Radicals ! ! !

Square Root	Cubed Root	Fourth Root	Fifteenth Root
$\sqrt{\ }$ or $\sqrt[3]{\ }$	$\sqrt[3]{\ }$	$\sqrt[4]{\ }$	$\sqrt[15]{\ }$

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1. Simplify each of these:

a) $\sqrt{49}$
$= \sqrt{7 \cdot 7}$
$= 7$

b) $\sqrt[3]{27}$
$= \sqrt[3]{3 \cdot 3 \cdot 3}$
$= 3$

c) $\sqrt[3]{-8}$
$= \sqrt[3]{(-2)(-2)(-2)}$
$= -2$

d) $\sqrt[3]{24x^5y^2}$
$= \sqrt[3]{2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot y \cdot y}$
$= 2x\sqrt[3]{3x^2y^2}$

$= \sqrt[3]{3 \cdot 2^3 \cdot x^3 \cdot x^2 \cdot y^2}$
$= 2x\sqrt[3]{3x^2y^2}$

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2. Multiplying Radical Expressions

a) $5\sqrt{6t} \cdot 4\sqrt{2t^3}$
$= 20\sqrt{3 \cdot 2 \cdot 2 \cdot t \cdot t \cdot t}$
$= 40t^2\sqrt{3}$

b) $\sqrt{5h} \cdot -2\sqrt{3h^3}$
$= -2\sqrt{5 \cdot 3 \cdot h \cdot h \cdot h \cdot h}$
$= -2h^2\sqrt{15}$

c) $2\sqrt[3]{3m^2} \cdot -5\sqrt[3]{18m^5}$
$= -10\sqrt[3]{3 \cdot 3 \cdot 3 \cdot 2 \cdot m \cdot m \cdot m \cdot m \cdot m \cdot m}$
$= -30m^2\sqrt[3]{2m}$

OR
$= -10\sqrt[3]{3^3 \cdot 2 \cdot m^3 \cdot m^3 \cdot m}$
$= -30m^2\sqrt[3]{2m}$

d) $2\sqrt[3]{24k^4} \cdot \sqrt[3]{3k^4}$

$= 2\sqrt[3]{(-2)(-2)(-2)(3)(3)kkkkkk}$ $\quad k^3 \cdot k^3 \cdot k^2$

$= -4k^2\sqrt[3]{9k^2}$

3. Simplify:

a) $\frac{5}{5} = 1$

$\frac{\sqrt{3}}{\sqrt{3}} = 1$

$\frac{\sqrt{5}}{5\sqrt{5}} = \frac{1}{5}$

b) $\frac{2\sqrt{3}}{2\sqrt{27}}$ $\quad \frac{2\sqrt{3}}{2\sqrt{27}}$

$= \frac{\sqrt{3}}{\sqrt{3}\cdot\sqrt{9}}$ $\quad = \sqrt{\frac{3}{27}}$

$= \frac{1}{3}$ $\quad = \sqrt{\frac{1}{9}}$

$= \frac{1}{3}$

c) $\frac{4\sqrt{8}}{3\sqrt{25}}$

$= \frac{4\sqrt{2\cdot2\cdot2}}{3\cdot\sqrt{5\cdot5}}$

$= \frac{8\sqrt{2}}{15}$

d) $\dfrac{\sqrt[3]{6}}{\sqrt[3]{2}}$

$= \dfrac{\cancel{\sqrt[3]{2}} \cdot \sqrt[3]{3}}{\cancel{\sqrt[3]{2}}}$

$= \sqrt[3]{3}$

e) $\dfrac{\sqrt[4]{10}}{3\sqrt[4]{32}}$

$= \dfrac{\sqrt[4]{2 \cdot 5}}{3\sqrt[4]{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}}$

$= \dfrac{\cancel{\sqrt[4]{2}} \cdot \sqrt[4]{5}}{6\cancel{\sqrt[4]{2}}}$

$= \dfrac{\sqrt[4]{5}}{6}$

f) ~~$\dfrac{4\sqrt[3]{6}}{3\sqrt[3]{375}}$~~

Homework

Worksheet: Multiplying and Dividing Radicals ***(white)***

complete every other pair starting with 3,4

3,4, 7,8, 11,12, 15,16, . . .