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NATURAL NUMBERS AND WHOLE NUMBERS

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 05
CHAPTER NAME : NATURAL NUMBERS AND WHOLE NUMBERS
SUB TOPIC: Properties of whole numbers for Multiplication
PERIOD NO: 3

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Learning outcomes

- Students will be able to solve problems related to Properties of multiplication on whole numbers.
- Students will develop application skill.

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Previous knowledge Test

- **1. (16 – 8) x 24 = …….. = ……..**
  16 x 24 – 8 x 24 = …….. – ……. = …….
  Is (16 – 8) x 24 = 16 x 24 – 8 x 24? ……..
  Is the type of result always true? ……
  Name the property used here ……

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Natural Numbers and Whole Numbers

Properties of multiplication of whole numbers will be explained with the help of a video
https://www.youtube.com/watch?v=Doqt7bb8Gno

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A. **Closure or Uniqueness Property**

Each pair of whole numbers has a unique (only and only one) sum or product which is also a whole number.

Example:

$8 + 12 = 20$

$7 + 5 = 15$

$6 \times 3 = 18$

$6 \times 7 = 42$

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Multiplication Properties

Commutative Property

You can multiply in any order.

$$a \times b = b \times a$$

$$3 \times 4 = 4 \times 3 = 12$$

Associative Property

You can group the numbers in any combination.

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

$$2 \times (4 \times 5) = (2 \times 4) \times 5$$

Identity Property

The product of 1 and any number is the number.

$$a \times 1 = a$$

$$6 \times 1 = 6$$

Zero Property

The product of 0 and any number is 0.

$$a \times 0 = 0$$

$$9 \times 0 = 0$$

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G. Distributive Property of Multiplication

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

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

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Evaluation Question

1. Fill in the blanks :

(i) 42 x o = …….

(ii) 592 x 1 = ……..

(iii) 328 x 573 = …….. x 328

(iv) 229 x …… = 578 x 229

(v) 32 x 15 = 32 x 6 + 32 x 7 + 32 x …….

(vi) 23 × 56 = 20 × 56 + …… × 56

(vii) 83 × 54 + 83 × 16 = 83 × (…….) = 83 × …… = …….

(viii) 98 × 273 – 75 × 273 = (……..)× 273 = ……. × 273

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Evaluation Question

ANS:

i) 42 × 0 = **0** (By closure property 0)

(ii) 592 × 1 = **592** (By closure property 1)

(iii) 328 × 573 = **573** × 328 (By commutative law of multiplication)

(iv) 229 × **578** = 578 × 229 (By commutative law of multiplication)

(v) 32 × 15 = 32 × 6 + 32 × 7 + 32 × **2** (By distributive law of multiplication)

(vi) 23 × 56 = 20 × 56 + **3** × 56 (By distributive law of multiplication)

(vii) 83 **×** 54 + 83 × 16 = 83 × **(54 + 16)** = 83 × **70** = **5810**

(viii) 98 **×** 273 – 75 × 273 = **(98 – 75)** × 273 = **23** × 273

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Evaluation Question

2.By re-arranging the given numbers, evaluate :

(i) 2 x 487 x 50

(ii) 25 x 444 x 4

(iii) 225 x 20 x 50 x 4

Solution:

(i) 2 × 487 × 50 = (2 × 50) × 487

= 100 × 487= 48700

(ii) 25 × 444 × 4= (25 × 4) × 444

= 100 × 444

= 44400

(iii) 225 × 20 × 50 × 4

(225 × 4) × (20 × 50) = 900 ×1000

= 900000

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Evaluation Question

3.Use distributive law to evaluate:

(i) 984 x 102

(ii) 385 x 1004

(iii) 446 x 10002

Solution:

(i) 984 × 102 = 984 × (100 + 2)

= 984 × 100 + 984 × 2

= 98400 + 1968 = 100, 368

(ii) 385 × 1004= 385 × (1000 + 4)

= 385 × 1000 + 385 × 4

= 385000 + 1540 = 386540

(iii) 446 × 10002 = 446 × (10000 + 2)

= 446 × 10000 + 446 × 2

= 4460000 + 892 = 4460892

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Evaluation Question

4. Evaluate using properties:

(i) 548 x 98

(ii) 924 x 988

(iii) 3023 x 723

Solution:

(i) 548 × 98 = (500 + 40 + 8) × 98

= 500 × 98 + 40 × 98 + 8 × 98

= 49000 + 3920 + 784= 53704

(ii) 924 × 988 = (900 + 20 + 4) × 988

= 900 × 988 + 20 × 988 + 4 × 988

= 889200 + 19760 + 3952 = 912912

(iii) 3023 × 723 = (3000 + 20 + 3) × 723

= 3000 × 723 + 20 × 723 + 3 × 723

= 2169000 + 14460 + 2169 = 2185629

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Evaluation Question

5. Evaluate using properties :

(i) 679 x 8 + 679 x 2

(ii) 284 x 12 – 284 x 2

(iii) 55873 x 94 + 55873 x 6

(iv) 7984 x 15 – 7984 x 5

(v) 8324 x 1945 – 8324 x 945

(vi) 3333 × 987 + 13 × 3333

Solution:

(i) 679 × 8 + 679 × 2= 679 × (8 + 2)

= 679 × 10 = 6790

(ii) 284 × 12 – 284 × 2= 284 × (12 – 2)

= 284 × 10= 2840

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Evaluation Question

(iii) 55873 × 94 + 55873 × 6

= 55873 × (94 + 6)

= 55873 × 100= 5587300

(iv)7984 × 15 – 7984 × 5

= 7984 × (15 – 5)

= 7984 × 10= 79840

V) 8324 × 1945 – 8324 × 945

= 8324 × (1945 – 945)

= 8324 × 1000= 8324000

(vi) 3333 × 987 + 13 × 3333

= 3333 × (987 + 13) = 3333 × 1000

= 3333000

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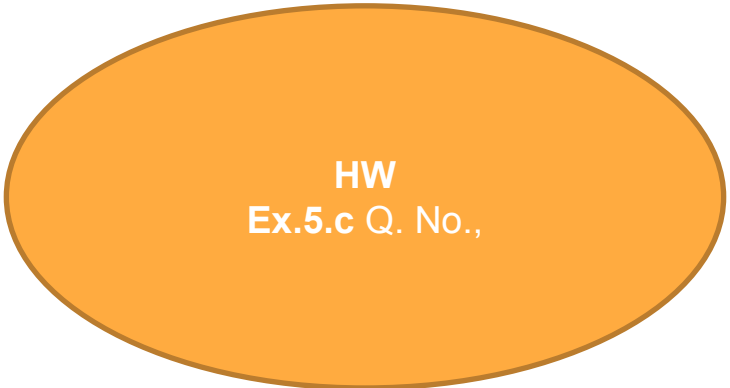
Additional Homework

1. Find the product of

i) The greatest number of three digits and smallest number of 5 digits

ii) The greatest number of 4 digits and greatest number of 5 digits.



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