

Pre-Algebra
Worksheet 8 Powers, Exponents and Square Roots, Solutions

- Simplify the following expressions leaving no negative exponents:

$$\frac{2a^5b^3a}{b^5} = 2a^{5+1}b^{3-5} = 2a^6b^{-2} = \frac{2a^6}{b^2} \quad (1)$$

$$\frac{3x^{-2}}{6xy^3} = \frac{3}{6}x^{-2-1}y^{-3} = \frac{1}{2}x^{-3}y^{-3} = \frac{1}{2x^3y^3} \quad (2)$$

$$(-8x^3)^2 = (-8)^2(x^3)^2 = 64x^6 \quad (3)$$

$$\frac{(2y^3)^2}{4(y^2x)^3} = \frac{2^2(y^3)^2}{4(y^2)^3x^3} = \frac{4y^6}{4y^6x^3} = \frac{y^{6-6}}{x^3} = \frac{y^0}{x^3} = \frac{1}{x^3} \quad (4)$$

$$\left(\frac{3n^{-4}}{m^7}\right)^3 = \frac{3^3(n^{-4})^3}{(m^7)^3} = \frac{27n^{-12}}{m^{21}} = \frac{27}{n^{12}m^{21}} \quad (5)$$

$$(5xy)^3(z^{-2})^{-3} = 5^3x^3y^3z^6 = 125x^3y^3z^6 \quad \text{or} \quad (5xyz^2)^3 \quad (6)$$

$$\frac{12^3}{2^69} = \frac{(4 \times 3)^3}{2^63^2} = \frac{(2^23)^3}{2^63^2} = \frac{(2^2)^33^3}{2^63^2} = \frac{2^63^3}{2^63^2} = 2^{6-6}3^{3-2} = 2^03^1 = 1 \times 3 = 3 \quad (7)$$

$$\frac{15^33^{-3}}{25} = \frac{(5 \times 3)^33^{-3}}{5^2} = \frac{5^33^33^{-3}}{5^2} = 5^{3-2}3^{3-3} = 5^13^0 = 5 \times 1 = 5 \quad (8)$$

- Write in scientific notation:

$$0.0031 = 3.1 \times 10^{-3} \quad (9)$$

$$314 \times 100,000,000 = 3.14 \times 10^2 \times 10^8 = 3.14 \times 10^{10} \quad (10)$$

$$(5 \times 10^{11})(2.9 \times 10^{-3}) = 5 \times 2.9 \times 10^{11-3} = 14.5 \times 10^8 \quad (11)$$

- Word problems:

1.

$$1 \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \left(\frac{1}{2}\right)^7 = \frac{1}{128} \quad (12)$$