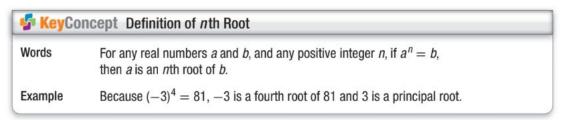
Finding the square root of a number and squaring a number are

operations. To find the square root of a number a, you must find a number with a square of a. Similarly, the inverse of raising a number to the nth power is finding the of a number.

Powers	Factors	Words	Roots
$x^3 = 64$	4 • 4 • 4 = 64	4 is a cube root of 64.	$\sqrt[3]{64} = 4$
$x^4 = 625$	$5 \cdot 5 \cdot 5 \cdot 5 = 625$	5 is a fourth root of 625.	$\sqrt[4]{625} = 5$
$x^5 = 32$	$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$	2 is a fifth root of 32.	$\sqrt[5]{32} = 2$
$a^n = b$	$\underbrace{a \cdot a \cdot a \cdot \dots \cdot a}_{n \text{ factors of } a} = b$	a is an nth root of b.	$\sqrt[n]{b} = a$



Symbol that indicates *nth* root:

Some numbers have more than one real nth root.

ex) 64 has two square roots

When there is more than one real root and n is even, the nonnegative root is called the principal root.

Examples of nth roots:

$$\sqrt{25} = 5$$
 $\sqrt{25}$ indicates the principal square root of 25.
 $-\sqrt{25} = -5$ $-\sqrt{25}$ indicates the opposite of the principal square root of 25.
 $\pm\sqrt{25} = \pm5$ $\pm\sqrt{25}$ indicates both square roots of 25.

1. Simplify:

a.
$$\pm \sqrt{16y^4}$$

f.
$$-\sqrt{(y+7)^{16}}$$

b.
$$-\sqrt{(x^2-6)^8}$$

g.
$$\sqrt[4]{y^4}$$

c.
$$\sqrt[5]{243a^{20}b^{25}}$$

h.
$$\sqrt[6]{64(x^2-3)^{18}}$$

d.
$$\sqrt{-16x^4y^8}$$

i.
$$\sqrt{36y^6}$$

e.
$$\pm \sqrt{36x^{10}}$$

j.
$$\sqrt[4]{16(x-3)^{12}}$$

k.
$$\pm \sqrt{100y^8}$$

n.
$$\sqrt[4]{16g^{16}h^{24}}$$

1.
$$-\sqrt{49u^8b^{12}}$$

o.
$$\sqrt{-16y^4}$$

m.
$$\sqrt{(y-6)^8}$$

p.
$$\sqrt[6]{64(2y+1)^{18}}$$