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EXPONENTS

PERIOD 1

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 2
CHAPTER NAME : EXPONENTS

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Learning outcome

- Students will **learn** what a base is and what an **exponent** is.
- Students will **learn** that **exponents** are a shortcut for multiplication.
- Students will **learn** to evaluate terms with **exponents**.

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Laws of exponents, negative integral exponent

- $a^m \times a^n = a^{m+n}$
- $a^m / a^n = a^{m-n}$
- $(a^m)^n = a^{mn}$
- $a^n / b^n = (a/b)^n$
- $a^0 = 1$
- $a^{-m} = 1/a^m$

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Laws of Exponents

https://www.youtube.com/watch?v=l7FdG4IgeMw (7:33)

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Exercise – 2(A)

1. (iv) $(3^{-1} \div 4^{-1})^{2}$

Solution:

$=(1/3 \div 1/4)^{2}$

(Expressing the equation in fractional form)

$=(1/3 \times 4/1)^{2} = (4/3)^{2}$

(Expressing the equation in mixed fraction)

$=16/9$

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Examples:

(*i*) $(-4)^5 \div (-4)^8$

$$= (-4)^{5-8} = (-4)^{-3} = \frac{1}{(-4)^3}$$

$$= \left(-\frac{1}{4}\right)^3 \qquad [\because \quad a^m \div a^n = a^{m-n}]$$

(*ii*) $\left(\frac{1}{2^3}\right)^2 = \frac{(1)^2}{(2^3)^2} = \frac{1}{2^6} = \left(\frac{1}{2}\right)^6$

(*iii*) $(-3)^4 \times \left(\frac{5}{3}\right)^4 = (-3)^4 \times \frac{(5)^4}{(3)^4}$

$$= \frac{(3)^4 \times (5)^4}{(3)^4} = 5^4$$

(*iv*) $(3^{-7} \div 3^{-10}) \times 3^{-5}$

$$= 3^{-7-(-10)} \times 3^{-5}$$

$$= 3^{-7+10} \times 3^{-5}$$

$$= 3^3 \times 3^{-5} = 3^{3-5}$$

$$= 3^{-2} = \frac{1}{3^2} = \left(\frac{1}{3}\right)^2$$

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Evaluate:

(i) $$\frac{25 \times t^{-4}}{5^{-3} \times 10 \times t^{-8}}$$

$$= \frac{5^2 \times t^{-4}}{5^{-3} \times 10 \times t^{-8}}$$

$$= \frac{5^{2+3} \times t^{-4+8}}{10} = \frac{5^5 \times t^4}{10}$$

$$= \frac{{}^{1}\cancel{5}.5^4 \times t^4}{\cancel{10}_{2}} = \frac{625}{2} t^4$$

(ii) $$\frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}}$$

$$= \frac{3^{-5} \times (2 \times 5)^{-5} \times 125}{5^{-7} \times (2 \times 3)^{-5}}$$

$$= \frac{3^{-5} \times 2^{-5} \times 5^{-5} \times 5^3}{5^{-7} \times 2^{-5} \times 3^{-5}}$$

$[\because \ (ab)^m = a^m \times b^m]$

$$= (3)^{-5+5} \times (2)^{-5+5} \times (5)^{7-5+3}$$

$$= 3^0 \times 2^0 \times 5^5$$

$$= 1 \times 1 \times 5^5 = 5^5$$

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Home assignment

Exercise 2(A) - 1 to 3

1. Find the value of x for which $2^x \div 2^{-4} = 4^5$

2. Calculate the missing value of "x" in the following expression: $(11/9)^3 \times (9/11)^6 = (11/9)^{2x-1}$

3. **Evaluate $(\sqrt{4})^{-3}$**

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THANKING YOU

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