

BE - Geometry II Monday

4-9-12

- ① LIST THE 6 EXPONENT RULES AND WRITE AN EXAMPLE OF EACH RULE.
 - ② WHAT IS THE VOLUME OF A cube of side 6 inches? What is its surface area?
 - ③ WHAT ARE THE EXACT VALUES OF the circumference AND area of a circle of radius 1 m?
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The "7th" exponent rule:

FER $a^{\frac{N}{m}} = \sqrt[m]{a^N} \text{ or } (\sqrt[m]{a})^N$
 (Fractional Exponent)
 = rule

(EX) $4^{\frac{1}{2}} = \sqrt[2]{4} = \sqrt{4} = 2$

Check using multiplication rule $\Rightarrow$ add exponents
 Does $4^{\frac{1}{2}} = \sqrt{4}$? $4^{\frac{1}{2}} \cdot 4^{\frac{1}{2}} = 4^{\frac{1}{2} + \frac{1}{2}} = 4^1$
 $\sqrt{4} \cdot \sqrt{4} = 4^1 \checkmark$
 $2 \cdot 2 = 4^1 \checkmark$

or $4^{\frac{1}{2}} = (\sqrt[2]{4})^1 = 2 \checkmark$

(EX) $8^{\frac{2}{3}} = \sqrt[3]{8^2} = \sqrt[3]{64} = 4$ since $4 \cdot 4 \cdot 4 = 64$

or $8^{\frac{2}{3}} = (\sqrt[3]{8})^2 = (2)^2 = 4$ EASIER IN THIS CASE

(EX) $X^{\frac{1}{3}} \cdot X^{\frac{1}{2}} = X^{\frac{1}{3} + \frac{1}{2}} = X^{\frac{2}{6} + \frac{3}{6}} = X^{\frac{5}{6}}$
 EXPONENTIAL FORM

$= \sqrt[6]{X^5}$
 RADICAL FORM

Practice:

Write in Exponential Form:

$$\textcircled{1} \sqrt{5r} = \boxed{(5r)^{\frac{1}{2}}}$$

$$\textcircled{2} {}^5\sqrt{N} = \boxed{N^{\frac{1}{5}}}$$

$$\textcircled{3} \left({}^3\sqrt{4r}\right)^2 = \boxed{(4r)^{\frac{2}{3}}}$$

$$\textcircled{4} {}^3\sqrt{(4r)^2} = \left({}^3\sqrt{4r}\right)^2 = (4r)^{\frac{2}{3}}$$

Write in radical form:

$$\textcircled{1} N^{\frac{1}{4}} = {}^4\sqrt{N}$$

$$\textcircled{2} (10x)^{\frac{5}{6}} = \boxed{\left({}^6\sqrt{10x}\right)^5 \text{ or } {}^6\sqrt{(10x)^5}}$$

$$\textcircled{3} (7N)^{\frac{5}{2}} = \boxed{\sqrt{{}^5(7N)} \text{ or } \left(\sqrt{7N}\right)^5}$$

$$\textcircled{4} (V)^{\frac{3}{4}} = {}^4\sqrt{V^3} \text{ or } \left({}^4\sqrt{V}\right)^3$$

$$\textcircled{\text{EX}} \text{ CALCULATOR } 18^{\frac{3}{4}} \text{ or } 18^{.75} \approx 8.7389...$$

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NOTE: $18^0 = 1$
 $18^1 = 18$ } $1 < 18^{.75} < 18$

Also $18^{\frac{1}{2}} = 18^{.5} = \sqrt{18} = 4.2426$

Practice - Fractional Exponents, Exponential Equations Date _____ Period _____

Write each expression in exponential form.

1) $(\sqrt{7m})^3$

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

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

4) $\sqrt{5n}$

Write each expression in radical form.

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

6) $(5n)^{\frac{4}{3}}$

7) $a^{\frac{8}{5}}$

8) $v^{\frac{3}{2}}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

9) $k \cdot 2k^{-2}$

10) $3p^2 \cdot p^{-1}$

11) $2x^2 \cdot x$

12) $2n^0 \cdot 3n^3$

13) $\left(\frac{1}{v^3}\right)^{-1}$

14) x^{-1}

15) $(k^3)^{\frac{1}{2}}$

16) $\left(p^{\frac{1}{2}}\right)^2$

17) $\frac{n^{\frac{3}{2}}}{2n^{-2}}$

18) $\frac{v^3}{3v^{-1}}$

19) $\frac{b^{-1}}{\frac{3}{b^2}}$

20) $\frac{2x^{-\frac{4}{3}}}{x^{-2}}$

Solve each equation.

21) $5^{-n-3} = 5^{3n-2}$

22) $5^{-2v} = \frac{1}{25}$

23) $6^{-3x} = 6^{3x}$

24) $6^{2x} = \frac{1}{36}$

25) $32^{3n-3} = \left(\frac{1}{16}\right)^{2n+2}$

26) $6^{3k+1} = 216$

27) $2^{2p} = 2^{-p+3}$

28) $2^{n+1} = 2^2$