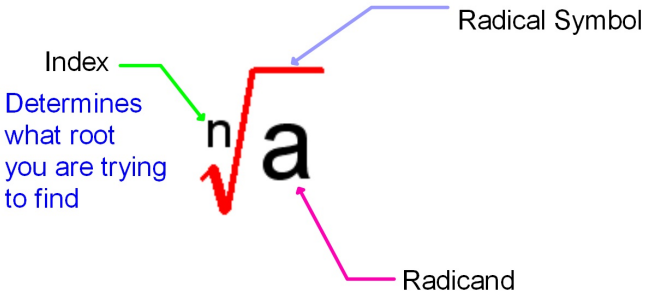

$32^{\wedge\frac{1}{5}}$

$=\sqrt{32} = 2$

$625^{\wedge\frac{1}{4}}$

$=\sqrt[4]{625} = 5$

In general: $a^{\wedge\frac{1}{n}} = \sqrt[n]{a}$

Evalute.

$4^{\wedge\frac{3}{2}} = \left(\sqrt{4}\right)^3 = 8$

$4^{\wedge\frac{3}{2}}$

Written in radical form:

$=\left(\sqrt[2]{4}\right)^3$ *or* $\sqrt[2]{(4)^3}$

Rational Exponents:

Definition **Rational Exponents**

If the nth root of a is a real number and m is an integer, then

$a^{\frac{1}{n}} = \sqrt[n]{a}$ and $a^{\frac{m}{n}} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$. If m is negative, $a \neq 0$.

Write in radical form:

1. $w^{\frac{5}{4}}$ $(\sqrt[4]{w})^5$ or $\sqrt[4]{w^5}$

2. $c^{\frac{1}{6}}$ $\sqrt[6]{c}$

Write with rational exponents.

3. $\sqrt[8]{h^3} = h^{\frac{3}{8}}$

4. $(\sqrt{g})^5 = g^{\frac{5}{2}}$

5. $\sqrt[7]{d} = d^{\frac{1}{7}}$

Simplify each without a calculator.

1. $9^{\frac{3}{2}}$
$= (\sqrt{9})^3$
$= 3^3 = 27$

2. $(-8)^{\frac{4}{3}}$
$= (\sqrt[3]{-8})^4$
$= (-2)^4 = 16$

3. $5^{\frac{3}{2}}$
$\sqrt{5^3}$
$= \sqrt{5 \cdot 5 \cdot 5}$
$= \sqrt{25 \cdot 5}$
$= 5\sqrt{5}$

4. $\sqrt{x} \cdot \sqrt[3]{x}$
$x^{\frac{1}{2}} \cdot x^{\frac{1}{3}} = x^{\frac{1}{2}+\frac{1}{3}} = x^{\frac{3}{6}+\frac{2}{6}} = x^{\frac{5}{6}}$

Simplify each. Write answer without negative exponents or decimal exponents

1. $w^{3.5}$ $w^{7/2}$

2. $\left(m^{\frac{5}{2}}\right)^{-6} = m^{-15} = \frac{1}{m^{15}}$

3. $\left(a^{\frac{7}{8}} b^{\frac{5}{9}}\right)^{12}$

$a^{4/2}\ b^{20/3}$

Hwk #1

Sec 7-4

Pages 388-389

Problems 11, 12, 18, 22, 47, 48

Evaluate without a calculator.

$\left(7^{\sqrt{2}}\right)^{\sqrt{2}}$

$7^{\sqrt{2}\cdot\sqrt{2}} = 7^2 = 49$

Find all the real fourth roots of 4096

± 8

Find all the real fifth roots of -1024

-4

All positive numbers have:

2 Square Roots $\pm$
1 Cube Root $+$
2 Fourth Roots $\pm$
1 Fifth Root $+$
2 Sixth Roots $\pm$
1 Seventh Root $+$

•
•
•

All Negative numbers have:

0 Square Roots
1 Cube Root $-$
0 Fourth Roots
1 Fifth Root $-$
0 Sixth Roots
1 Seventh Root $-$

•
•
•

In general:

All positive numbers have:

2 Even Roots $\pm$

1 Odd Root $+$

All Negative numbers have:

0 Even Roots

1 Odd Root $-$