

LESSON

8-6

Practice B**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. $\left(125^{\frac{2}{3}}\right)^{\frac{1}{2}}$

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

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

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

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

17. $\frac{(25x)^{\frac{3}{2}}}{5 \cdot x^{\frac{1}{2}}}$

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 ofprotons 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 $Z = 92$?

$$x(x-1) + 3(x+3) = 12$$

$$x^2 + 2x - 3 = 0; x = -3$$

Challenge

- $x < -5$ or $x > -3$
- $x < \frac{1}{2}$ or $x \geq \frac{7}{5}$
- $-3 < x < 2$
- $x < -3$ or $-1 < x < 1$
- $x < -1$ or $1 \leq x \leq 2$ or $x > 3$
- $x < -1$
- $-6 \leq x < 5$
- $\frac{1}{8} < x < 5$
- $x < 2$ OR $x > 7$

Problem Solving

- $\frac{1}{j}$
 - $\left[\frac{1}{4}(2.5)\right] + \left[\frac{1}{j}(2.5)\right] = 1$
 - $6\frac{2}{3}h$
- $\frac{1}{n}$
 - $\left[\frac{1}{n}\left(\frac{1}{3}\right)\right] + \left[\frac{1}{2}\left(\frac{1}{3}\right)\right] = 1$

- C
- A

Reading Strategies

- $x = 2$
- $x = 0$
- $x = 3$
- $x = -1, 0, 1$
- $x = -5, 0$
- $x = -\frac{2}{3}$
- $x = -3, 3$
- $x = 0, \frac{1}{4}$
- $x = -2, 1$
- No; possible answer: the solution should be $x \geq 1$ or $x < \frac{1}{2}$, $x = \frac{1}{2}$ is an extraneous solution.

LESSON 8-6

Practice A

- 6 and -6
- The square root
- \sqrt{n}
- $\sqrt[4]{n^7}$
- $\sqrt[12]{10}$
- ± 1
- 3
- ± 9
- $\sqrt{6}$
- $\sqrt[3]{8^2} = 4$
- $\sqrt[3]{5^4}$
- 7^1 or 7
- $5^{\frac{3}{4}}$
- $10^{\frac{5}{3}}$
- $2x$
- $\frac{3}{2}$
- 2^5 or 32
- $9x^2$
- 5^4 or 625
- $\frac{2x}{3}$
- $\frac{2}{x}$
- 1
- $125x^3$

Practice B

- $5x^3$
- $\frac{x^2}{3}$
- $2x$
- 32
- 9
- 16
- $51^{\frac{4}{5}}$
- $169^{\frac{3}{2}}$
- 36^2
- 256
- 9
- 5
- 144
- $\frac{1}{3}$
- $\frac{1}{4}$
- $-3x^2$
- $25x$
- $\frac{3}{2}$
- About 0.15c

Practice C

- $16x^4$
- $\frac{x^4y^2}{3}$