

## More Laws of Exponents Practice...

$$\begin{aligned} & (3x)^3(4x)^5 \\ & = (27x^3)(1024x^5) \\ & = 27648x^8 \end{aligned}$$

$$\begin{aligned} & (x^4y^2)^3(x^{-2}y^2)^5 \\ & (x^{12}y^6)(x^{-10}y^{10}) \\ & = x^2y^{16} \end{aligned}$$

$$\begin{aligned} & \frac{(x^3y^2)^2(x^2y^4)^3}{(x^3y^4)^2} \\ & \frac{(x^6y^4)(x^6y^{12})}{x^6y^8} \\ & = \frac{x^{12}y^{16}}{x^6y^8} \\ & = x^6y^8 \end{aligned}$$

$$x^{-1/8} = \frac{1}{x^{1/8}}$$

$$\begin{aligned} & \frac{(x^{1/2}y^{3/4})^{1/3}(x^{1/4}y^{2/3})^{1/2}}{(x^{5/3}y^{2/3})^{1/4}} \\ & = \frac{(x^{1/6}y^{3/12})(x^{1/8}y^{1/3})}{x^{5/12}y^{2/12}} \\ & = \frac{(x^{4/24}y^{6/24})(x^{3/24}y^{8/24})}{x^{10/24}y^{4/24}} \\ & = \frac{x^{7/24}y^{14/24}}{x^{10/24}y^{4/24}} \\ & = x^{-3/24}y^{10/24} \\ & = x^{-1/8}y^{5/12} \\ & = \frac{y^{5/12}}{x^{1/8}} \end{aligned}$$

$$\begin{aligned} & = \frac{a^2b^{-3}c^5d^{-7}}{e^4f^{-2}g^{-7}h} = \frac{a^2c^5f^2g^7}{e^4hb^3d^7} \\ & \quad \text{(circled: } b^3d^7e^4h) \end{aligned}$$

$$21.a) \left( \frac{a^{-3}b}{c^2} \right)^{-4} \cdot \left( \frac{c^5}{a^4b^{-3}} \right)^{-1}$$

$$\left( \frac{3}{5} \right)^{-2} = \left( \frac{5}{3} \right)^2$$

$$= \left( \frac{1c^2}{a^{-3}b} \right)^4 \cdot \left( \frac{a^4b^{-3}}{c^5} \right)^1$$

$$= \left( \frac{c^8}{a^{-12}b^4} \right) \cdot \left( \frac{a^4b^{-3}}{c^5} \right)$$

$$= \frac{a^4b^{-3}c^8}{a^{-12}b^4c^5}$$

$$= a^{16}b^{-7}c^3$$

$$= \frac{a^{16}c^3}{b^7}$$

$$21. b) \frac{(2a^{-1}b^4c^{-3})^{-2}}{(4a^2bc^{-4})^2}$$

$$= \frac{1}{(4a^2bc^{-4})^2 (2a^{-1}b^4c^{-3})^2}$$

$$= \frac{1}{(16a^4b^2c^{-8})(4a^{-2}b^8c^{-6})}$$

$$= \frac{1}{64a^2b^{10}c^{-14}}$$

$$= \frac{c^{14}}{64a^2b^{10}}$$

$$22. \quad x = a^{-2} \quad y = a^{2/3}$$

$$a) \quad (x^{1/2} y^{2/3})^{2/1}$$

$$= x^{1/2} y^{2/3}$$

$$= (a^{-2})^{1/2} (a^{2/3})^{2/3}$$

$$= a^{-2 \cdot 1/2} \cdot a^{2/3 \cdot 2/3}$$

$$\frac{-2 \times 1}{1 \times 2} = \frac{-2}{2}$$

$$a^{-1} \cdot a^{4/9}$$

$$= a^{-10/9} \checkmark$$

$$= \frac{1}{a^{10/9}} \checkmark$$

$$= \frac{1}{\sqrt[9]{a^{10}}} \checkmark$$

$$= \frac{1}{(\sqrt[9]{a})^{10}} \checkmark$$

**BONUS PROBLEM:** [4]

Apply your knowledge of exponents and radicals to express the following in SIMPLEST FORM:

$$\frac{\sqrt[4]{x^5 y^7 z^{-3}} \cdot \left(\sqrt[3]{x^{-2} y^4}\right)^{-3} \cdot \sqrt[5]{y^{-5} z^{-10}}}{\sqrt[20]{x^{19} y^{-23}} \cdot \left(\sqrt[6]{x^{-5} y^2 z^{42}}\right)^2}$$

## Operations Involving Radicals

$$\frac{3w + 7w}{10w} = \frac{10w}{10w}$$

- Addition and Subtraction

**Like radicals** such as  $5\sqrt{7}$  and  $3\sqrt{7}$  can be added or subtracted using the distributive law.

**Unlike radicals** such as  $6\sqrt{2}$  and  $4\sqrt{5}$  cannot be combined.

$$11\sqrt{6} + 5\sqrt{6} =$$

$$\begin{array}{l} 10w + 5w \\ w(10+5) \\ \hline 16\sqrt{6} \\ \sqrt{6}(11+5) \\ 16\sqrt{6} \end{array}$$

$$6\sqrt{2} - 4\sqrt{2} + 1\sqrt{2} =$$

$$3\sqrt{2}$$

$$4\sqrt{5} + 2\sqrt{10} =$$

$$= 4\sqrt{5} + 2\sqrt{10}$$

## Attachments

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Worksheet - DeMoivres Theorem.doc