$\frac{\text{Power}}{\text{root}}$

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Date ____________
Pre Calculus

Given Radicals

Rewrite the following as radicals

1. $x^{\frac{2}{3}}$ $\frac{p}{r}$

$\sqrt[3]{x^2}$

2. $x^{\frac{3}{4}}$ $\frac{p}{r}$

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

3. $x^{\frac{5}{6}}$ $\frac{p}{r}$

$\sqrt[6]{x^5}$

4. $x^{\frac{1}{3}}$ $\frac{p}{r}$

$\sqrt[3]{x}$

5. $x^{\frac{3}{2}}$ $\frac{p}{r}$

$\sqrt{x^3}$

6. $x^{\frac{1}{2}}$ $\frac{p}{r}$

$\sqrt{x}$

1. $x^{\frac{4}{5}}$ $\frac{p}{r}$

$\sqrt[4]{x^5}$

8. $x^{\frac{1}{7}}$ $\frac{p}{r}$

$\sqrt[7]{x}$

9. $x^{\frac{5}{2}}$ $\frac{p}{r}$

$\sqrt{x^5}$

Rewrite the following using fractional exponents

10. $\sqrt[3]{x^4}$

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

11. $\sqrt[5]{x^3}$

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

12. $\sqrt[4]{x^7}$

$x^{\frac{7}{4}}$

13. $\sqrt[2]{x^3}$

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

14. $\sqrt[6]{x^5}$

$x^{\frac{5}{6}}$

15. $\sqrt[2]{x^1}$

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

1. $\sqrt[8]{x^3}$

$x^{\frac{3}{8}}$

16. $\sqrt[5]{x^3}$

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

17. $\sqrt[3]{x^1}$

$x^{\frac{1}{3}}$

18. The expression $\sqrt[4]{16x^2y^7}$ is equivalent to

1) $2x^{\frac{1}{2}}y^{\frac{7}{4}}$
2) $2x^8y^{28}$
3) $4x^{\frac{1}{2}}y^{\frac{7}{4}}$
4) $4x^8y^{28}$

$(16x^2y^7)^{\frac{1}{4}}$

$16^{\frac{1}{4}}x^{\frac{1}{2}}y^{\frac{7}{4}}$

$2x^{\frac{1}{2}}y^{\frac{7}{4}}$

19. The expression $\sqrt[4]{81x^2y^5}$ is equivalent to

1) $3x^{\frac{1}{2}}y^{\frac{5}{4}}$
2) $3x^{\frac{1}{2}}y^{\frac{4}{5}}$
3) $9xy^{\frac{5}{2}}$
4) $9xy^{\frac{2}{5}}$

$(81x^2y^5)^{\frac{1}{4}}$ $81^{\frac{1}{4}}x^{\frac{1}{2}}y^{\frac{5}{4}}$

$3x^{\frac{1}{2}}y^{\frac{5}{4}}$

20. Which expression is equivalent to $(\sqrt[2]{a^2b^{\frac{1}{2}}})^{-1}$?

(1) $a^{-2}b^{-\frac{1}{2}}$
(2) $-ab^{\frac{1}{4}}$
(3) $-ab^2$
(4) $\frac{1}{ab^{\frac{1}{4}}}$

$(a^2b^{\frac{1}{2}})^{-\frac{1}{2}}$

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

21. 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.

$\frac{(5)2}{(5)7} + \frac{3(7)}{5(7)}$

$\frac{10}{35} + \frac{21}{35} = \frac{31}{35}$

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

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

No!

22. 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 $y \neq 0$.

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

$$\frac{(4)2}{(4)3} - \frac{3(3)}{4(3)} \quad \frac{8}{12} - \frac{9}{12} = -\frac{1}{12}$$

$$\frac{5}{3} - \frac{1(3)}{1(3)} \quad \frac{5}{3} - \frac{3}{3} = \frac{2}{3}$$

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

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

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

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

$$\frac{(2)16}{(2)1} + \frac{5}{2} \quad \frac{32}{2} + \frac{5}{2} \quad \frac{37}{2}$$

$$\frac{(2)18}{(2)1} + \frac{1}{2} \quad \frac{36}{2} + \frac{1}{2} \quad \frac{37}{2}$$

24. Use the properties of rational exponents to determine the value of y for the equation:

$\dfrac{\sqrt[3]{x^8}}{\left(x^4\right)^{\frac{1}{3}}} = x^y,\ x > 1$

$$\frac{x^{\frac{8}{3}}}{x^{\frac{4}{3}}} = x^{\frac{4}{3}} = x^{y}$$

$$y = \frac{4}{3}$$

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

25. Express the fraction $\dfrac{2x^{\frac{3}{2}}}{\left(16x^4\right)^{\frac{1}{4}}}$ in simplest radical form.

$$\frac{2x^{\frac{3}{2}}}{16^{\frac{1}{4}}x^1} \quad \frac{\cancel{2}x^{\frac{3}{2}}}{\cancel{2}x^1}$$

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

$$\sqrt{x}$$

$$\frac{3}{2} - \frac{1(2)}{1(2)} \quad \frac{3}{2} - \frac{2}{2} = \frac{1}{2}$$