

# Exponent Properties

①  $a^m \cdot a^n = a^{m+n}$

$a^{1/2} \cdot a^{2/3} = a^{7/6}$

②  $\frac{a^m}{a^n} = a^{m-n}$

$\frac{a^7}{a^{4/3}} = a^{20/3}$

③  $(a^m)^n = a^{m \cdot n}$

$(a^4)^{3/4} = a^3$

④  $(ab)^n = a^n b^n$

$(a^2 b^3)^{1/3} = a^{2/3} b^1$

⑤  $a^{-m} = \frac{1}{a^m}$

$a^{-3} = \frac{1}{a^3}$

⑥  $\sqrt[n]{ab} = a^{1/n} b^{1/n}$

$\sqrt[3]{a^2 b^4} = a^{2/3} b^{4/3}$

⑦  $\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$

$\sqrt[2]{\frac{4}{9}} = \frac{\sqrt{4}}{\sqrt{9}} = \frac{2}{3}$

⑧  $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

$\left(\frac{x^2}{y^3}\right)^{1/2} = \frac{x}{y^{3/2}}$

## examples

what is the reduced radical expression?

1.  $81^{5/4} \cdot 81^{-1/3} \rightarrow^{-2/6}$   
 $81^{3/4} = 81^{1/2} = \boxed{9}$

4.  $\sqrt[3]{16x^5} = 2x \sqrt[3]{2x^2}$

2.  $\left(\frac{3}{32^{2/5}}\right)^{1/2}$   
 $\frac{3^{1/2}}{32^{1/5}} = \frac{\sqrt{3}}{\sqrt[5]{32}} = \boxed{\frac{\sqrt{3}}{2}}$

5.  $\sqrt[4]{81a^8b^5} = 3a^2b \sqrt[4]{b}$

3.  $2a^{1/3} (ab^{1/2})^{2/3}$   
 $2a^{1/3} a^{2/3} b^{1/3}$   
 $= 2ab^{1/3}$   
 $= \boxed{2a \sqrt[3]{b}}$

6.  $\frac{\sqrt[3]{x^4 y^2}}{\sqrt{125x}}$  \*inside 1st!  
 $\frac{\sqrt[3]{x^3 y^2}}{\sqrt{125}} = \boxed{\frac{x \sqrt[3]{y^2}}{5}}$