

Converting between Radical Form and Rational Exponent Form

$$\sqrt[b]{x^a} = x^{\frac{a}{b}}$$

Write in Exponential Form

$$1. \sqrt[3]{x^5} = x^{\frac{5}{3}} \qquad 2. \sqrt[5]{y^1} = y^{\frac{1}{5}}$$

More than 1 part use parentheses \swarrow invisible \searrow make sure to simplify

$$3. \sqrt{2x} = (2x)^{\frac{1}{2}} \qquad 4. \sqrt[4]{x^6} = x^{\frac{6}{4}} = x^{\frac{3}{2}}$$

Write in Radical Form

$$5. x^{\frac{2}{3}} = \sqrt[3]{x^2} \qquad 6. (7n)^{\frac{4}{5}} = \sqrt[5]{(7n)^4}$$

don't have to write \rightarrow

$$7. (2m)^{\frac{3}{2}} = \sqrt{(2m)^3} \qquad 8. (5xy^2)^{\frac{3}{4}} = \sqrt[4]{(5xy^2)^3}$$

Squares	Cubes	4 th	5 th	6 th
$1^2 = 1$	$1^3 = 1$	$1^4 = 1$	$1^5 = 1$	$1^6 = 1$
$2^2 = 4$	$2^3 = 8$	$2^4 = 16$	$2^5 = 32$	$2^6 = 64$
$3^2 = 9$	$3^3 = 27$	$3^4 = 81$	$3^5 = 243$	$3^6 = 729$
$4^2 = 16$	$4^3 = 64$	$4^4 = 256$		
$5^2 = 25$	$5^3 = 125$	$5^4 = 625$		
$6^2 = 36$	$6^3 = 216$			
$7^2 = 49$	$7^3 = 343$			
$8^2 = 64$	$8^3 = 512$			
$9^2 = 81$	$9^3 = 729$			
$10^2 = 100$	$10^3 = 1000$			

Simplifying Rational Exponents

$$1. 9^{1/2} \rightarrow \sqrt{9} = 3$$

$$2. 8^{2/3} \rightarrow \sqrt[3]{8^2} = \sqrt[3]{64} = 4$$

$$3. 100^{5/2} \rightarrow \sqrt{100^5} = 10^5 = 100000$$

$$4. 27^{5/3} \rightarrow \sqrt[3]{27^5} = 3^5 = 243$$

$$5. 64^{3/2} \rightarrow \sqrt{64^3} = 8^3 = 512$$

$$6. 625^{-3/4} \rightarrow \sqrt[4]{625^3} \rightarrow 5^3 \rightarrow \frac{1}{125}$$

Converting & Simplifying Rational Exponents

Date _____

Write each expression in exponential form.

1) $\sqrt[4]{3p}$

$4\sqrt[4]{3} \quad 4\sqrt[4]{x}$

2) $(\sqrt[5]{3x})^8$

$(3x)^{\frac{8}{5}}$

3) $(\sqrt[6]{2p})^5$

4) $\sqrt[4]{b}$

$b^{\frac{1}{4}}$

5) $(\sqrt[3]{b})^5$

6) $(\sqrt{p})^3$

$p^{\frac{3}{2}}$

7) $(\sqrt{6n})^5$

8) $\sqrt[3]{5n}$

$(5n)^{\frac{1}{3}}$

Write each expression in radical form.

9) $(7x)^{\frac{4}{3}}$

10) $x^{\frac{1}{2}}$

\sqrt{x}

11) $(5v)^{\frac{5}{2}}$

12) $(6x)^{\frac{1}{3}}$

$\sqrt[3]{6x}$

13) $(10x)^{\frac{7}{4}}$

14) $(10v)^{\frac{3}{4}}$

$\sqrt[4]{(10v)^3} = (\sqrt[4]{10v})^3$

15) $n^{\frac{1}{5}}$

16) $p^{\frac{4}{3}}$

$\sqrt[3]{p^4}$

Simplify.

17) $125^{\frac{4}{3}}$

5^4 625

19) $81^{\frac{1}{2}}$

$\sqrt{81} = \boxed{9}$

21) $343^{\frac{2}{3}}$

$(7^3)^{\frac{2}{3}}$ $7^{\frac{6}{3}} = 7^2$
 $7^{\frac{3 \cdot 2}{3}}$ 49

23) $25^{\frac{3}{2}}$ = 53

125

25) $64^{\frac{1}{2}}$

$\sqrt{64} = \boxed{8}$

27) $4^{-\frac{1}{2}}$

29) $64^{-\frac{1}{2}}$

18) $81^{-\frac{3}{2}}$

$= \frac{1}{729}$

20) $16^{-\frac{3}{2}}$

$= \frac{1}{64}$

22) $1000^{\frac{4}{3}}$

10000

24) $125^{\frac{2}{3}}$

25

26) $125^{\frac{1}{3}}$

5

28) $64^{\frac{3}{2}}$

512

30) $100^{-\frac{3}{2}}$

$\frac{1}{1000}$