

Understanding Roots

1. Complete the following problem by filling in the blanks for the exponents. Note that a blank may contain a "1" to indicate the first power. **Rewrite the problem so that the exponents can be read easily.**

$$\sqrt[4]{x^4 y^9 w^3} = x^? y^? \sqrt[4]{y^? w^?}$$

2. Simplify the following roots.

a. $\sqrt[3]{18x^8y^3}$

b. $\sqrt{64x^5y^9}$

c. $\sqrt[4]{8x^5y^{12}z^2}$

3. Someone in class sort of remembers a rule that "you can't take a root of a negative number." Is this always true, sometimes true or never true? Justify your answer with an explanation.
4. Your instructor tells you that there are actually *two* numbers that are the square root of 9. Assuming you believe her...
- What are they?
 - Do all numbers have two roots? Are there ever more? (Consider both different numbers and different roots.)