

Exponent Laws Part 3

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Mathematics 9 Exponents Exponent Laws Part 3

A. Operations with Exponents

1) Simplify the following.

$$\begin{aligned} \text{a)} & (3x^2y)(-5xy^4) \\ & = -15x^{2+1}y^{1+4} \\ & = \boxed{-15x^3y^5} \end{aligned}$$

$$\begin{aligned} \text{b)} & \frac{6x^3y^2}{10xy^5} \\ & = \frac{3x^{3-1}y^{2-5}}{5} \\ & = \frac{3x^2y^{-3}}{5} \\ & = \boxed{\frac{3x^2}{5y^3}} \end{aligned}$$

$$\begin{aligned} \text{c)} & \frac{(4x^3)(6x^{-2})}{2x^{-1}} \\ & = \frac{24x^{3+2}}{2x^{-1}} \\ & = \frac{24x}{2x^{-1}} \\ & = 12x^{1-1} = 12x^{1+1} \\ & = \boxed{12x^2} \end{aligned}$$

$$\begin{aligned} \text{d)} & (2xy^2)^2(3xy^{-1})^2 \\ & = (2^2x^2y^4)(3^2x^2y^{-2}) \\ & = (4x^2y^4)(9x^2y^{-2}) \\ & = 36x^{2+2}y^{4+2} \\ & = \boxed{36x^4y^2} \end{aligned}$$

$$\begin{aligned}
 e) & \left(3x^2y^{-2}\right)^{-2} \\
 & = 3^{-2} x^{2 \cdot -2} y^{-2 \cdot -2} \\
 & = \cancel{(3^{-2})} \cancel{x^{-4}} y^4 \\
 & = \frac{y^4}{3^2 x^4} \\
 & = \boxed{\frac{y^4}{9x^4}}
 \end{aligned}$$

$$\begin{aligned}
 f) & \left(\frac{2x^{-2}}{3y}\right)^{-2} \\
 & = \frac{2^{-2} x^{-2 \cdot -2}}{3^{-2} y^{-2}} \\
 & = \cancel{(2^{-2})} \cancel{x^{-2}} y^4 \\
 & = \frac{3^2 x^4 y^2}{2^2} \\
 & = \boxed{\frac{9x^4 y^2}{4}}
 \end{aligned}$$

$$\begin{aligned}
 g) & \frac{(4x^2y)^2}{(2xy^{-1})^3} \\
 & = \frac{4^2 x^{2 \cdot 2} y^2}{2^3 x^3 y^{-1 \cdot 3}} \\
 & = \frac{\cancel{(16)} x^4 y^2}{\cancel{(8)} x^3 y^{-3}} \\
 & = 2 x^{4-3} y^{2-(-3)} \\
 & = \boxed{2 x y^5}
 \end{aligned}$$

$$\begin{aligned}
 h) & \frac{(-4x^2)(3y^{-1})}{(2xy)(7x^{-1}y^{-1})} \\
 & = \frac{-12 x^2 y^{-1}}{14 x^{1+1} y^{1+1}} \\
 & = \frac{-12 x y^2}{14 x^0 y^0} \\
 & = \frac{-12 x^2 y^{-1}}{14(1)(1)} \\
 & = \frac{-12 x^2 y^{-1}}{14} \\
 & = \boxed{-\frac{6x^2}{7y}}
 \end{aligned}$$

Assignment: Exponent Laws Part 3 Assignment

Name: _____

Exponent Laws Part 3 Assignment

Simplify the following.

$$1. (3x)(2x)$$

$$2. (-5x^{-1})(3x^4)$$

$$3. (2m^7n^2)(3m^4n^{-2})$$

$$4. \frac{m^5n^4}{mn^2}$$

$$5. \frac{10x^2y}{5x^4y^{-3}}$$

$$6. \frac{12mn^{-1}}{18m^{-2}n^2}$$

$$7. (3m^{-1}n)^2$$

$$8. (-4x^{-2}y^{-3})^3$$

$$9. \frac{6x^2y^{-2}}{8x^4y^{-4}}$$

$$10. (3x^2y^{-2})^{-2}$$

$$11. (x^3y^3)^{-1}(x^3y^2)^2$$

$$12. (x^2y^{-2})(xy^{-3})$$

$$13. \frac{(m^2n)(m^3n)}{(m^{-1}n)^2}$$

$$14. \frac{(a^4)^3}{(a^3)^3}$$

$$15. \frac{(2x^{-1}y^3)^3}{(4xy^3)^2}$$

$$16. (a^{-1}b^2)^{-3}(a^2b^{-2})^2$$

Answers

1) $6x^2$

2) $-15x^3$

3) $6m^{11}$

4) m^4n^2

5) $\frac{2y^4}{x^2}$

6) $\frac{2m^3}{3n^3}$

7) $\frac{9n^2}{m^2}$

8) $\frac{-64}{x^6y^9}$

9) $\frac{3y^2}{4x^2}$

10) $\frac{y^4}{9x^4}$

11) x^3y

12) $\frac{x^3}{y^5}$

13) m^7

14) $\frac{1}{a^3}$

15) $\frac{y^3}{2x^5}$

16) $\frac{a^7}{b^{10}}$