In the Module 6/8 we have discussed about the properties under division .

Recall the following concepts under the division

- **Natural Numbers(N) , Whole Numbers (W) and integers (I) are not closed under Division.**

- **Natural Numbers(N) , Whole Numbers (W) and integers (I) are not Commutative under Division.**

- **Natural Numbers(N) , Whole Numbers (W) and integers (I) are not Associative under Division.**

- **(+) ÷ (+) = +**

- **(+) ÷ (-) = -**

- **(-) ÷ (+) = -**

- **(-) ÷ (-) = +**

In this Module 7/8 we will discuss about distributive property.

1. Distributive property under

   (a) Multiplication over addition

   (b) Multiplication over subtraction.

a) Distributive property under multiplication over addition

   For any three integers 'a' , 'b' and 'c'
   $a \times (b + c) = (a \times b) + (a \times c)$

Ex. For any three integers 5 , 3 , and -8
   $5 \times [(3 + (-8)] = 5 \times [3 - 8]$
   $= 5 \times (-5)$
   $= -25$

   $(5 \times 3) + [5 \times (-8)] = 15 + (-40)$
   $= -25$

   $5 \times [(3 + (-8)] = (5 \times 3) + [5 \times (-8)]$

b) Distributive property under multiplication over subtraction.
   For any three integers 'a' , 'b' and 'c'
   $a \times (b - c) = (a \times b) - (a \times c)$

   $5 \times [(3 - (-8)] = 5 \times [3 + 8]$
   $= 5 \times 11$
   $= 55$
   $(5 \times 3) - [5 \times (-8)] = 15 - (-40)$
   $= 15 + 40$
   $= 55$

5 x [(3 - (-8)]   = (5 X 3) - [5 X (-8)]

Applications of the above properties.

1. Verify 18 X [17 + (-3)]   = (18 X 17) + [18 X (-3)]
$$18 \text{ x } [17 + (-3)] = 18 \text{ X } [17 – 3]$$
$$= 18 \text{ X } 14$$
$$= 252$$

$$(18 \text{ x } 17) + [18 \text{ X } (-3)] = 306 + (-54)$$
$$= 306 – 54$$
$$= 252$$

Hence it is verified

2. Verify 12 X (5 - 8)= (12 X 5) - (12 X 8)
$$12 \text{ x } (5- 8) = 12 \text{ X } (– 3)$$
$$= -36$$

$$(12 \text{ X } 5) – (12 \text{ X } 8) = 60 – 96$$
$$= -36$$
Hence it is verified.

3. find the value of   67 X 102
$$67 \text{ x } 102 = 67 \text{ x } (100 + 2)$$
$$= 67 \text{ X } 100 + 67 \text{ X } 2$$
$$= 6700 + 134$$
$$= 6834$$
4. Find the value of 43 X 98
$$43 \text{ X } (100 - 2) = 43 \text{ X } 100 – 43 \text{ X } 2$$
$$= 4300 – 86$$
$$= 4214$$

Assignment.

I) Verify

1) 25 X (8 + 9) = (25 X 8) + (25 X 9)

2) (-6) X (10 + 6) = [(-6) X 10] + [(-6) X 6]

3) 8 X [(-10) + 7] = [8 X (-10)] + (8 X 7)

4) 12 X (5 – 2) = (12 x5) – (12 x 2)

5) (-3) X [6 – (-4)] = [(-3) X 6] – [(-3) X (-4)]

II) Find the value by using suitable property.

6) 36 X 105

7) 72 X 98

8) 45 X 352 + 352 X 55

9) 25 X 89 + 89

10) 62 X 143 – 62 X 43
11) 54 X (-98) + 54 X (-2)

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