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FUNDAMENTAL OPERATIONS

SUBJECT : MATHEMATICS
CHAPTER NUMBER:19
CHAPTER NAME :FUNDAMENTAL OPERATIONS
SUBTOPIC : Multiplication of Monomials
PERIOD NO: 3

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Learning outcomes

- Students will be able to multiply a monomial by a monomial.
- Students will be able to multiply monomial by a binomial.

PREVIOUS KNOWLEDGE TEST

1.Add the following expressions:

(i) $-17x^2 - 2xy + 23y^2$, $-9y^2 + 15x^2 + 7xy$

and $13x^2 + 3y^2 - 4xy$

(ii) $-x^2 - 3xy + 3y^2 + 8$, $3x^2 - 5y^2 - 3 + 4xy$ and $-6xy + 2x^2 - 2 + y^2$

(iii) $a^3 - 2b^3 + a$, $b^3 - 2a^3 + b$ and $-2b + 2b^3 - 5a + 4a^3$

Negative numbers and Integers

- Students will Learn multiplication of polynomials with the help of a video .
- https://www.youtube.com/watch?v=_nGv_xSAT2I(12.59)

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Monomial x Polynomial

Distribute the monomial to all of the terms inside the parenthesis.
Multiply the coefficients. Add the exponents.

For example,

$$-2x^2(9x^2 - 6x + 5) = -18x^4 + 12x^3 - 10x^2$$

FIND THE PRODUCT

$$(3a)(2a^2+4ab^2-5ab)$$

$$=\boxed{6a^3+12a^2b^2-15a^2b}$$

$$a(b+c+d)$$

$$(a)b+(a)c+(a)d$$

$$ab+ac+ad$$

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Evaluation Question EX-19 C

1. Fill in the blanks:

(i) 6×3 = ……. and $6x \times 3x$ = ……

(ii) 6×3 = …… and $6x^2 \times 3x^3$ = ……

(iii) 5×4 = ……. and $5x \times 4y$ = ……

(iv) 4×7 = ……. and $4ax \times 7x$ = …….

(v) 6×2 = ……. and $6xy \times 2xy$ = …….

Solution: (i) $6 \times 3 = 18$

Hence, $6x \times 3x = 6 \times 3 \times x \times x$

$= 18 \times x^2 = 18x^2$

Therefore, $6 \times 3 = 18$ and $6x \times 3x = 18x^2$

Evaluation Question EX-19 C

Solution: (ii) $6 \times 3 = 18$

Hence, $6x^2 \times 3x^3 = 6 \times 3 \times x^{2+3}$

$= 18 \times x^5 = 18x^5$

Therefore, $6 \times 3 = 18$ and $6x^2 \times 3x^3 = 18x^5$

(iii) $5 \times 4 = 20$ and $5x \times 4y = 5 \times 4 \times x \times y$

$= 20xy$

Therefore, $5 \times 4 = 20$ and $5x \times 4y = 20xy$

(iv) $4 \times \mathbf{7} = 28$

Hence, $4ax \times 7x = 4 \times \mathbf{7} \times a \times x \times x = 28 \times a \times x^2 = 28ax^2$

Therefore, $4 \times 7 = 28$ and $4ax \times 7x = 28ax^2$

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Evaluation Question EX-19 C

Solution: (v) $6 \times 2 = 12$

Hence, $6xy \times 2xy = 6 \times 2 \times x^{1+1} \times y^{1+1}$

$= 12 \times x^2 \times y^2 = 12x^2y^2$

Therefore, $6 \times 2 = 12$ and $6xy \times 2xy = 12x^2y^2$

2. Fill in the blanks:

(i) $4x \times 6x \times 2$ = ……

(ii) $3ab \times 6ax$ = ……

(iii) $x \times 2x^2 \times 3x^3$ = ……

(iv) $5 \times 5a^3$ = ……

(v) $6 \times 6x^2 \times 6x^2y^2$ = ……

Evaluation Question EX-19 C

Solution: (i) $4x \times 6x \times 2 = 4 \times 6 \times 2 \times x \times x$

$= 48 \times x^2 = 48x^2$

Hence, $4x \times 6x \times 2 = 48x^2$

(ii) $3ab \times 6ax = 3 \times 6 \times a \times a \times b \times x$

$= 18 \times a^2 \times b \times x = 18a^2bx$

Hence, $3ab \times 6ax = 18a^2bx$

(iii) $x \times 2x^2 \times 3x^3 = 2 \times 3 \times x \times x^2 \times x^3$

$= 6 \times x^{1+2+3} = 6 \times x^6 = 6x^6$

Hence, $x \times 2x^2 \times 3x^3 = 6x^6$

Evaluation Question EX-19 C

Solution: (iv) $5 \times 5a^3 = 5 \times 5 \times a^3$

$= 25 \times a^3 = 25a^3$

Hence, $5 \times 5a^3 = 25a^3$

(v) $6 \times 6x^2 \times 6x^2y^2 = 6 \times 6 \times 6 \times x^2 \times x^2 \times y^2$

$= 216 \times x^{2+2} \times y^2 = 216 \times x^4 \times y^2 = 216x^4y^2$

Hence, $6 \times 6x^2 \times 6x^2y^2 = 216x^4y^2$

3. Find the value of:

(i) $3x^3 \times 5x^4$

(ii) $5a^2 \times 7a^7$

(iii) $3abc \times 6ac^3$

(iv) $a^2b^2 \times 5a^3b^4$ **(v) $2x^2y^3 \times 5x^3y^4$**

Evaluation Question EX-19 C

Solution:

(i) $3x^3 \times 5x^4$

$3x^3 \times 5x^4 = 3 \times 5 \times x^3 \times x^4$

$= 15 \times x^{3+4}$

$= 15 \times x^7 = 15x^7$

Hence, the value of $3x^3 \times 5x^4$ is $15x^7$

(ii) $5a^2 \times 7a^7$

$5a^2 \times 7a^7 = 5 \times 7 \times a^2 \times a^7$

$= 35 \times a^{2+7} = 35 \times a^9$

$= 35a^9$

Hence, the value of $5a^2 \times 7a^7$ is $35a^9$

Evaluation Question EX-19 C

Solution:

(iii) $3abc \times 6ac^3$

$3abc \times 6ac^3 = 3 \times 6 \times a \times a \times b \times c \times c^3$

$=18 \times a^{1+1} \times b \times c^{1+3} = 18 \times a^2 \times b \times c^4$

$= 18a^2bc^4$

Hence, the value of $3abc \times 6ac^3$ is $18a^2bc^4$

(iv) $a^2b^2 \times 5a^3b^4$

$a^2b^2 \times 5a^3b^4 = 5 \times a^2 \times a^3 \times b^2 \times b^4$

$= 5 \times a^{2+3} \times b^{2+4} = 5 \times a^5 \times b^6$

$= 5a^5b^6$

Hence, the value of $a^2b^2 \times 5a^3b^4$ is $5a^5b^6$

Evaluation Question EX-19 C

Solution:(v) $2x^2y^3 \times 5x^3y^4$

$2x^2y^3 \times 5x^3y^4 = 2 \times 5 \times x^2 \times x^3 \times y^3 \times y^4 = 10 \times x^{2+3} \times y^{3+4}$

$= 10 \times x^5 \times y^7 = 10x^5y^7$

Hence, the value of $2x^2y^3 \times 5x^3y^4$ is $10x^5y^7$

4. Multiply:

(i) a + b by ab **(ii) 3ab – 4b by 3ab**

(iii) 2xy – 5by by 4bx **(iv) 4x + 2y by 3xy**

(v) 1 + 4x by x

Evaluation Question EX-19 C

Solution:

(i) a + b by ab

The multiplication of a + b by ab is calculated as,

$(a + b) \times ab = a \times ab + b \times ab = a^{1+1}b + ab^{1+1}$

$= a^2b + ab^2$

Hence, (a + b) by ab = $a^2b + ab^2$

(ii) 3ab – 4b by 3ab

The multiplication of 3ab – 4b by 3ab is calculated as,

$(3ab – 4b) \times 3ab = 3ab \times 3ab – 4b \times 3ab$

$= 9a^{1+1}b^{1+1} – 12ab^{1+1} = 9a^2b^2 – 12ab^2$

Evaluation Question EX-19 C

Solution:

(iii) $2xy - 5by$ by $4bx$

The multiplication of $2xy - 5by$ by $4bx$ is calculated as,

$(2xy - 5by) \times 4bx = 2xy \times 4bx - 5by \times 4bx$

$= 8bx^{1+1}y - 20b^{1+1}xy = 8bx^2y - 20b^2xy$

Therefore, $(2xy - 5by)$ by $4bx = 8bx^2y - 20b^2xy$

(iv) $4x + 2y$ by $3xy$

The multiplication of $4x + 2y$ by $3xy$ is calculated as,

$(4x + 2y) \times 3xy = 4x \times 3xy + 2y \times 3xy$

On simplification, we get $12x^{1+1}y + 6xy^{1+1} = 12x^2y + 6xy^2$

Therefore, $(4x + 2y)$ by $3xy = 12x^2y + 6xy^2$

Evaluation Question EX-19 C

Solution:

(v) 1 + 4x by x

The multiplication of (1 + 4x) by x is calculated as,

$(1 + 4x) \times x = 1 \times x + 4x \times x$

On simplification, we get

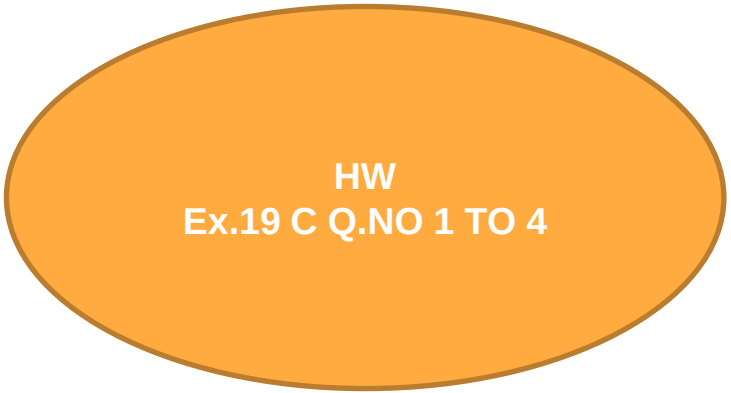
$= x + 4x^{1+1}$

$= x + 4x^2$

Therefore, (1 + 4x) by x = $x + 4x^2$

Additional Homework

1. $-2x(x + y) + x^2$
2. $b(2b - 1/b) - 2b(b - 1/b)$



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