

Name _____ Date _____

Radical! Because It's Cliché!

Properties of Rational Exponents

Vocabulary

Match each definition to its corresponding term.

- | | |
|---|---------------------|
| 1. the number a in the expression $\sqrt[n]{a}$ | A cube root |
| 2. the number b when $b^3 = a$ | B index |
| 3. the exponent $\frac{1}{n}$ in the expression $a^{\frac{1}{n}}$ | C n th root |
| 4. the number n in the expression $\sqrt[n]{a}$ | D radicand |
| 5. the number b when $b^n = a$ | E rational exponent |

Problem Set

Write each expression as a single power.

- | | |
|--|------------------------|
| 1. $\frac{10^5}{10^8}$ | 2. $\frac{10^0}{10^4}$ |
| $\frac{10^5}{10^8} = 10^{5-8} = 10^{-3}$ | |
| 3. $\frac{10^2}{10^5}$ | 4. $\frac{x^4}{x^9}$ |
| 5. $\frac{5^3}{5^{10}}$ | 6. $\frac{y^2}{y^8}$ |



Evaluate each expression.

7. $\sqrt[3]{216} =$
 $\sqrt[3]{216} = 6$

8. $\sqrt[3]{64} =$

9. $\sqrt[3]{-125} =$

10. $\sqrt[3]{-343} =$

11. $\sqrt[3]{729} =$

12. $\sqrt[3]{-8} =$

Evaluate each expression.

13. $\sqrt[5]{32} =$
 $\sqrt[5]{32} = 2$

14. $\sqrt[4]{625} =$

15. $\sqrt[6]{729} =$

16. $\sqrt[5]{-1024} =$

17. $\sqrt[4]{-128} =$

18. $\sqrt[5]{-243} =$

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Write each radical as a power.

19. $\sqrt[4]{15}$
 $\sqrt[4]{15} = 15^{\frac{1}{4}}$

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

21. $\sqrt[4]{31}$

22. $\sqrt[3]{x}$

23. $\sqrt[6]{y}$

24. \sqrt{z}

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Write each power as a radical.

25. $12^{\frac{1}{3}}$
 $12^{\frac{1}{3}} = \sqrt[3]{12}$

26. $7^{\frac{1}{5}}$

27. $18^{\frac{1}{4}}$

28. $a^{\frac{1}{2}}$

29. $d^{\frac{1}{5}}$

30. $c^{\frac{1}{6}}$

Write each expression in radical form.

31. $5^{\frac{2}{3}}$
 $5^{\frac{2}{3}} = \sqrt[3]{5^2}$

32. $8^{\frac{2}{5}}$

33. $18^{\frac{3}{4}}$

34. $x^{\frac{3}{5}}$

35. $y^{\frac{4}{3}}$

36. $m^{\frac{5}{2}}$

Write each expression in rational exponent form.

37. $\sqrt[4]{6^3}$
 $\sqrt[4]{6^3} = 6^{\frac{3}{4}}$

38. $\sqrt[5]{8^4}$

39. $\sqrt[3]{12^2}$

40. $\sqrt{n^5}$

41. $\sqrt[4]{p^7}$

42. $\sqrt[5]{m^3}$