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Date _____
Algebra II

Fractional Exponents Regents Practice

For Multiple Choice, Use Multiple Choice Strategy!!!!!!

*put parenthesis around the root

1. Given $y > 0$, the expression $\sqrt{3x^2y} \cdot \sqrt[3]{27x^3y^2}$ is equivalent to 12240...

1) $81x^5y^3$ 2.7E10
2) $3^{1.5}x^2y$ 7744...
3) $3^{\frac{5}{2}}x^2y^{\frac{5}{3}}$ 142218...
4) $3^{\frac{3}{2}}x^2y^{\frac{7}{6}}$ 12240...

2. The expression $\left(\frac{m^2}{m^{\frac{1}{3}}}\right)^{-\frac{1}{2}}$ .146...

→ put parenthesis around the root

1) $-\sqrt[6]{m^5}$ -6.81...
2) $\frac{1}{\sqrt[6]{m^5}}$ .146...
3) $-m(\sqrt[5]{m})$ ~~-15.84~~ -15.84...
4) $\frac{1}{m(\sqrt[5]{m})}$ .063...

~~2510530.87~~

3. Which equation is equivalent to $P = 210x^{\frac{4}{3}}y^{\frac{?}{3}}$

1) $P = \sqrt[3]{210x^4y^7}$ 71059...
2) $P = 70xy^2(\sqrt[3]{xy})$ 836843...
3) $P = 210xy^2(\sqrt[3]{xy})$ 2510530.87
4) $P = 210xy^2(\sqrt[3]{x^3y^5})$ 43107606.4

4. For $x \geq 0$, which equation is *false*?

1) $(x^{\frac{3}{2}})^2 = \sqrt[4]{x^3}$ 1000 = 5.6... X
2) $(x^3)^{\frac{1}{4}} = \sqrt[4]{x^3}$ 5.6 = 5.6 ✓
3) $(x^{\frac{3}{2}})^{\frac{1}{2}} = \sqrt[4]{x^3}$ 5.6 = 5.6 ✓
4) $(x^{\frac{2}{3}})^2 = \sqrt[3]{x^4}$ 21... = 21. ✓

5. For $x \neq 0$, which expressions are equivalent to one divided by the sixth root of x? $\frac{1}{\sqrt[6]{x}} = .68...$

.68... .68... .68...

I. $\frac{\sqrt[6]{x}}{\sqrt[3]{x}}$ II. $\frac{x^{\frac{1}{6}}}{x^{\frac{1}{3}}}$ III. $x^{\frac{-1}{6}}$

1) I and II, only
2) I and III, only
3) II and III, only
4) I, II, and III

Express the following in simplest form, with a rational exponent.

6. $a\sqrt[5]{a^4}$

7. $2xy^2\sqrt[3]{x^2y}$

8. $\dfrac{\sqrt[3]{x^2}\cdot\sqrt[2]{x^5}}{\sqrt[6]{x^1}}$

9. $\dfrac{x\sqrt[2]{x^3}}{\sqrt[3]{x^5}}$

Express the following in simplest radical form:

10. $\dfrac{x^{\frac{1}{5}}}{x^{\frac{1}{2}}}$

11. $\left(\dfrac{1}{x^{-2}}\right)^{-\frac{3}{4}}$

12. $\dfrac{2x^{\frac{3}{2}}}{\left(16x^4\right)^{\frac{1}{4}}}$

13. $\dfrac{(x^2y^4)^{\frac{1}{3}}}{xy}$

Radicals are Fractional Exponents
Get rid of parenthesis
Negative exponents are fractions
Clean it up: multiply, divide/reduce, evaluate

$4-\frac{2}{3}=\frac{10}{3}$ $5-\frac{17}{2}=\frac{-7}{2}$

Determine the value of n in each of the following equations:

14. $\dfrac{\sqrt[3]{x^8}}{(x^4)^{\frac{1}{3}}}=x^n$

$\frac{8}{3}-\frac{4}{3}=\frac{4}{3}$

$\dfrac{x^{\frac{8}{3}}}{x^{\frac{4}{3}}}=x^n$ $\frac{4}{3}=n$

$x^{\frac{4}{3}}=x^n$

15. $\left(\dfrac{1}{\sqrt[3]{y^2}}\right)y^4=y^n$

$\left(\frac{1}{y^{\frac{2}{3}}}\right)(y^4)=y^n$

$y^{\frac{10}{3}}=y^n$

$\frac{10}{3}=n$

16. $\left[\dfrac{y^{\frac{17}{8}}}{y^{\frac{5}{4}}}\right]^{-4}=y^n$

$\dfrac{y^{-\frac{17}{2}}}{y^{-5}}=y^n$

$\dfrac{y^5}{y^{\frac{17}{2}}}=y^n$

$y^{-\frac{7}{2}}=y^n$

$-\frac{7}{2}=n$

17. Kenzie believes that for $x \geq 0$, the expression $\left(\sqrt[7]{x^2}\right)\left(\sqrt[5]{x^3}\right)$ is equivalent to $\sqrt[35]{x^6}$. Is she correct? Justify your response algebraically.

$\frac{2}{7}+\frac{3}{5}=\frac{31}{35}$

$(x^{\frac{2}{7}})(x^{\frac{3}{5}}) \neq x^{\frac{6}{35}}$

$x^{\frac{31}{35}} \neq x^{\frac{6}{35}}$

No!

18. Justify why $\dfrac{\sqrt[3]{x^2y^5}}{\sqrt[4]{x^3y^4}}$ is equivalent to $x^{\frac{-1}{12}}y^{\frac{2}{3}}$ using properties of rational exponents, where $x \neq 0$ and $y \neq 0$.

$\frac{2}{3}-\frac{3}{4}=\frac{-1}{12}$

$\frac{5}{3}-1=\frac{2}{3}$

$\dfrac{(x^2y^5)^{\frac{1}{3}}}{(x^3y^4)^{\frac{1}{4}}}=\dfrac{x^{\frac{2}{3}}y^{\frac{5}{3}}}{x^{\frac{3}{4}}y^1}=x^{-\frac{1}{12}}y^{\frac{2}{3}}$

19. For n and $p > 0$, is the expression $\left[p^2n^{\frac{1}{2}}\right]^8\sqrt[2]{p^5n^4}^1$ equivalent to $p^{18}n^6\sqrt[2]{p}^1$? Justify your answer.

$(p^2n^{\frac{1}{2}})^8(p^5n^4)^{\frac{1}{2}}=p^{18}n^6p^{\frac{1}{2}}$

$(p^{16}n^4)(p^{\frac{5}{2}}n^2)=p^{18}n^6p^{\frac{1}{2}}$

$p^{\frac{37}{2}}n^6=p^{\frac{37}{2}}n^6$ yes!

$16+\frac{5}{2}=\frac{37}{2}$

$18+\frac{1}{2}=\frac{37}{2}$

✓