Number Properties

Recall the following rules of exponents:

$x^a \cdot x^b = x^{a+b}$

$\frac{x^a}{x^b} = x^{a-b}$

$(x^a)^b = x^{ab}$

$(xy)^a = x^a y^a$

$\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$

Here x, y, a, and b are real numbers with x and y nonzero.

Replace each of the following expressions with an equivalent expression in which the variable of the expression appears only once with a positive number for its exponent.

(For example, $\frac{7}{b^2} \cdot b^{-4}$ is equivalent to $\frac{7}{b^6}$.)

a) $(16x^2) \div (16x^5)$

d) $\left((25w^4) \div (5w^3)\right) \div (5w^{-7})$

b) $(2x)^4(2x)^3$

e) $(25w^4) \div \left((5w^3) \div (5w^{-7})\right)$

c) $(9z^{-2})(3z^{-1})^{-3}$

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$(xy)^a = x^a y^a$ $\qquad \left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$

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a) $(16x^2) \div (16x^5)$

$\frac{1}{x^3}$

b) $(2x)^4(2x)^3$

$128x^7$

c) $(9z^{-2})(3z^{-1})^{-3}$

$\frac{z}{3}$

d) $\left((25w^4) \div (5w^3)\right) \div (5w^{-7})$

w^8

e) $(25w^4) \div \left((5w^3) \div (5w^{-7})\right)$

$\frac{25}{w^6}$