Name:_____ Class:_____ Date: Key

6-6: Rational Exponents (Practice)

Write each expression in radical form, or write each radical in exponential form.

1. $5^{\frac{1}{3}}$ $= \sqrt[3]{5}$

2. $m^{\frac{4}{7}}$ $= \sqrt[7]{m^4}$ or $\left(\sqrt[7]{m}\right)^4$

3. $\left(n^3\right)^{\frac{2}{5}}$ $= \left(\sqrt[5]{n^3}\right)^2$ or $\sqrt[5]{(n^3)^2}$ $= \sqrt[5]{n^6}$

4. $\sqrt{79}$ $79^{1/2}$

5. $\sqrt[3]{27m^6n^4}$ $(27m^6n^4)^{1/3}$

6. $\sqrt[5]{2a^{10}b}$ $(2a^{10}b)^{1/5}$

Evaluate each expression.

7. $81^{\frac{1}{4}}$ $\sqrt[4]{81} = \boxed{3}$

8. $1024^{\frac{1}{5}}$ $\sqrt[5]{1024} = \boxed{4}$

9. $(-64)^{\frac{2}{3}}$ $\left(\sqrt[3]{-64}\right)^2 = (-4)^2 = \boxed{16}$

10. $27^{\frac{1}{3}} \cdot 27^{\frac{4}{3}}$ $= 27^{1/3+4/3} = 27^{5/3}$ $= \boxed{27\sqrt[3]{27^2} \text{ or } 27\sqrt[3]{729}}$

11. $\left(\frac{125}{216}\right)^{\frac{2}{3}}$ $\left(\sqrt[3]{\frac{125}{216}}\right)^2 = \left(\frac{5}{6}\right)^2 = \boxed{\frac{25}{36}}$

12. $\frac{64^{\frac{2}{3}}}{343^{\frac{2}{3}}}$ $= \left(\sqrt[3]{\frac{64}{343}}\right)^2 = \left(\frac{4}{7}\right)^2 = \boxed{\frac{16}{49}}$

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Simplify each expression.

13. $g^{\frac{4}{7}} \cdot g^{\frac{3}{7}}$ $g^{\frac{4}{7}+\frac{3}{7}} = g^{\frac{7}{7}} = g$

14. $s^{\frac{3}{4}} \cdot s^{\frac{13}{4}}$ $= s^{\frac{3}{4}+\frac{13}{4}} = s^{\frac{16}{4}} = s^4$

15. $\left(u^{\frac{1}{3}}\right)^{\frac{4}{5}}$ $u^{1/3 \cdot 4/5} = u^{4/15}$

16. $y^{-\frac{1}{2}}$ $\frac{1}{y^{1/2}} = \frac{1}{\sqrt{y}} = \frac{1}{\sqrt{y}} \cdot \frac{\sqrt{y}}{\sqrt{y}} = \frac{\sqrt{y}}{y}$

17. $b^{\frac{3}{5}}$ already simplified

18. $\frac{q^{\frac{3}{5}}}{q^{\frac{2}{5}}}$ $q^{3/5 - 2/5}$ $= q^{1/5}$

19. $\frac{t^{\frac{2}{3}}}{5t^{\frac{1}{2}} \cdot t^{-\frac{3}{4}}}$ $\frac{t^{2/3}}{5t^{1/2+-3/4}} = \frac{t^{2/3}}{5t^{-1/4}}$ $= \frac{t^{2/3} \cdot t^{1/4}}{5} = \frac{t^{8/12+3/12}}{5} = \frac{t^{11/12}}{5}$

20. $\sqrt[10]{8^5}$ $= 8^{5/10} = 8^{1/2}$ or $\sqrt{8}$ $= \sqrt{4 \cdot 2} = 2\sqrt{2}$

21. $\sqrt[4]{6} \cdot 3\sqrt[4]{6}$ $6^{1/4} \cdot 3(6^{1/4}) = 3(6^{\frac{1}{4}+\frac{1}{4}})$ $= 3(6^{1/2})$ or $3\sqrt{6}$

22. $\frac{a}{\sqrt{3b}} \cdot \frac{\sqrt{3b}}{\sqrt{3b}}$ $= \frac{a\sqrt{3b}}{3b}$

23. **BUSINESS** A company that produces DVDs uses the formula $C = 88n^{\frac{1}{3}} + 330$ to calculate the cost C in dollars of producing n DVDs per day. What is the company's cost to produce 150 DVDs per day? Round your answer to the nearest dollar.

$n = 150$

$C = 88(150)^{1/3}$

$C = \$467.57$

$C = \$468$