AA PREP—OPERATIONS WITH EXPONENTS—WORKSHEET #2 KEY

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

a) $(4x)^0$ → 1

b) $x^7 \cdot x^1$ → x^8

c) $\frac{x^{8-8}}{x^{10-8}}$ → $\frac{1}{x^2}$

d) $(x^4)^3$ → x^{12}

e) $x^4x^4x^4$ → x^{12}

f) $\frac{x^4}{x^{-3}}$ → x^4x^3 → x^7

g) $4x^0$ → $4 \cdot 1$ → 4

h) $(x^3y^5)^2$ → x^6y^{10}

i) $(-2x^5)(4x^7)$ → $-2 \cdot 4 \cdot x^5 \cdot x^7$ → $-8x^{12}$

j) $\frac{x^{-3}}{x^{-4}}$ → $\frac{x^{4-3}}{x^{3-3}} =$ → x

k) $\left(\frac{x^1}{x^6}\right)^{-3} =$ → $\left(\frac{1}{x^5}\right)^{-3} = \left(\frac{x^5}{1}\right)^3 =$ → x^{15}

l) $2x^6(5x)^3$ → $2x^6 \cdot 125x^3$ → $250x^9$

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

a) $3x^4y^8 \cdot -4x^{11}y^1$ → $3 \cdot -4 \cdot x^4 \cdot x^{11} \cdot y^8 \cdot y^1$ → $-12x^{15}y^9$

b) $(-2x^7y^3)^4$ → $16x^{28}y^{12}$

c) $(4xy^9)(-10x^3y^7)$ → $4 \cdot -10 \cdot x^1 \cdot x^3 \cdot y^9 \cdot y^7$ → $-40x^4y^{16}$

d) $(-3x^5y^4)^3(-2x^8y^6)^2$ → $-27 \cdot x^{15} \cdot y^{12} \cdot 4 \cdot y^{12}$ → $-108x^{15}y^{24}$

e) $\frac{27x^4y^{-7}}{81x^{-2}y^1}$ → $\frac{27x^4x^2}{81y^1y^7} =$ → $\frac{x^6}{3y^8}$

f) $\frac{2^{-3}x^{-9}y^{-1}}{-4x^{-6}y^0} =$ → $\frac{x^6}{2^3 \cdot -4 \cdot x^9 \cdot y^1} =$ → $\frac{x^6}{-32x^9y^1} =$ → $\frac{1}{-32x^3y}$

g) $\left(\frac{64^{\frac{1}{2}}x^{-4}}{-2(3x)^2}\right)^{-2}$ → $\left(\frac{8x^{-4}}{-2 \cdot 9x^2}\right)^{-2} =$ → $\left(\frac{8x^{-4}}{-18x^2}\right)^{-2} =$ → $\left(\frac{4}{-9x^6}\right)^{-2} =$ → $\left(\frac{-9x^6}{4}\right)^2 =$ → $\frac{81x^{12}}{16}$

$64^{\frac{1}{2}} = \sqrt[2]{64^1} = 8$

h) $\left(\frac{4x^{-3}}{8(2x^5)^3}\right)^{-2} \cdot (-2x^4y)^{-3}$ → $\left(\frac{4x^{-3}}{8 \cdot 8x^{15}}\right)^{-2}$ → $\left(\frac{4x^{-3}}{64x^{15}}\right)^{-2}$ → $\left(\frac{1}{16x^{18}}\right)^{-2}$ → $\left(\frac{16x^{18}}{1}\right)^2$ → $\frac{256x^{36}}{1}$ • $\left(\frac{1}{-2x^4y^1}\right)^3$ → $\frac{1}{-8x^{12}y^3}$ → $\frac{256x^{36}}{-8x^{12}y^3} =$ → $\frac{-32x^{24}}{y^3}$