

# Exponent Laws Part 3

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## Mathematics 9 Exponents Exponent Laws Part 3

### A. Operations with Exponents

1) Simplify the following.

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

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

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

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

$$\begin{aligned}
 \text{e) } & (3x^2y^{-2})^{-2} \\
 &= 3^{-2} x^{2 \cdot -2} y^{-2 \cdot -2} \\
 &= \frac{3^{-2} x^{-4} y^4}{1} \\
 &= \frac{y^4}{3^2 x^4} \\
 &= \boxed{\frac{y^4}{9x^4}}
 \end{aligned}$$

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

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

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

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

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

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

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

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

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

$$14. \frac{(a^4)^{\frac{3}{2}}}{(a^3)^3}$$

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

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

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