Simplify each.

1. $\sqrt[3]{m^3} = m^{\frac{3}{3}}$

$= m^1 = m$

2. $\sqrt[3]{b^6}$ or $b^{\frac{6}{3}}$

$= \sqrt[3]{b^3 \cdot b^3}$

$= b \cdot b = b^2$

3. $\sqrt[5]{g^{35}} = g^{\frac{35}{5}}$

$= g^7$

Simplify.

4. $\sqrt[3]{k^8} = k^{\frac{8}{3}} = k^{2\frac{2}{3}} = k^{2+\frac{2}{3}}$

$= k^2 \cdot k^{\frac{2}{3}} = k^2\sqrt[3]{k^2}$

OR

$= \sqrt[3]{k^6 \cdot k^2} = \sqrt[3]{k^6} \cdot \sqrt[3]{k^2} = k^2\sqrt[3]{k^2}$

to simpify radicals like this you really only have to do the following:

$3\overline{)8}$ 2 r 2

6

2

$\sqrt[3]{k^8} = k^2\sqrt[3]{k^2}$

Simplify.

5. $\sqrt[7]{a^{46}} = a^6\sqrt[7]{a^4}$

$7\overline{)46}$ 6 r = 4

42

Simplify.

$\sqrt[9]{q^{415}}$

$= q^{46}\sqrt[9]{q^1}$

$9\overline{)415}$ 46 r 1

36

55

54

Simplify.

$\sqrt[3]{40x^7y^{24}z^{11}} = \sqrt[3]{40} \cdot \sqrt[3]{x^7} \cdot \sqrt[3]{y^{24}} \cdot \sqrt[3]{z^{11}}$

$\sqrt[3]{8 \cdot 5}$; $3\overline{)7}$ 2 r 1, $\frac{6}{1}$; $3\overline{)24}$ 8 r 0, $\frac{24}{}$; $3\overline{)11}$ 3 r 2, $\frac{9}{2}$

$2x^2y^8z^3\sqrt[3]{5xz^2}$

$\sqrt[4]{80a^{11}b^{29}c^{43}}$ → $\sqrt[4]{c^{43}}$ → $4\overline{)43}$ 10 r 3, $\frac{40}{3}$

$\sqrt[4]{16 \cdot 5}$ → $\sqrt[4]{b^{29}}$ → $4\overline{)29}$ 7 r 1, $\frac{28}{1}$ → $b^7\sqrt[4]{b}$

$2^4 = 16$, $3^4 = 81$, 4^4, 5^4

$2a^2b^7c^{10}\sqrt[4]{5a^3bc^3}$

$\sqrt[4]{a^{11}}$ → $4\overline{)11}$ 2 r 3, $\frac{8}{3}$ → $a^2\sqrt[4]{a^3}$

$6^2 = 36$ and $(-6)^2 = 36$

What are the square roots of 36? ± 6

What are the square roots of 81? ± 9

Why are there no real square roots of -36?

No real number squared will be equal to -36. Squaring a real number never results in a negative answer.

How many square roots does any positive number have? 2

$3^4 = 81$ $(-3)^4 = 81$

What are the fourth roots of 81? ± 3

What are the fourth roots of 2401? ± 7

Are there any real fourth roots of -256? NO

How many fourth roots does any positive number have? 2

5^3 = 125 $(-5)^3$ = −125

How many cube roots does 125 have? 1

Find the cube root of -125 = −5

Find the cube root of -512 = −8

How many cube roots does any number have? 1

The cube root of any number has what sign? the same as the radicand

The number of REAL nth roots of a number $\sqrt[n]{\square}$

Radicand is	n is even	n is odd
Positive	2	1
Zero	1	1
Negative	None	1

There are 2 even roots of every positive number.

$-\sqrt{\ }$ asks for the Negative Root

$\pm\sqrt{\ }$ asks for the Pos & Neg Roots

$\sqrt{\ }$ asks for the Positive Root

$\sqrt{25}$ = ____ $\sqrt{\ }$ in this situation indicates the Principal Root

→ which means the positive root when there are two roots.

What is the difference?

Simplify.

$\sqrt{36}$ = 6

this is asking you for the Principal (pos) root

Solve.

$x^2 = 36$

x = ± 6

This is asking you for ALL the numbers you could square and get 36....All the square roots of 36