

LESSON

Practice B**8-6****Radical Expressions and Rational Exponents**

Simplify each expression. Assume all variables are positive.

1. $\sqrt[3]{125x^9}$

2. $\sqrt[4]{\frac{x^8}{81}}$

3. $\sqrt[3]{\frac{64x^3}{8}}$

Write each expression in radical form, and simplify.

4. $64^{\frac{5}{6}}$

5. $27^{\frac{2}{3}}$

6. $(-8)^{\frac{4}{3}}$

Write each expression by using rational exponents.

7. $\sqrt[5]{51^4}$

8. $(\sqrt{169})^3$

9. $\sqrt[7]{36^{14}}$

Simplify each expression.

10. $4^{\frac{3}{2}} \cdot 4^{\frac{5}{2}}$

11. $\frac{27^{\frac{4}{3}}}{27^{\frac{2}{3}}}$

12. $(125^{\frac{2}{3}})^{\frac{1}{2}}$

13. $(27 \cdot 64)^{\frac{2}{3}}$

14. $(\frac{1}{243})^{\frac{1}{5}}$

15. $64^{-\frac{1}{3}}$

16. $(-27x^6)^{\frac{1}{3}}$

17. $\frac{(25x)^{\frac{3}{2}}}{5 \cdot x^2}$

18. $(4x)^{-\frac{1}{2}} \cdot (9x)^{\frac{1}{2}}$

Solve.

19. In every atom, electrons orbit the nucleus with a certain characteristic velocity

known as the Fermi–Thomas velocity, equal to $\frac{Z^{\frac{2}{3}}}{137}c$, where Z is the number of protons in the nucleus and c is the speed of light. In terms of c , what is the characteristic Fermi-Thomas velocity of the electrons in Uranium, for which $Z = 92$?
