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FUNDAMENTAL OPERATIONS

SUBJECT : MATHEMATICS
CHAPTER NUMBER:19
CHAPTER NAME :FUNDAMENTAL OPERATIONS
SUBTOPIC : Division of a Monomial by a Monomial, and Polynomial by a Monomial.
PERIOD NO: 5

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Learning outcomes

- Students will be able to divide monomial by monomial .
- Students will be able to binomial by monomial

PREVIOUS KNOWLEDGE TEST

1. Find the product of:

(i) a + b – c and 2a – 3b

(ii) 5x – 6y – 7z and 2x + 3y

(iii) 5x – 6y – 7z and 2x + 3y + z

Negative numbers and Integers

- Students will Learn division of monomials and polynomials with the help of a video .
- https://www.youtube.com/watch?v=hJ9na3B1bVo(7.24)

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Division in Algebra

$$\frac{6a^2b}{-2ab^2} = \frac{-3a}{b}$$

$$\frac{6 * a * a * b}{-2 * a *}$$

For example

$$\frac{8x - 2x^2}{2x}$$

$$= \frac{8x}{2x} - \frac{2x^2}{2x}$$

$$= \frac{8}{2}\frac{x}{x} - \frac{2}{2}\frac{x^2}{x}$$

$$= 4$$

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Division of polynomial by monomial means dividing the polynomials which is written as numerator by a monomial
which is written as denominator to find their quotient.

For example: $4a^3 – 10a^2 + 5a \div 2a$

Now the polynomials $(4a^3 – 10a^2 + 5a)$ is written as numerator and the monomial $(2a)$ is written as denominator.

Therefore, we get(4a3−10a2+5a)/2a

Now we observe that there are three terms in the polynomial so,
each term of the polynomial (numerator)
is separately divided by the same monomial (denominator).

4a3/2a−10a2/2a+5a/2a=4a3/2a−10a2/2a+5a/2a

Note:

The process is exactly converse of finding the L.C.M. of fractions and reducing the expression
into a single fraction.

Now we will cancel out the common factor from both numerator and denominator to simplify.

= 4a2−5a+5/2

Evaluation Question EX-19 D

1. Divide:

(i) 3a by a

(ii) 15x by 3x

(iii) 16m by 4

(iv) $20x^2$ by 5x

(v) $30p^2$ by $10p^2$

Solution:

(i) 3a by a

3a ÷ a

This can be written as, 3a / a = (3 × a) / a = 3

Hence, 3a ÷ a = 3

Evaluation Question EX-19 D

Solution: (ii) 15x by 3x

$15x \div 3x$

$15x / 3x = (15 \times x) / (3 \times x)$

This can be written as,

$= (3 \times 5 \times x) / (3 \times x) = 5$

Hence, $15x \div 3x = 5$

(iii) 16m by 4

$16m \div 4$

$16m / 4 = (16 \times m) / 4$

This can be written as, $= (4 \times 4 \times m) / 4$

$= 4m$

Evaluation Question EX-19 D

Solution: (iv) $20x^2$ by $5x$

$20x^2 \div 5x = 20x^2 / 5x = (20 \times x^2) / (5 \times x)$

This can be written as,

$= (4 \times 5 \times x^{2-1}) / 5 = 4 \times x$

$= 4x$

Hence, $20x^2 \div 5x = 4x$

(v) $30p^2$ by $10p^2$

$30p^2 \div 10p^2 = (30 \times p^2) / (10 \times p^2)$

This can be written as, $(3 \times 10 \times p^{2-2}) / 10$

$= 3 \times p^0 = 3 \times 1 = 3$

Hence, $30p^2 \div 10p^2 = 3$

Evaluation Question EX-19 D

2. Simplify:

(i) $2x^5 \div x^2$

(ii) $6a^8 \div 3a^3$

(iii) $20xy \div -5xy$

(iv) $-24a^2b^2c^2 \div 6ab$

(v) $-5x^2y \div xy^2$

Solution: (i) $2x^5 \div x^2$

$= (2 \times x^5) / x^2 = 2 \times x^{5-2}$

$= 2 \times x^3$

$= 2x^3$

Hence, $2x^5 \div x^2 = 2x^3$

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Evaluation Question EX-19 D

Solution: (ii) $6a^8 \div 3a^3$

$= (6 \times a^8) / (3 \times a^3)$

This can be written as,

$= (2 \times 3 \times a^{8-3}) / 3$

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

Hence, $6a^8 \div 3a^3 = 2a^5$

(iii) $20xy \div -5xy$

$= (20 \times x \times y) / (-5 \times x \times y)$

This can be written as, $(4 \times 5) / -5$

$= -4$

Hence, $20xy \div -5xy = -4$

Evaluation Question EX-19 D

Solution: (iv) $-24a^2b^2c^2 \div 6ab$

$= (-24 \times a^2 \times b^2 \times c^2) / (6 \times a \times b)$

This can be written as,

$= (-4 \times 6 \times a^{2-1} \times b^{2-1} \times c^2) / 6$

$= -4 \times a \times b \times c^2 = -4abc^2$

Hence, $-24a^2b^2c^2 \div 6ab = -4abc^2$

(v) $-5x^2y \div xy^2$

$= (-5 \times x^2 \times y) / (x \times y^2)$

This can be written as, $(-5 \times x^{2-1}) / y^{2-1}$

$= (-5 \times x) / y = -5x / y$

Hence, $-5x^2y \div xy^2 = -5x / y$

Evaluation Question EX-19 D

3. Divide:

(i) (- 3m / 4) by 2m

(ii) – $15p^6q^8$ by – $5p^6q^7$

(iii) – $21m^5n^7$ by $14m^2n^2$

(iv) $36a^4x^5y^6$ by $4x^2a^3y^2$

(v) $20x^3a^6$ by 5xy

Solution: (i) (- 3m / 4) by 2m

= – 3m / 4 ÷ 2m = – 3m / 4 × 1 / 2m

= – (3 × m) / (4 × 2 × m)

= – 3 / 8

Hence, (- 3m / 4) ÷ 2m = – 3 / 8

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Evaluation Question EX-19 D

Solution: (ii) $-15p^6q^8$ by $-5p^6q^7$

$-15p^6q^8 \div -5p^6q^7 = (-15 \times p^6 \times q^8) / (-5 \times p^6 \times q^7)$

This can be written as,

$= (3 \times 5 \times q^{8-7}) / 5 = 3 \times q$

$= 3q$

Hence, $-15p^6q^8 \div -5p^6q^7 = 3q$

(iii) $-21m^5n^7$ by $14m^2n^2$

$-21m^5n^7 \div 14m^2n^2 = (-21 \times m^5 \times n^7) / (14 \times m^2 \times n^2)$

This can be written as, $(-3 \times 7 \times m^{5-2} \times n^{7-2}) / (2 \times 7)$

$= (-3 \times m^3 \times n^5) / 2 = -3m^3n^5 / 2$

Hence, $-21m^5n^7 \div 14m^2n^2 = -3m^3n^5 / 2$

Evaluation Question EX-19 D

Solution: (iv) $36a^4x^5y^6$ by $4x^2a^3y^2$

$36a^4x^5y^6 \div 4x^2a^3y^2 = (36 \times a^4 \times x^5 \times y^6) / (4 \times x^2 \times a^3 \times y^2)$

This can be written as,

$= (4 \times 9 \times a^{4-3} \times x^{5-2} \times y^{6-2}) / 4$

$= 9 \times a^1 \times x^3 \times y^4 = 9ax^3y^4$

Hence, $36a^4x^5y^6 \div 4x^2a^3y^2 = 9ax^3y^4$

(v) $20x^3a^6$ by $5xy$

$20x^3a^6 \div 5xy = (20 \times x^3 \times a^6) / (5 \times x \times y)$

This can be written as,

$= (4 \times 5 \times x^{3-1} \times a^6) / (5 \times y) = (4 \times x^2 \times a^6) / y = 4x^2a^6 / y$

Hence, $20x^3a^6 \div 5xy = 4x^2a^6 / y$

Additional Homework

1. Divide:

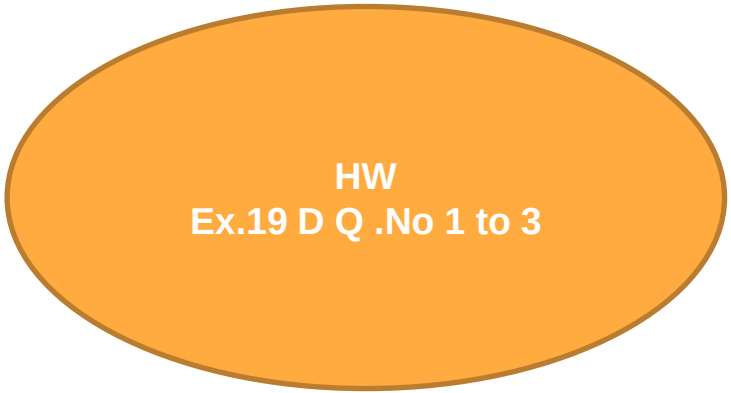
(i) $-16ab^2c$ by $6abc$

(ii) $25x^2y$ by $-5y^2$

(iii) $8x + 24$ by 4

(iv) $4a^2 - a$ by $-a$

(v) $8m - 16$ by -8



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