

## Radicals and Exponents #2

*It is easier to work with exponent laws than with radicals*

*So, our first step is often a conversion to expo form*

1) **Simplify the following**

a)  $(\sqrt[3]{x^7})(\sqrt{x^3})$

convert:  $x^{\frac{7}{3}}x^{\frac{3}{2}} \rightarrow x^{\frac{14}{6}}x^{\frac{9}{6}}$  add expo =  $x^{\frac{23}{6}}$  or  $\sqrt[6]{x^{23}}$

b)  $(25\sqrt[3]{x^8})^{\frac{1}{2}}(16\sqrt{x^5})^{\frac{1}{4}}$

convert:  $(25x^{\frac{8}{3}})^{\frac{1}{2}}(16x^{\frac{5}{2}})^{\frac{1}{4}}$  apply expo  $(5x^{\frac{4}{3}})(2x^{\frac{5}{8}}) \rightarrow (5x^{\frac{32}{24}})(2x^{\frac{15}{24}}) = 10x^{\frac{47}{24}}$  or  $10\sqrt[24]{x^{47}}$

c)  $\left(\frac{5x^7y^{11}}{125x^{-3}y^7}\right)^{\frac{-1}{2}}$

*Notice that applying the power would make a mess So simplify, then flip*  $\left(\frac{x^{10}y^4}{25}\right)^{\frac{-1}{2}} \rightarrow \left(\frac{25}{x^{10}y^4}\right)^{\frac{1}{2}} = \frac{5}{x^5y^2}$

d)  $\left(\frac{-27x^{-3}y^8}{343x^{-15}y^{17}}\right)^{\frac{-1}{3}}$

*simplify, then flip*  $\left(\frac{-27x^{12}}{343y^9}\right)^{\frac{-1}{3}} \rightarrow \left(\frac{343y^9}{-27x^{12}}\right)^{\frac{1}{3}} = \frac{7y^3}{-3x^4}$

e)  $(\sqrt[4]{16x^8y^{-2}})(\sqrt{4x^2y})^{-1}$

convert:  $\frac{(16x^8y^{-2})^{\frac{1}{4}}}{(4x^2y)^{\frac{1}{2}}}$  apply expo  $\frac{4x^4y^{-\frac{1}{2}}}{2x^2y^{\frac{1}{2}}}$  simplify  $= \frac{2x^2}{y}$

2) **Without using a calculator – evaluate the following (no decimals)**

a)  $16^{\frac{3}{4}}$   $\sqrt[4]{16^3}$   $16^3$  is a big # but  $\sqrt[4]{16} = 2$   $\rightarrow (2)^3 = 8$

b)  $125^{\frac{-2}{3}}$   $\frac{1}{\sqrt[3]{125^2}}$   $125^2$  is a big # but  $\sqrt[3]{125} = 5$   $\rightarrow \frac{1}{5^2} = \frac{1}{25}$

c)  $16^{\frac{-3}{2}}$   $\frac{1}{\sqrt{16^3}}$   $16^3$  is a big # but  $\sqrt{16} = 4$   $\rightarrow \frac{1}{4^3} = \frac{1}{64}$

d)  $64^{\frac{-2}{3}}$   $\frac{1}{\sqrt[3]{64^2}}$   $64^2$  is a big # but  $\sqrt[3]{64} = 4$   $\rightarrow \frac{1}{4^2} = \frac{1}{16}$

Assignment = worksheet

## Radicals and Exponent Laws #2

1) **Combine and simplify the following**

a)  $9(32x^9)^{-\frac{1}{5}}$

b)  $(81x^{\frac{5}{7}})^{-\frac{1}{4}}$

c)  $(2x)^3(16x^{\frac{5}{2}})^{-\frac{1}{2}}$

**Now write your answers in radical form**

a)

b)

c)

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d)  $18(64x^9)^{-\frac{1}{4}}$

e)  $\frac{(8(x)^{\frac{9}{7}})^{\frac{1}{3}}}{10(x)^{-\frac{1}{5}}}$

\*f)  $\frac{(32(x)^{\frac{1}{7}})^{\frac{2}{5}}}{24(x)^{-\frac{1}{6}}}$

**Now write your answers in radical form**

d)

e)

f)

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g)  $(\sqrt[3]{x})(\sqrt{x})$

h)  $(\sqrt[3]{x^5})(\sqrt{x^9})$

i)  $(\sqrt[3]{x})(\sqrt[7]{x^6})$

**Now write your answers in radical form**

g)

h)

i)

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j)  $(\sqrt[3]{x^4})(\sqrt{x^9})$

k)  $(8\sqrt[3]{x^7})(6\sqrt{x^3})$

l)  $(-12\sqrt[5]{x})(3\sqrt[4]{x^9})$

**Now write your answers in radical form**

j)

k)

l)

$$m) (\sqrt[3]{x^4})^2 (\sqrt{x^9})^{\frac{1}{3}}$$

$$n) (4\sqrt[3]{x^7})^{\frac{1}{2}} (16\sqrt{x^3})^{\frac{1}{4}}$$

$$o) (-\sqrt[5]{x})(3\sqrt[4]{x^8})$$

**Now write your answers in radical form**

**m)**

**n)**

**o)**

**2) Do Page 227 #12**

**a)**

**b)**

**c)**

**d)**

**e)**

**f)**

**4) Simplify the following by converting them to radical form first (NO decimals)**

**a)  $81^{\frac{3}{4}}$**

**b)  $27^{-\frac{2}{3}}$**

**c)  $16^{-\frac{5}{2}}$**

**d)  $125^{-\frac{2}{3}}$**

**e)  $81^{\frac{1}{3}}$**

**f)  $16^{-\frac{1}{3}}$**

**g)  $125^{-\frac{1}{2}}$**

**h)  $64^{-\frac{2}{3}}$**

**5) Do Page 242 #16**

**a)**

**b)**

**c)**

**d)**