

AA PREP—OPERATIONS WITH EXPONENTS—WORKSHEET #1

KEY

1. BASICS. Simplify each expression, assuming that no variable equals zero. Write answers with positive exponents only!

a) $x^6 \cdot x^2$ x^8	b) $(2x)^0$ 1	c) $\frac{x^9 \cdot x^{-3}}{x^3 \cdot x^{-1}} = \frac{x^6}{x^2} = x^4$	d) $(x^6)^2$ x^{12}
e) $\frac{x^{-9}}{x^3} \cdot \frac{1}{x^9 x^3} = \frac{1}{x^{12}}$	f) $x^6 x^6 x^6$ x^{18}	g) $(x^2 y^3)^4$ $x^8 y^{12}$	h) $2x^0$ $2 \cdot 1$ 2
i) $(2x^4)(3x^5)$ $2 \cdot 3 \cdot x^4 \cdot x^5$ $6x^9$	j) $\frac{x^{-9}}{x^{-3}} \cdot \frac{x^3 \cdot x^{-3}}{x^9 \cdot x^{-3}} = \frac{1}{x^6}$	k) $\left(\frac{x^4}{x}\right)^{-2} = (x^3)^{-2} = \frac{1}{x^6}$	l) $2x^1(3x^4)^2$ $2x^1 \cdot 9x^8$ $18x^9$

2. MORE COMPLICATED.

Simplify each expression, assuming that no variable equals zero. Write answers with positive exponents only!

a) $-4x^5 y^6 \cdot 2x^{12} y^{13}$ $-4 \cdot 2 \cdot x^5 \cdot x^{12} \cdot y^6 \cdot y^{13}$ $-8x^{17} y^{19}$	b) $(-4x^5 y^6)^3$ $-64x^{15} y^{18}$
c) $(-4xy^{11})(-2x^3 y^5)$ $8x^4 y^{16}$	d) $(-2x^6 y^{10})^2 (-3xy^4)^3$ $4x^{12} y^{20} \cdot -27x^3 y^{12}$ $-108x^{15} y^{32}$
e) $\frac{12xy^{-7}}{18x^{-3}y^{-5}} \cdot \frac{12x^1 x^3 y^5}{18y^7} = \frac{2x^4}{3y^2}$	f) $\frac{5^3 x^{-8} y^{-4}}{25x^{-1} y^{-10}} \cdot \frac{x^1 y^{10}}{5^3 \cdot 25 x^0 y^4} = \frac{x^1 y^{10}}{3125 x^0 y^4} = \frac{y^6}{3125 x^7}$
g) $\left(\frac{9^{\frac{1}{2}} x^{-2}}{-3(2x^6)^3}\right)^{-2} \cdot \left(\frac{3x^{-2}}{-3 \cdot 8x^{18}}\right)^{-2} =$ $9^{\frac{1}{2}} = \sqrt{9} = 3$ $\left(\frac{3x^{-2}}{-24x^{18}}\right)^{-2} =$ $\left(\frac{1}{-8x^{20}}\right)^{-2} =$ $\left(\frac{-8x^{20}}{1}\right)^2 = 64x^{40}$	h) $\left(\frac{4x^{-5}}{2(3x^4)^2}\right)^{-2} \cdot (2x^{-3}y^{-7})^{-3} =$ $\left(\frac{4x^{-5}}{2 \cdot 9x^8}\right)^{-2} \cdot \left(\frac{2}{x^3 y^7}\right)^{-3} =$ $\left(\frac{4x^{-5}}{18x^8}\right)^{-2} \cdot \left(\frac{x^3 y^7}{2}\right)^3 =$ $\left(\frac{2}{9x^{13}}\right)^{-2} \cdot \left(\frac{x^9 y^{21}}{8}\right) =$ $\frac{81x^{26}}{4} \cdot \frac{x^9 y^{21}}{8} = \frac{81x^{35} y^{21}}{32}$