ODM EDUCATIONAL GROUP
Changing your Tomorrow

EXPONENTS

PERIOD 3

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 2
CHAPTER NAME : EXPONENTS

Website: www.odmegroup.org
Email: info@odmps.org
Toll Free: 1800 120 2316
Sishu Vihar, Infocity Road, Patia, Bhubaneswar- 751024

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**.
- Students will practice evaluating terms with **exponents**
- Students will simplify express as positive indices

ODM EDUCATIONAL GROUP
Changing your Tomorrow

Previous knowledge test:

1) Simplify:
   $(x^{a+b})^{a-b}.(x^{b+c})^{b-c}.(x^{c+a})^{c-a}$
2) (i) $(a^{-2})^{-2}.\ (ab)^{-3}$
   (ii) $(x^{n}y^{-m})^{4} \times (x^{3}y^{-2})^{-n}$

ODM EDUCATIONAL GROUP
Changing your Tomorrow

Problems:

1. **If $3^{x} = 500$, find the value of 3^{x-2}**

Sol: $3^{x-2} = 3^{x} \div 3^{2} = 500/9$

2. Express the product of 3.2×10^{6} and 4.1×10^{1} in the standard form.

Sol: Product of 3.2×10^{6} and 4.1×10^{-1}

$$= (3.2 \times 10^{6})(4.1 \times 10^{-1})$$

$$= (3.2 \times 4.1) \times 10^{6} \times 10^{-1}$$

$$= 13.12 \times 10^{5} = 1.312 \times 10^{5} \times 10^{1} \qquad [\because a^{m} \times a^{n} = a^{m+n}]$$

$$= 1.312 \times 10^{6}$$

ODM EDUCATIONAL GROUP
Changing your Tomorrow

Examples:

Given, $\frac{5^m \times 5^3 \times 5^{-2}}{5^{-5}} = 5^{12}$

Using laws of exponents, $a^m + a^n = (a)^{m-n}$ and $a^{-m} = \frac{1}{a^n}$ [$\because a$ is non-zero integer]

Then, $5^m \times 5^3 \times 5^{-2} \times 5^5 = 5^{12}$

$\Rightarrow$ $5^m \times 5^8 \times 5^{-2} = 5^{12}$

$\Rightarrow$ $5^m \times 5^6 = 5^{12}$

$\Rightarrow$ $5^{m+6} = 5^{12}$ [$\because a^m \times a^n = a^{m+n}$]

On comparing both sides, we get

$m + 6 = 12$

$\Rightarrow$ $m = 6$

ODM EDUCATIONAL GROUP
Changing your Tomorrow

4) Planet A is at a distance of 9.35 x 10^6 km from Earth and planet B is 6.27 x 107 km from Earth. Which planet is nearer to Earth?

Sol: Distance between planet A and Earth = 9.35 x 10^6 km Distance between planet B and Earth = 6.27 x 10^7 km

For finding difference between above two distances, we have to change both in same exponent of 10, i.e. 9.35 x.10^6 = 0.935 x 10^7, clearly 6.27 x 10^7 is greater.

So, planet A is nearer to Earth.

ODM EDUCATIONAL GROUP
Changing your Tomorrow

5) Evaluate: $\dfrac{16 \times 10^2 \times 64}{2^4 \times 4^2}$

Using laws of exponents, $a^m \div a^n = (a)^{m-n}$ and $a^m \times a^n = a^{m+n}$ [$\because$ a is non-zero integer]

$$\therefore \quad \frac{16 \times 10^2 \times 64}{2^4 \times 4^2} = (4)^2 \times \frac{16 \times 10^2 \times 64}{2^4 \times 4^2} \div 4^{-2}$$

[$\because 64 = 4 \times 4 \times 4$ and $16 = 4 \times 4$]

$$= (4)^3 \times 10^2 \times 2^{-4}$$

$$= (2^2)^3 \times 10^2 \times 2^{-4}$$

$$= 2^6 \times 10^2 \times 2^{-4}$$

$$= 2^2 \times 10^2 = 4 \times 100 = 400$$ [$\because 2^2 = 4$]

Home assignment:

Exercise-2(B)

AHA

$$(i)\ \left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}} \left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} \left(\frac{x^c}{x^a}\right)^{\frac{1}{ca}} = 1$$

$$(ii)\ \frac{1}{1+x^{a-b}} + \frac{1}{1+x^{b-a}} = 1$$

ODM EDUCATIONAL GROUP
Changing your Tomorrow

THANKING YOU

ODM EDUCATIONAL GROUP

ODM EDUCATIONAL GROUP
Changing your Tomorrow