

8.1 Evaluate Nth Roots and Use Rational Exponents

$2^3 = 8$

$\sqrt[3]{8}$

$b^n = a$

$\sqrt[n]{a} = b$

Changing between Radical Form
and Rational Exponents

$\sqrt[n]{a} = a^{1/n}$

Radical Form	Rational Exponents

$2^2 =$

$\sqrt{4} =$

$2^3 =$

$\sqrt[3]{8} =$

$2^4 =$

$\sqrt[4]{16} =$

$2^5 =$

$\sqrt[4]{32} =$

Even Roots

$a < 0:$

$a = 0:$

$a > 0:$

$(-2)^2 =$

$\sqrt{-4} =$

$(-2)^3 =$

$\sqrt[3]{-8} =$

$(-2)^4 =$

$\sqrt[4]{-16} =$

$(-2)^5 =$

$\sqrt[5]{-32} =$

Odd Roots

$a < 0:$

$a = 0:$

$a > 0:$

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

Ex 1:

Ex 2:

Ex 3:

Simplify: You must show your work.

Ex 4:

Ex 5:

Ex 6:

Ex 7:

Evaluate using a calculator. Round to 2 decimal places if appropriate.

Ex 8:

Ex 9:

Solve the equation. Round the result to two decimal places if appropriate.

Ex 10:

Ex 11:

Ex 12:

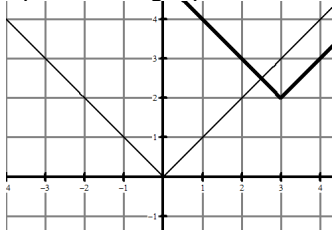
Ex 13:

Try These:

Summarize your notes:

Algebra Skillz

Below, the parent function $f(x) = |x|$ is represented by the thin graph.



Write the equation of the function in bold.

4) $\frac{5}{\sqrt{50}}$

3) $\frac{\sqrt{27}}{3\sqrt{6}}$

5) Factor:
 $4x^3 - 20x^2 + 24x$

6) Factor and solve.
 $50n^2 - 60n = 25n - 30$

8.1 Practice Problems

Directions: Write each expression in exponential form.

1) $\sqrt{6x}$

2) $\frac{1}{\sqrt{m}}$

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

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

Directions: Write each expression in radical form.

5) $(4m)^{5/3}$

6) $(-5x)^{7/4}$

7) $n^{1/3}$

8) $(8y)^{-3/4}$

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

9) $n = 3, a = 125$

10) $n = 4, a = 256$

11) $n = 4, a = -81$

12) $n = 5, a = -32$

Directions: Simplify. You must SHOW WORK!

13) $\sqrt[3]{512}$

14) $\sqrt[3]{64}$

15) $(\sqrt[3]{-216})^2$

16) $(\sqrt[4]{625})^3$

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

18) $(\sqrt[3]{-27})^{-4}$

19) $81^{3/2}$

20) $36^{3/2}$

21) $(-125)^{-2/3}$

22) $81^{-3/2}$

23) $125^{1/3}$

24) $343^{4/3}$

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

25) $x^5 = 243$

26) $6x^3 = -1296$

27) $(x - 4)^4 = 81$

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

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

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

8.1 Application and Extension

1) Simplify: SHOW WORK: $(-125)^{2/3}$

2) SOLVE: $(x + 3)^5 - 2500 = 625$

3) Mr. Kelly has a HUGE head...its like an orange on a toothpick. He claims it's to hold his huge brain and that it has the volume of about 905 cubic inches. If we assume Mr. Kelly's head is spherical what is the radius of his huge noggin? (Hint: $V = \frac{4}{3}\pi r^3$)

4) Mr. Bean is a former PBA (Professional Bolwer's Association) pro. That's right, he actually got to tour the country, bowl and make money from it. A bad wrist injury sidelined his dream of becoming the next Pete Weber. Every Saturday he still waxes up his favorite bowling ball and he knows that the surface area is about 232 square inches. What's the radius of his favorite ball? (Hint: $SA: 4\pi r^2$)

5) Complete the following table for $f(x) = 7^x$. Round your answers to four decimal places.

x	F(x)
1	
$\frac{1}{2}$	
$\frac{1}{3}$	
$\frac{1}{4}$	
$\frac{1}{5}$	
$\frac{1}{10}$	
$\frac{1}{100}$	
$\frac{1}{1000}$	

a) As you go down the table of values, what number does X approach? In other words, what number is it getting closer and closer to?

b) As you go down the table of values, what number does f(x) approach?

6) Complete the following table for $g(x) = x^x$. Round your answers to four decimal places.

x	G(x)
1	
$\frac{1}{2}$	
$\frac{1}{3}$	
$\frac{1}{4}$	
$\frac{1}{5}$	
$\frac{1}{10}$	
$\frac{1}{100}$	
$\frac{1}{1000}$	

a) As you go down the table of values, what number does x approach?

b) As you go down the table of values, what number does g(x) approach?

c) What do you notice about the number that f(x) and g(x) both approach? Why is it true?

SAT PREP Below are sample SAT questions. The SAT is the main standardized test that colleges look at for admission. One is multiple choices; the other is free response where you must grid in your answer. Blow it up.

MULTIPLE CHOICE

If n and p are positive integers and $3^{n/p} = \sqrt{27}$, then the product of n and p is:

- (A) -1
- (B) 0
- (C) 3
- (D) 6
- (E) 9

GRID IN

If $p^m \cdot p^{-4} = p^5$, and $(p^{-2})^n = p^{20}$, what is the value of $m-n$?

•	•	•	•
	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9