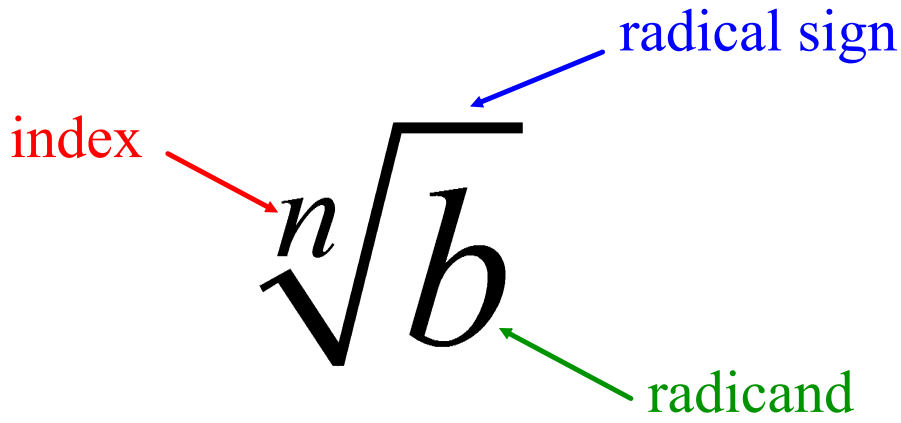
Notes 6.4 *n*th Roots



Some roots have more than one real nth root. For example, 64 had two square roots, _____ and _____ since _____ and _____ both equal 64.

KeyConcept Real *n*th Roots

Suppose n is an integer greater than 1, and a is a real number.

a	n is even.	n is odd.
$a > 0$	1 unique positive and 1 unique negative real root: $\pm\sqrt[n]{a}$; positive root is principal root	1 unique positive and 0 negative real roots: $\sqrt[n]{a}$
$a < 0$	0 real roots	0 positive and 1 negative real root: $\sqrt[n]{a}$
$a = 0$	1 real root: $\sqrt[n]{0} = 0$	1 real root: $\sqrt[n]{0} = 0$

Example: $\pm\sqrt{16x^8}$

$\pm\sqrt{16}\sqrt{x^8}$

$\pm\sqrt{4^2}\sqrt{x^{8}}$ → divide index off exponent

$\pm 4x^4$

Example 1 Guided Practice:

1A. $\pm\sqrt{36x^{10}}$

1B. $-\sqrt{(y+7)^2}$

Approximate Radicals with a Calculator

Use the math menu
Choice 4 is for a third root
Choice 5 is for any root

You must type the index first,
then choose math choice 5, then
enter the radicand

Example:
for $\sqrt[6]{64}$
enter 6 then choose math choice 5
and type 64 enter