Consider

$y = x^{(a/b)}$

then

$y^b = x^a$

The result of a and y being real happens when a+b is even. I have some scrawl on the back of an envelope, but the reasoning is probably buried in that dusty textbook somewhere.

If we are using floating point arithmetic, then we can't really find out what a or b is because the accuracy of the machine is not perfect.

i.e. 2.01 = 201/200 - but we really can't be sure.