Name _____ Date _____ Class _____

TEKS 2A.2.A

Practice B
Radical Expressions and Rational Exponents

Simplify each expression. Assume all variables are positive.

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

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

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

_____   _____   _____

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

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

_____   _____   _____

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

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

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

_____   _____   _____

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

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

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 $\dfrac{Z^{\frac{2}{3}}}{137}$ 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 $Z = 92$?

_____

Holt Algebra 2

TEKS 2A.2.A

LESSON 8-6

Practice B
Radical Expressions and Rational Exponents

Simplify each expression. Assume all variables are positive.

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

$5x^3$

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

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

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

$2x$

Write each expression in radical form, and simplify.

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

32

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

9

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

16

Write each expression by using rational exponents.

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

$51^{\frac{4}{5}}$

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

$169^{\frac{3}{2}}$

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

36^2

Simplify each expression.

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

256

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

9

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

5

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

144

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

$\dfrac{1}{3}$

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

$\dfrac{1}{4}$

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

$-3x^2$

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

$25x$

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

$\dfrac{3}{2}$

Solve.

19. In every atom, electrons orbit the nucleus with a certain characteristic velocity known as the Fermi–Thomas velocity, equal to $\dfrac{Z^{\frac{2}{3}}}{137}\,c$, 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 $Z = 92$?

About $0.15c$

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