3. Classify each of the following numbers according to the subsets to which they belong.

   a. $-\sqrt[3]{-343} = -1 \times \sqrt[3]{(-7)^3} = -1 \times (-7) = 7$
   Natural, Whole, Integer, Rational, Real

   b. $-\sqrt{81} = -\sqrt{9^2} = -9$ Integer, Rational, Real

   c. $-\dfrac{\sqrt[3]{64}}{3} = -\dfrac{\sqrt[3]{64}}{3} = -\dfrac{4}{3}$ Rational, Real

4. Arrange the following numbers from greatest to least.
   $-\sqrt[3]{-8}, \sqrt[3]{-8}, \sqrt[3]{-27}, -\sqrt[3]{1}, \sqrt[3]{27}$

   $-\sqrt[3]{-8} = -1 \times \sqrt[3]{(-2)^3} = -1 \times -2 = 2$
   $\sqrt[3]{-8} = \sqrt[3]{(-2)^3} = -2$
   $\sqrt[3]{-27} = \sqrt[3]{(-3)^3} = -3$
   $-\sqrt[3]{1} = -1 \times \sqrt[3]{1^3} = -1 \times 1 = -1$
   $\sqrt[3]{27} = \sqrt[3]{(3)^3} = 3$

   The order from greatest to least is: $\sqrt[3]{27}, -\sqrt[3]{-8}, -\sqrt[3]{1}, \sqrt[3]{-8}, \sqrt[3]{-27}$.

Please complete *Lesson 4.3 Explore Your Understanding Assignment* located in *Workbook 4.3* before proceeding to *Lesson 4.4*.

Lesson 4.4: Exponent Laws

Practice – IV

1. Apply the exponent laws to simplify the following expressions.

   a. $\dfrac{(2x^{12}y^2)(7x^{-4}y^7)}{(28x^2y)(xy^2)}$

   $\dfrac{(2x^{12}y^2)(7x^{-4}y^7)}{(28x^2y)(xy^2)} = \dfrac{14x^8y^9}{28x^3y^3}$
   $= \dfrac{x^5y^6}{2}$

b. $\left(\frac{5a^5b^{-6}}{6a^{-2}b^2}\right)^{-2}$

$$\left(\frac{5a^5b^{-6}}{6a^{-2}b^2}\right)^{-2} = \left(\frac{6a^{-2}b^2}{5a^5b^{-6}}\right)^2$$
$$= \frac{6^2a^{-4}b^4}{5^2a^{10}b^{-12}}$$
$$= \frac{36a^{(-4-10)}b^{(4-(-12))}}{25}$$
$$= \frac{36a^{-14}b^{16}}{25}$$
$$= \frac{36b^{16}}{25a^{14}}$$

c. $(64a^{24}b^8)^{\frac{1}{2}}$

$$(64a^{24}b^8)^{\frac{1}{2}} = 64^{\frac{1}{2}} \cdot a^{24\cdot\frac{1}{2}}b^{8\cdot\frac{1}{2}}$$
$$= \sqrt{64} \cdot a^{\frac{24}{2}}b^{\frac{8}{2}}$$
$$= 8a^{12}b^4$$

d. $\left(\frac{343}{216}\right)^{-\frac{2}{3}}$

$$\left(\frac{343}{216}\right)^{-\frac{2}{3}} = \left(\frac{216}{343}\right)^{\frac{2}{3}}$$
$$= \left(\frac{\sqrt[3]{216}}{\sqrt[3]{343}}\right)^2$$
$$= \left(\frac{6}{7}\right)^2$$
$$= \frac{36}{49}$$

e. $\left(\frac{1}{32}\right)^{-\frac{1}{5}}$

$$\left(\frac{1}{32}\right)^{-\frac{1}{5}} = \left(\frac{32}{1}\right)^{\frac{1}{5}}$$
$$= \left(\frac{\sqrt[5]{32}}{\sqrt[5]{1}}\right)^1$$
$$= \frac{\sqrt[5]{2^5}}{\sqrt[5]{1^5}}$$
$$= 2$$

Please complete *Lesson 4.4 Explore Your Understanding Assignment*, located in *Workbook 4.4*.