**Roots and Powers** 

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Evaluate expressions with fractional and negative exponents. Connect fractional exponents to radicals, and
negative exponents to reciprocals.

Recall:

1. $3^6 3^2 =$	2. $6^3 6^7 6^2 6^5 =$	3. $7^67^37^1 =$
3×3×3×3×3×3×3×3×3	= 63+7+2-45	= 76+3+1
= 36+2	= 67	= 7 <sup>ID</sup>
= 38		,
۲۵ Extend the idea to ا	tional n-whole number exponents:	
4. $2^{\frac{1}{2}}2^{\frac{1}{2}} =$	5. $5^{0.25}5^{0.25}5^{0.25}5^{0.25} =$	6. $11^{\frac{1}{3}}11^{\frac{1}{3}}11^{\frac{1}{3}} =$
$= 2^{\frac{1}{2} + \frac{1}{2}}$	= 5 <sup>0.25 + 0.25 + 0.26 + 0.25</sup>	$= 1 + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$
= 2 1	= 5	= 1) <sub>1</sub>

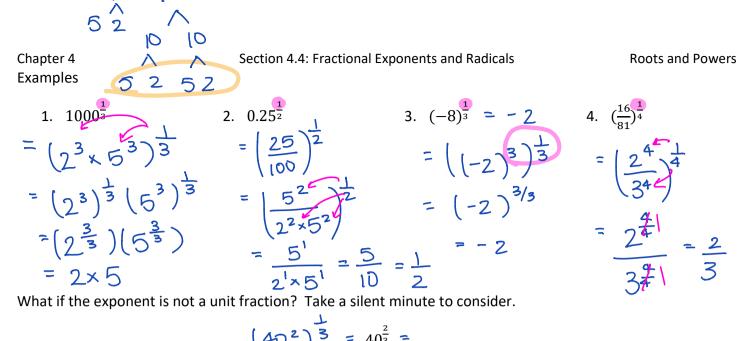
=5 = 2

Take a silent moment. What do you think the fractional exponents represent?

The denominator of your exponent is the index of your radical.

When *n* is a natural number and *x* is a rational number,

 $z^{\dagger} = \eta z$ 



$$(40^{2})^{3} = 40^{3} = 40^{3} = 40^{2}$$

$$(40^{2})^{3} = 3\sqrt{(40)^{2}}$$

$$(40^{2})^{3} = (3\sqrt{40})^{2}$$

$$(40^{2})^{3} = (3\sqrt{40})^{2}$$

