Name: _____ Date: _____ Period: _____

5.1 nth Roots & Rational Exponents CYU

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Set up the radical	1 – 4		
Simplify nth roots	1 - 4		
Evaluating rational exponents with & w/o calc	5 - 8	9 - 10	
Converting rational exponents to and from radicals	11 - 14		
Evaluating radicals and rational exponents	15 - 18		
Geometry Review	19, 20		
Solving equations with exponents		21 - 23	
Real world problems with exponents			24, 25

Find the indicated real nth root(s) of a.

1. n = 3 & a = 8   2. n = 2 & a = 0   3. n = 4 & a = 256   4. n = 5 & a = - 32

Evaluate the expression without using a calculator.

5. $64^{\frac{1}{6}}$ 6. $25^{\frac{3}{2}}$ 7. $(-243)^{\frac{1}{5}}$ 8. $8^{-\frac{2}{3}}$

ERROR ANALYSIS *Describe & correct the error in evaluating the expression.*

9.
$$27^{2/3} = (27^{1/3})^2$$
$$= 9^2$$
$$= 81$$

10.
$$256^{4/3} = \left(\sqrt[4]{256}\right)^3$$
$$= 4^3$$
$$= 64$$

MATCHING *Using the proper structure, match the equivalent expressions.*

11. $\left(\sqrt[3]{5}\right)^4$ A. $5^{-\frac{1}{4}}$

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

13. $\frac{1}{\sqrt[4]{5}}$ C. $-5^{\frac{1}{4}}$

14. $-\sqrt[4]{5}$ D. $5^{\frac{3}{4}}$

Evaluate the expression using a calculator. Round your answer to two decimal places when appropriate.
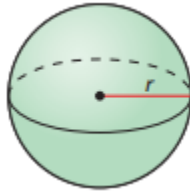
15. $\sqrt[5]{32,768}$
16. $25^{-\frac{1}{3}}$
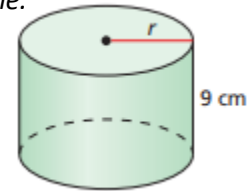17. $20,736^{\frac{4}{5}}$
18. $\left(\sqrt[4]{187}\right)^{3}$

MATHEMATICAL CONNECTIONS *Find the radius of the figure with the given volume.*

19. V = 216 ft³
20. V = 1332 cm³

9 cm

Find the real solution(s) of the equation. Do not round your answer. Leave all answers exact.

21. $x^6 + 36 = 100$
22. $x^3 + 40 = 25$
23. $\frac{1}{6}x^3 = -36$

PROBLEM SOLVING

24. A weir is a dam that is built across a river to regulate the flow of water. The flow rate Q (in cubic feet per second) can be calculated using the formula $Q = 3.367lh^{\frac{3}{2}}$, where l is the length (in feet) of the bottom of the spillway and h is the depth (in feet) of the water on the spillway. Determine the flow rate of a weir with a spillway that is 20 feet long and has a water depth of 5 feet.

spillway

25. The mass of the particles that a river can transport is proportional to the sixth power of the speed of the river normally flows at a speed of 1 meter per second. What must its speed be in order to transport particles that are twice as massive as usual? 10 times as massive? 100 times as massive?

CYU Reflection: *How far can you go: basic, intermediate, or advanced?*
Rate your mastery level!
How confident are you with the skills this CYU covered? Circle the score you would give yourself.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Basic | | Intermediate | | | Advanced | | Solved ALL! |