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## Real Number Exponents

Simplify

Ex 1  $(7^{\sqrt{3}})^2$   
 $7^{2\sqrt{3}}$   
 $(7^2)^{\sqrt{3}}$   
 $49^{\sqrt{3}}$

2  $\sqrt[2]{4^{6\pi}}$   
 $4^{6\pi/2}$   
 $4^{3\pi}$   
 $(4^3)^\pi$   
 $(64)^\pi$

3  $\frac{6^{\sqrt{2}} \cdot 6^{\sqrt{8}}}{6^{3\sqrt{2}}}$   $\rightarrow$   $\frac{6^{\sqrt{2}} \cdot 6^{2\sqrt{2}}}{6^{3\sqrt{2}}}$   
 $\rightarrow$   $\frac{6^{3\sqrt{2}}}{6^{3\sqrt{2}}}$   $\rightarrow$   $6^0 \rightarrow 1$

Hint: Play around with the order of the exponents or change to exponential form.

Always Always ALWAYS Match the bases!!!  
 When the bases are matched, then the exponents must be equal.

Solve

Ex 4  $5^x = \frac{1}{125}$   
 $5^x = \frac{1}{5^3}$   
 $5^x = 5^{-3}$   
 $x = -3$

5  $5^{4-x} = 25^{x-1}$   
 $5^{4-x} = (5^2)^{x-1}$   
 $5^{4-x} = 5^{2x-2}$   
 $4-x = 2x-2$   
 $+x \quad +x$   
 $4 = 3x-2$   
 $2 \quad +2$   
 $3x = 6$   
 $x = 2$

6  $49^{x-2} = 7 \cdot \sqrt{7}$   
 $(7^2)^{x-2} = 7 \cdot 7^{1/2}$   
 $7^{2x-4} = 7^{3/2}$   
 $2x-4 = \frac{3}{2}$   
 $+4 \quad +4$   
 $2x = \frac{11}{2} \div 2$   
 $2$   
 $2x = \frac{11}{2} \cdot \frac{1}{2}$   
 $x = \frac{11}{4}$