

## 11.1 Practice Worksheet

Key Name: \_\_\_\_\_ Hr: \_\_\_\_\_

Simplify each expression. Make sure to show your work (what you changed to get that answer).

$$1. \frac{10^{\frac{1}{3}}}{10^{\frac{1}{6}}} = 10^{\frac{1}{3} - \frac{1}{6}} = 10^{\frac{1}{6}} = \sqrt[6]{10}$$

$$2. \left(\frac{2}{3}\right)^{-3} = \left(\frac{3}{2}\right)^3 = \frac{3^3}{2^3} = \frac{27}{8}$$

$$3. \sqrt{6} \cdot \sqrt{12} = 6^{\frac{1}{2}} \cdot (6 \cdot 2)^{\frac{1}{2}} = 6^{\frac{1}{2}} \cdot 6^{\frac{1}{2}} \cdot 2^{\frac{1}{2}} = 6\sqrt{2}$$

$$4. \sqrt{7} \cdot \sqrt{14} = 7^{\frac{1}{2}} \cdot 7^{\frac{1}{2}} \cdot 2^{\frac{1}{2}} = 7\sqrt{2}$$

$$5. (x^2 y^4)^5 = x^{10} y^{20}$$

$$6. \frac{x^3 y^2}{(y^2)^2} = \frac{x^3 y^2}{y^4} = \frac{x^3}{y^2}$$

$$7. (243y^5)^{\frac{1}{5}} = 243^{\frac{1}{5}} y = 3y$$

$$8. \sqrt[4]{256y^6} = 256^{\frac{1}{4}} y^{\frac{6}{4}} = 4|y|\sqrt{y^2}$$

← use |y| since y must be nonnegative + there is no indication of which variables are negative.

9. Express using rational exponents

$$\sqrt[4]{81x^8y^3} = 81^{\frac{1}{4}} x^{\frac{8}{4}} y^{\frac{3}{4}} = 3x^2\sqrt[4]{y^3}$$

10. Express using a radical.

$$17x^{\frac{1}{4}}y^{\frac{1}{3}} = 17(x^3y^4)^{\frac{1}{12}} = 17\sqrt[12]{x^3y^4}$$

Solve each equation.

$$11. 7766 = x^{\frac{5}{2}} - 10 \implies 7776 = x^{\frac{5}{2}} \implies (7776)^{\frac{2}{5}} = x \implies 36 = x$$

$$12. 3\sqrt[3]{x^3} = 192 \implies \sqrt[3]{x^3} = 64 \implies (x^{\frac{3}{3}})^{\frac{1}{3}} = (64)^{\frac{1}{3}} \implies x = 16$$