5-2 Additional Practice

Properties of Exponents and Radicals

Rewrite each expression using the properties of exponents.

1. $\left(\dfrac{4}{64^{\frac{5}{6}}}\right)^{\frac{1}{2}}$

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

2. $3m^{\frac{1}{4}}(mn^{\frac{1}{3}})^{\frac{3}{2}}$

$3m^{\frac{7}{4}}n^{\frac{1}{2}}$

3. $2a^{\frac{1}{2}}(5a^{\frac{1}{2}}b^{\frac{1}{4}})^2$

$50a^{\frac{3}{2}}b^{\frac{1}{2}}$

4. $\left(x^{\frac{1}{3}} \cdot x^{\frac{1}{9}}\right)^6 \div x^{\frac{1}{3}}$

$x^{\frac{7}{3}}$

How can you rewrite each expression?

5. $\sqrt[3]{125x^9y^7}$

$5x^3y^{\frac{7}{3}}$

6. $\sqrt[4]{\dfrac{a^5b^3}{625a}}$

$\dfrac{|a|\sqrt[4]{b^3}}{5}$

7. $\sqrt[5]{288x^3y^7}$

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

8. $\sqrt[3]{\dfrac{297m^4n^5}{3m^2n}}$

$n\sqrt[3]{99m^2n}$

What is the reduced radical form of each expression?

9. $\left(\sqrt[4]{32}\right)^2$

$2^{\frac{5}{2}}$

10. $\left(\sqrt[3]{4^5}\right)\left(\sqrt[3]{5^5}\right)$

$20^{\frac{5}{3}}$

11. $\sqrt{a^3b^5} \cdot 5\sqrt{4ab}$

$10a^2|b^3|$

12. $\sqrt[3]{\dfrac{24x^3}{36x}}$

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

How can you rewrite each expression in a simpler form?

13. $\sqrt[3]{3000} + \sqrt[3]{3} - \sqrt[3]{1029}$

$4\sqrt[3]{3}$

14. $\sqrt{45} - \sqrt{180} - \sqrt{720}$

$-15\sqrt{5}$

Multiply.

15. $(x - \sqrt{8})(x + \sqrt{8})$

$x^2 - 8$

16. $\sqrt{12}(\sqrt{3} + \sqrt{6})$

$6 + 6\sqrt{2}$

What is the reduced radical form of each expression?

17. $\dfrac{3 - \sqrt{7}}{3 - \sqrt{5}}$

$\dfrac{9 - 3\sqrt{5} - 3\sqrt{7} - \sqrt{35}}{4}$

18. $\dfrac{-5x}{3 - \sqrt{x}}$

$\dfrac{-15x - 5x\sqrt{x}}{9 - x}$

19. Discuss the possible values of k such that $\sqrt{50} + \sqrt{k}$ can be written as a single term. **k must be a product of 2 and a perfect square.**

20. Write $\sqrt{\dfrac{16}{7}}$ in two different ways, one where the number is simplified and another where the denominator is rationalized. **$\dfrac{4\sqrt{7}}{7}$; $\dfrac{4}{\sqrt{7}}$**

21. The length of a rectangle is $(3 + \sqrt{7})m$ and its width is $(1 + 2\sqrt{7})n$. What is the area of the rectangle? **$17mn + 7mn\sqrt{7}$**