Name KEY

Algebra 2

5.2 Properties of Exponents and Radicals WS

Note: Assume all variables represent **non-zero** quantities.

For problems 1-6: Rewrite each expression using the properties of exponents. Simplify as much as possible, then write your final answer with rational exponents without negative exponents.

1. $\dfrac{m^4 n^{-3} p^{-1}}{m n^{-3} p^5}$

$\dfrac{m^3}{p^6}$

2. $\left(\dfrac{a^5 b^{-3} c^2}{a^6 b^9 c^8}\right)^0$

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3. $\dfrac{\left(gh^5\right)^2 k^{-2}}{g^{-3}\left(h^{-1}k^4\right)^{-3}}$

$\dfrac{g^2 h^5 g^3 k^{12}}{k^2 h^3} = g^5 h^2 k^{10}$

4. $\left(\dfrac{rt^{-2}s^3}{r^3 t^{-2} s}\right)^{-2}$

$\left(\dfrac{s^2}{r^2}\right)^{-2} = \dfrac{r^4}{s^4}$

5. $5x^{\frac{1}{3}}\left(x^{\frac{-2}{5}} y^{\frac{1}{4}}\right)^{\frac{-5}{2}}$

$5x^{1/3} \times y^{-\frac{5}{8}}$

$\dfrac{5x^{4/3}}{y^{5/8}}$

6. $\left(\dfrac{9}{81^{\frac{4}{5}}}\right)^{\frac{1}{2}}$

$\dfrac{3}{81^{2/5}}$

For problems 7-20: Simplify each radical expression, using absolute value bars when necessary. Write your answer in reduced radical form.

7. $\sqrt[5]{32x^{15}y^8}$

$2xy^5\sqrt{y^3}$

8. $\sqrt{48p^{17}q^8}$

$4p^8q^4\sqrt{3p}$

9. $\sqrt[4]{192x^5y^8}$

$2xy^2\sqrt[4]{12x}$

10. $\sqrt[3]{\dfrac{24}{9m^5}}$

$\dfrac{\sqrt[3]{24}}{\sqrt[3]{9m^5}} \cdot \dfrac{\sqrt[3]{3m}}{\sqrt[3]{3m}}$

$\dfrac{\sqrt[3]{72m}}{\sqrt[3]{27m^6}} = \dfrac{2\sqrt[3]{9m}}{3m^2}$

11. $\sqrt[3]{\dfrac{a^7b^3}{125a}}$

$\dfrac{\sqrt[3]{a^7b^3}}{\sqrt[3]{125a}} \cdot \dfrac{\sqrt[3]{a^2}}{\sqrt[3]{a^2}}$

$\dfrac{ab}{5a} = \dfrac{a^2b}{5}$

12. $\dfrac{12}{\sqrt{18x^4y^9}} \cdot \dfrac{\sqrt{2y}}{\sqrt{2y}}$

$\dfrac{12\sqrt{2y}}{6x^2y^5} = \dfrac{2\sqrt{2y}}{x^2y^5}$

13. $\dfrac{-4x}{1-\sqrt{x}} \cdot \dfrac{1+\sqrt{x}}{1+\sqrt{x}}$

$\dfrac{-4x - 4x\sqrt{x}}{1-x}$

14. $\dfrac{5-\sqrt{2}}{2-\sqrt{3}} \cdot \dfrac{2+\sqrt{3}}{2+\sqrt{3}}$

$\dfrac{10+5\sqrt{3}-2\sqrt{2}-\sqrt{6}}{4-3}$

$10+5\sqrt{3}-2\sqrt{2}-\sqrt{6}$

15. $\sqrt[3]{4a^2b}\cdot\sqrt[3]{10a^5b^2}$

$\sqrt[3]{40a^7b^3}$

$2a^2b^3\sqrt[3]{5a}$

16. $-2\sqrt{45}-3\sqrt{20}-2\sqrt{6}$

$-6\sqrt{5}-6\sqrt{5}-2\sqrt{6}$

$-12\sqrt{5}-2\sqrt{6}$

17. $-3\sqrt[3]{-3}+2\sqrt[3]{162}+3\sqrt[3]{81}$

$-3\sqrt[3]{-3}+6\sqrt[3]{6}+9\sqrt[3]{3}$

18. $3\sqrt{3}(4-3\sqrt{5})$

$12\sqrt{3}-9\sqrt{15}$

19. $(2\sqrt{x}+2)(\sqrt{x}+3)$

$2x+6\sqrt{x}+2\sqrt{x}+6$

$2x+8\sqrt{x}+6$

20. $(\sqrt{3}+\sqrt{5x})(\sqrt{4}-5\sqrt{x})$

$2\sqrt{3}-5\sqrt{3x}+2\sqrt{5x}-5x\sqrt{5}$

21. The length of a large storage box is $3x+\sqrt{48}$ cm and the width is $5+\sqrt{12x}$.

a. Write an expression that represents the perimeter of the field.

$P=2(3x+\sqrt{48})+2(5+\sqrt{12x})$

$P=6x+8\sqrt{3}+10+4\sqrt{3x}$

b. Write an expression that represents the area of the field.

$A=(3x+4\sqrt{3})(5+2\sqrt{3x})$

$A=15x+6x\sqrt{3x}+20\sqrt{3}+24\sqrt{x}$