

IN-CLASS ASSIGNMENT #1
Simplifying Exponents
201-943-DW
August 27th 2012
SOLUTIONS

Simplify the following expressions

$$\textcircled{1} \quad 2 \cdot 3^{-1} = 2 \cdot \frac{1}{3} = \boxed{\frac{2}{3}}$$

$$\textcircled{2} \quad (-4)(-2)^{-3} = (-4)\left(\frac{1}{(-2)^3}\right) = \frac{-4}{-8} = \boxed{\frac{1}{2}}$$

$$\textcircled{3} \quad \frac{x^{-1}}{\frac{1}{(-x)^{-1}}} = \frac{x^{-1}}{(-x)} = \frac{1}{(-x)x} = \boxed{-\frac{1}{x^2}}$$

$$\textcircled{4} \quad \frac{x^2 y^{-1}}{\frac{1}{2xy^{-2}}} = \frac{\frac{x^2}{y}}{\frac{y^2}{2x}} = \frac{x^2}{y} \cdot \frac{2x}{y^2} = \boxed{\frac{2x^3}{y^3}}$$

$$\textcircled{5} \quad \frac{(-3xy)^{-11}}{3^{-10}x^{-3}y^2} = \frac{3^{10}x^3}{(-3xy)^{11}y^2} = \frac{3^{10}x^3}{-3^{11}x^{11}y^{11}y^2} = \boxed{\frac{-1}{3x^8y^{13}}}$$

(2)

$$\textcircled{6} \quad \frac{\frac{1}{2^{-1}b}}{\frac{(-2)^4}{b^{-3}}} = \frac{1}{2^{-1}b} \cdot \frac{b^{-3}}{(-2)^4} = \frac{2}{b(-2)^4 b^3} = \boxed{\frac{1}{2^3 b^4}}$$

$$\begin{aligned} \textcircled{7} \quad & \left(\frac{5xy^{-1}}{xy^{-2}} \right)^{-1} \left(\frac{5^2 x^{-2} y^2}{5^{-4} x^4 y^3} \right)^2 \\ &= \left(\frac{5^{-1} x^{-1} y}{x^{-1} y^2} \right) \left(\frac{5^4 x^{-4} y^4}{5^{-8} x^8 y^6} \right) \\ &= \left(\frac{1}{5y} \right) \left(\frac{5^{12}}{x^{12} y^2} \right) = \boxed{\frac{5^{11}}{x^{12} y^3}} \end{aligned}$$

$$\begin{aligned} \textcircled{8} \quad & \frac{(2a)^{-3} \left(\frac{1}{b} \right)^{-1} (a^2 b)^3}{(-2^2 a^2)^{-1} (ab)^2 \left(\frac{2^3}{a^2 b^{-1}} \right)} = \frac{b (a^2 b)^3 (-2^2 a^2)}{(ab)^2 \left(\frac{2^3 b}{a^2} \right) (2a)^3} \\ &= \frac{b (a^6 b^3) (-2^2 a^2)}{a^2 b^2 2^3 b a^{-2} 2^3 a^3} \\ &= \frac{-2^2 a^8 b^4}{2^6 b^3 a^3} = \boxed{\frac{-a^5 b}{2^4}} \end{aligned}$$

(3)

$$\textcircled{9} \quad \frac{\left(\frac{a^{-1}b^2}{(a^2b)^{-3}} \right)^2}{(2a)^2b \left[\frac{(2a^2b)}{(ab)^3 \left(\frac{2^2a}{b^{-1}} \right)^{-2}} \right]}$$

$$= \frac{\frac{a^{-2}b^4}{a^{-12}b^{-6}}}{2^2a^2b \left[\frac{2a^2b}{a^3b^3 \left(\frac{2^{-4}a^{-2}}{b^2} \right)} \right]}$$

$$= \frac{a^{10}b^{10}}{2^2a^2b \left[\frac{2a^2b}{ab2^{-4}} \right]}$$

$$= \frac{a^{10}b^{10}}{2^7a^3b} = \frac{a^{10}b^{10}}{1} \cdot \frac{1}{2^7a^3b}$$

$$= \boxed{\frac{a^7b^9}{2^7}}$$