

Introduction to Rational Exponents

Name _____

What is the value of each expression?

1. $\sqrt[3]{64}$

2. $\sqrt[3]{125}$

3. $\sqrt[5]{32}$

4. $\sqrt{100}$

5. $\sqrt[4]{1}$

6. $\sqrt{225}$

7. $\sqrt[3]{729}$

8. $\sqrt{289}$

9. $\sqrt[3]{243}$

Fractional (Rational) Exponent Notes:

Remember:

$$x^{\frac{1}{2}} = \sqrt{x} \quad x^{\frac{1}{3}} = \sqrt[3]{x} \quad \text{So, } x^{\frac{1}{4}} = \underline{\hspace{2cm}}$$

Also,

$$x^{\frac{1}{5}} = \sqrt[5]{x}, \quad x^{\frac{2}{5}} = \sqrt[5]{x^2}, \quad x^{\frac{3}{5}} = \sqrt[5]{x^3} \quad \text{So, } a^{\frac{5}{9}} = \underline{\hspace{2cm}}$$

What's the difference between:

$$3x^{\frac{2}{3}} \quad \text{and} \quad (3x)^{\frac{2}{3}}$$

Write each expression in radical form.

10. $b^{\frac{3}{2}}$

11. $(36x)^{\frac{1}{2}}$

12. $25y^{\frac{1}{2}}$

13. $81s^{\frac{2}{3}}$

14. $(72b)^{\frac{1}{2}}$

15. $(125a)^{\frac{2}{3}}$

16. $(40x)^{\frac{1}{3}}$

17. $36t^{\frac{1}{4}}$

18. $(99r)^{\frac{1}{2}}$

Write each expression in exponential form.

19. $\sqrt[3]{b^4}$

20. $\sqrt{(3x)^4}$

21. $\sqrt[3]{125d^4}$

22. $\sqrt{49a}$

23. $\sqrt[3]{(64b)^2}$

24. $\sqrt[4]{256b^5}$

25. $\sqrt{144d^4}$

26. $\sqrt[3]{(27x)^2}$

27. $\sqrt{625a^5}$