$\sqrt[4]{125}$

$3 < \sqrt[4]{125} < 4$

16

81 $\quad 3^4$

256 $\quad 4^4$

9 $\quad \sqrt{x^5} = x^{5/2}$

31 $\quad 64^{-2/3}$

$\frac{1}{(4^3)^{2/3}}$

$\frac{1}{16}$

$\frac{1}{(\sqrt[3]{64})^2} = \frac{1}{16}$

$$128^{5/7}$$

$$(2^7)^{5/7}$$

$$32$$

3.2: Operations with rational exponents
Skip #9 and #10

Simplify

a.) $\sqrt[3]{64} = 4$

b.) $\sqrt[5]{-243} = -3$

c.) $\sqrt[4]{-81}$ = nonreal

d.) $\sqrt{18} = 3\sqrt{2}$

e.) $\sqrt[3]{24}$

$\sqrt[3]{8} \cdot \sqrt[3]{3}$

$2\sqrt[3]{3}$

$\sqrt[3]{2 \cdot 2 \cdot 2 \cdot 3}$

$2\sqrt[3]{3}$

f.) $\sqrt[5]{-96} = \sqrt[5]{-32} \cdot \sqrt[5]{3} = -2\sqrt[5]{3}$

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

g.) $\sqrt[5]{128} = \sqrt[5]{32} \cdot \sqrt[5]{4} = 2\sqrt[5]{4}$

h.) $\sqrt[3]{81} = \sqrt[3]{27} \cdot \sqrt[3]{3} = 3\sqrt[3]{3}$

Operations:

Adding/subtracting - you must have like radicals (which means same index and radicand) $2\sqrt[4]{5} + 3\sqrt[4]{5}$

Multiplication/Division - the index must be the same $\sqrt[3]{12} \cdot \sqrt[3]{4}$

Perform the indicated operation

a) $\sqrt[4]{10} + 7\sqrt[4]{10} = 8\sqrt[4]{10}$

b) $\sqrt[3]{12} \cdot \sqrt[3]{18} = \sqrt[3]{2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 2} = 3 \cdot 2 = 6$

c) $\sqrt[3]{54} - \sqrt[3]{2} =$

$\sqrt[3]{27} \cdot \sqrt[3]{2} - \sqrt[3]{2}$

$3\sqrt[3]{2} - \sqrt[3]{2}$

$2\sqrt[3]{2}$

d.) $\dfrac{\sqrt[3]{250}}{\sqrt[3]{2}} = \sqrt[3]{125} = 5$

e.) $\sqrt{\dfrac{7}{2}} \cdot \dfrac{\sqrt{2}}{\sqrt{2}} = \dfrac{\sqrt{14}}{2}$

f.) $\sqrt[3]{\frac{11}{2}} = \frac{\sqrt[3]{11}}{\sqrt[3]{2}} \left(\frac{\sqrt[3]{4}}{\sqrt[3]{4}}\right) = \frac{\sqrt[3]{44}}{\sqrt[3]{8}} = \frac{\sqrt[3]{44}}{2}$

g.) $\frac{\sqrt[4]{5}}{\sqrt[4]{10}} = \frac{1}{\sqrt[4]{2}} \cdot \frac{\sqrt[4]{8}}{\sqrt[4]{8}} = \frac{\sqrt[4]{8}}{\sqrt[4]{16}} = \frac{\sqrt[4]{8}}{2}$

h.) $\dfrac{2}{\sqrt[4]{9}} = \dfrac{2}{\sqrt[4]{3^2}} \cdot \left(\dfrac{\sqrt[4]{3^2}}{\sqrt[4]{3^2}}\right) = \dfrac{2\sqrt[4]{9}}{3}$

i.) $16^{1/4} \cdot 16^{3/2}$

$16^{\frac{1}{4}+\frac{3}{2}}$

$16^{7/4}$

$(2^4)^{7/4}$

128

$16^{1/4} \cdot 16^{3/2}$

$(2^4)^{1/4} \cdot (4^2)^{3/2}$

$2 \cdot 4^3$

$2 \cdot 64$

128

j.) $\left(6^{1/2} \cdot 8^{1/6}\right)^2$

$6^1 \cdot 8^{1/3}$

$6 \cdot 2$

12

$8^{1/3} = \sqrt[3]{8^1}$

k.) $\left(4^5 \cdot 4^3\right)^{-1/4}$

$\left(4^8\right)^{-1/4}$

4^{-2}

$\frac{1}{4^2}$

$\frac{1}{16}$

1) $\dfrac{3}{2^{1/3}} = \dfrac{3}{\sqrt[3]{2}} \cdot \dfrac{\sqrt[3]{4}}{\sqrt[3]{4}} = \dfrac{3\sqrt[3]{4}}{2}$

$\dfrac{3}{2^{1/3}} \cdot \left(\dfrac{2^{2/3}}{2^{2/3}}\right) = \dfrac{3 \cdot 2^{2/3}}{2^{1}}$?

$\dfrac{3 \cdot \sqrt[3]{2^2}}{2}$:)

$\dfrac{1}{3} + \square = 1$