8.1 Practice Problems

Directions: Write each expression in exponential form.

1) $\sqrt{6x}$ $(6x)^{1/2}$

2) $\frac{1}{\sqrt{m}}$ $m^{-1/2}$

3) $(\sqrt[4]{5n})^5$ $(5n)^{5/4}$

4) $(\sqrt[3]{-27g})^2$ $(-27g)^{2/3}$

Directions: Write each expression in radical form.

5) $(4m)^{5/3}$ $(\sqrt[3]{4m})^5$

6) $(-5x)^{7/4}$ $(\sqrt[4]{-5x})^7$

7) $n^{1/3}$ $\sqrt[3]{n}$

8) $(8y)^{-3/4}$ $\frac{1}{(\sqrt[4]{8y})^3}$

Directions: Find the indicated real nth root(s) of a. Show work.

9) n = 3, a = 125 $\sqrt[3]{125} = \sqrt[3]{25\cdot5}$ $\sqrt[3]{5\cdot5\cdot5}$ 5

10) n = 4, a = 256 $\sqrt[4]{256} = \sqrt[4]{4\cdot64}$ $\sqrt[4]{4\cdot8\cdot8}$ $\sqrt[4]{4\cdot4\cdot2\cdot4\cdot2}$ $\sqrt[4]{4\cdot4\cdot4\cdot4} = \pm4$

11) n = 4, a = -81 $\sqrt[4]{-81} = \sqrt[4]{-9\cdot9}$ $= \sqrt[4]{-3\cdot3\cdot3\cdot3}$ NO REAL ROOT

12) n = 5, a = -32 $\sqrt[5]{-32} = \sqrt[5]{-4\cdot8}$ $\sqrt[5]{-2\cdot2\cdot-2\cdot4}$ $\sqrt[5]{-2\cdot2\cdot-2\cdot-2\cdot2} = -2$

Directions: Simplify. You must SHOW WORK!

13) $\sqrt[3]{512}$ $\sqrt[3]{2\cdot256}$ $\sqrt[3]{2\cdot2\cdot128}$ $\sqrt[3]{2\cdot2\cdot2\cdot64}$ $\sqrt[3]{2\cdot2\cdot2\cdot8\cdot8}$ $\sqrt[3]{8\cdot8\cdot8}$ 8

14) $\sqrt[3]{64}$ $\sqrt[3]{8\cdot8}$ $\sqrt[3]{4\cdot2\cdot4\cdot2}$ $\sqrt[3]{2\cdot2\cdot2\cdot2\cdot2\cdot2} = 2\cdot2 = 4$

15) $(\sqrt[3]{-216})^2$ $(\sqrt[3]{-6\cdot36})^2$ $(\sqrt[3]{-6\cdot-6\cdot-6})^2$ $(-6)^2 = 36$

16) $(\sqrt[4]{625})^3$ $(\sqrt[4]{25\cdot25})^3$ $(\sqrt[4]{5\cdot5\cdot5\cdot5})^3$ $(5)^3 = 125$

17) $\sqrt[3]{-64}$ $\sqrt[3]{-4\cdot16}$ $\sqrt[3]{-4\cdot-4\cdot-4}$ -4

18) $(\sqrt[3]{-27})^{-4}$ $(\sqrt[3]{-3\cdot9})^{-4}$ $(\sqrt[3]{-3\cdot-3\cdot-3})^{-4}$ $(-3)^{-4} = \frac{1}{(-3)^4} = \frac{1}{81}$

19) $81^{3/2}$ $(\sqrt{81})^3$ $9^3 = 729$

20) $36^{3/2}$ $(\sqrt{36})^3$ $(6)^3 = 216$

21) $(-125)^{-2/3}$ $(\sqrt[3]{-125})^{-2}$ $(\sqrt[3]{-25\cdot5})^{-2}$ $(\sqrt[3]{-5\cdot-5\cdot-5})^{-2} = (-5)^{-2}$ $= \frac{1}{(-5)^2} = \frac{1}{25}$

22) $81^{-3/2}$ $(\sqrt{81})^{-3}$ $9^{-3} = \frac{1}{9^3} = \frac{1}{729}$

23) $125^{1/3}$ $\sqrt[3]{125}$ $\sqrt[3]{25\cdot5}$ $\sqrt[3]{5\cdot5\cdot5} = 5$

24) $343^{4/3}$ $(\sqrt[3]{343})^4$ $(\sqrt[3]{7\cdot49})^4$ $(\sqrt[3]{7\cdot7\cdot7})^4 = 7^4 = 2401$

Directions: Solve the equation. Round your answer to two decimal places when appropriate.

25) $\sqrt[5]{x^5} = \sqrt[5]{243}$

$x = 3$

26) $6x^3 = -1296$

$\frac{6x^3}{6} = \frac{-1296}{6}$

$\sqrt[3]{x^3} = \sqrt[3]{-216}$

$x = -6$

27) $\sqrt[4]{(x-4)^4} = \sqrt[4]{81}$

$x - 4 = \pm 3$

$+4 \quad +4$

$x = 3 + 4 \qquad x = -3 + 4$

$7 \text{ or } 1$

28) $(x+2)^7 + 10 = -2197$

$-10 \quad -10$

$\sqrt[7]{(x+2)^7} = \sqrt[7]{-2187}$

$x + 2 = -3$

$-2 \quad -2$

$x = -5$

29) $(x+2)^3 - 20 = 196$

$+20 \quad +20$

$\sqrt[3]{(x+2)^3} = \sqrt[3]{216}$

$x + 2 = 6$

$-2 \quad -2$

$x = 4$

30) $x^8 - 25 = -10$

$+25 \quad +25$

$\sqrt[8]{x^8} = \sqrt[8]{15}$

$x = \pm 1.40$