
 &= 84700 - 847 \\
 &= 83853
 \end{aligned}$$



$$\begin{aligned}
 & \text{(ii) } 847 \times 99 \\
 &= 847 \times (100 - 1) \\
 &= 847 \times 100 - 847 \times 1 \\
 &= 84700 - 847 \\
 &= 83853
 \end{aligned}$$

$$\begin{aligned}
 & \text{(iii) } 2437 \times 999 \\
 &= 2437 \times (1000 - 1) \\
 &= 2437 \times 1000 - 2437 \times 1 \\
 &= 2437000 - 2437 \\
 &= 2434563
 \end{aligned}$$

**Q7**

**Answer :**

$$\begin{array}{r}
 \text{(i)} \\
 \begin{array}{r}
 456 \\
 \times 67 \\
 \hline
 3206 \quad \text{Multiplication by 7} \\
 27480 \quad \text{Multiplication by 60} \\
 \hline
 30686
 \end{array} \\
 458 \times 67 = 30686
 \end{array}$$

$$\begin{array}{r}
 \text{(ii)} \\
 \begin{array}{r}
 3709 \\
 \times 89 \\
 \hline
 33381 \quad \text{Multiplication by 9} \\
 296720 \quad \text{Multiplication by 80} \\
 \hline
 330101
 \end{array} \\
 3709 \times 89 = 330101
 \end{array}$$

$$\begin{array}{r}
 \text{(iii)} \\
 \begin{array}{r}
 4617 \\
 \times 234 \\
 \hline
 18468 \quad \text{Multiplication by 4} \\
 138510 \quad \text{Multiplication by 30} \\
 923400 \quad \text{Multiplication by 200} \\
 \hline
 1080378
 \end{array} \\
 4617 \times 234 = 1080378
 \end{array}$$

$$\begin{array}{r}
 \text{(iv)} \\
 \begin{array}{r}
 15208 \\
 \times 542 \\
 \hline
 30416 \quad \text{Multiplication by 2} \\
 608320 \quad \text{Multiplication by 40} \\
 7604000 \quad \text{Multiplication by 500} \\
 \hline
 8242736
 \end{array} \\
 15208 \times 542 = 8242736
 \end{array}$$

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$$15208 \times 542 = 8242736$$

Q8

**Answer :**

Largest three-digit number = 999

Largest five-digit number = 99999

$\therefore$  Product of the two numbers =  $999 \times 99999$

$$\begin{aligned} &= 999 \times (100000 - 1) && \text{(Using distributive law)} \\ &= 99900000 - 999 \\ &= 99899001 \end{aligned}$$

Q9

**Answer :**

Uniform speed of a car = 75 km/h

Distance = speed  $\times$  time

$$\begin{aligned} &= 75 \times 98 \\ &= 75 \times (100 - 2) && \text{(Using distributive law)} \\ &= 75 \times 100 - 75 \times 2 \\ &= 7500 - 150 \\ &= 7350 \text{ km} \end{aligned}$$

$\therefore$  The distance covered in 98 h is 7350 km.

Q10

**Answer :**

Cost of 1 VCR set = Rs 24350

Cost of 139 VCR sets =  $139 \times 24350$

$$\begin{aligned} &= 24350 \times (140 - 1) && \text{(Using distributive property)} \\ &= 24350 \times 140 - 24350 \\ &= 3409000 - 24350 \\ &= \text{Rs } 3384650 \end{aligned}$$

$\therefore$  The cost of all the VCR sets is Rs 33,84,650.

**Answer :**

Cost of construction of 1 house = Rs 450000

Cost of construction of 197 such houses =  $197 \times 450000$

$$= 450000 \times (200 - 3)$$

$$= 450000 \times 200 - 450000 \times 3$$

property of multiplication over subtraction]

$$= 90000000 - 1350000$$

$$= 88650000$$

[Using distributive

$\therefore$  The total cost of construction of 197 houses is Rs 8,86,50,000.

**Q12**

**Answer :**

Cost of a chair = Rs 1065

Cost of a blackboard = Rs 1645

Cost of 50 chairs =  $50 \times 1065$  = Rs 53250

Cost of 30 blackboards =  $30 \times 1645$  = Rs 49350

$\therefore$  Total amount of the bill = cost of 50 chairs + cost of 30 blackboards

$$= \text{Rs } (53250 + 49350)$$

$$= \text{Rs } 1,02,600$$

**Q13**

**Answer :**

Number of student in 1 section = 45

Number of students in 6 sections =  $45 \times 6$  = 270

Monthly charges from 1 student = Rs 1650

$\therefore$  Total monthly collection from class VI =  $\text{Rs } 1650 \times 270$  = Rs 4,45,500

**Q14**

**Answer :**

If the product of two whole numbers is zero, then one of them is definitely zero.

Example:  $0 \times 2 = 0$  and  $0 \times 15 = 0$

If the product of whole numbers is zero, then both of them may be zero.

i.e.,  $0 \times 0 = 0$

Now,  $2 \times 5 = 10$ . Here, the product will be non-zero because the numbers to be multiplied are not equal to zero.

**Q15**

**Answer :**

(i) Sum of two odd numbers is an even number. Example:  $3 + 5 = 8$ , which is an even number

(ii) Product of two odd numbers is an odd number. Example:  $5 \times 7 = 35$ , which is an odd number.

(iii)  $a \neq 0$  and  $a \times a = a$

Given:  $a \times a = a$

$$\Rightarrow a = \frac{a}{a} = 1, a \neq 0$$