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

The answer from an EVEN radical must be POSITIVE.
"Principal Root"
unless... there is a - or ±
in front of the radical.

The answer from an ODD radical can be anything (pos or neg).

A real number raised to an EVEN power is ALWAYS POSITIVE.

A real number raised to an ODD power can either be negative or positive.

Simplify each. Use absolute value symbols when needed.

14. $\sqrt[3]{x^{22}} = \sqrt[3]{x^{21} \cdot x^{1}} = x^{7}\sqrt[3]{x}$

15. $\sqrt[3]{-27e^{12}f^{17}g^{19}} = -3e^{4}f^{5}g^{6}\sqrt[3]{f^{2}g}$

Simplify each. Use absolute value symbols when needed.

16. $\sqrt[4]{16m^{12}n^{25}} = 2|m^3|n^6\sqrt[4]{n}$

17. $\sqrt[5]{32R^{21}S^{34}} = 2R^4S^6\sqrt[5]{RS^4}$

Simplify each. Use absolute value symbols when needed.

18. $\sqrt{72c^{18}d^{33}g^{12}}$

$36 \cdot 2$

$= 6|c^9|d^{16}g^6\sqrt{2d}$

Absolute value symbols **may** be needed when taking an <u>even</u> root.

Absolute value symbols are **not** used when taking an <u>odd</u> root.

If the result of an <u>even</u> root **could** be negative then absolute value symbols are needed.

This will occur when the result of taking the root is a variable raised to an <u>odd</u> power.

Simplify each. Use absolute value symbols when needed.

1. $\sqrt[5]{m^{20}q^{35}}$

$= m^4q^7$

2. $\sqrt[4]{a^{12}b^{32}}$

$= |a^3|b^8$

3. $\sqrt[8]{x^{40}y^{21}z^{15}}$

$= |x^5| y^2 |z| \sqrt[8]{y^5 z^7}$

4. $\sqrt[9]{k^{41}j^{29}}$

$= k^4 j^3 \sqrt[9]{k^5 j^2}$

Simplify. Use absolute value symbols when needed.

$$\sqrt{25c^{14}d^{29}} = 5|c^7| d^{14}\sqrt{d}$$

Simplify. Assume all variables are positive.

This means regardless of the index NO absolute value is needed.

$$\sqrt[4]{m^{12}n^{23}p^6} = m^3 n^5 p \sqrt[4]{n^3 p^2}$$

$$? \quad = b^{8}c^{5}d^{11}\sqrt[3]{c^{2}d^{1}}$$

What was the original problem that produced the answer shown above?

$$\sqrt[3]{b^{24}c^{17}c^{34}}$$

$8 \cdot 3 = 24$ $\quad 5 \cdot 3 + 2 = 17$ $\quad 11 \cdot 3 + 1 = 34$

You can now finish Hwk #16 Sec 7-1

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Problems 43 - 46, 49 - 54