7.4 Rational Exponents

$$\sqrt[2]{4^{1}} = 4^{\frac{1}{2}} \begin{matrix}\leftarrow \text{exponent} \\ \leftarrow \text{root}\end{matrix}$$

radical form   rational exponent

$\sqrt{4} = 2$ $4^{1/2} = 2$

$125^{1/3} = \sqrt[3]{125} = 5$

$16^{1/4} = 2$ $\sqrt[4]{16}$

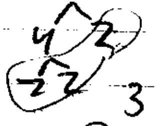
$8^{\frac{2}{3}} = \left(\sqrt[3]{8}\right)^{2} = 2^{2} = 4$

$2^{1/2} \cdot 2^{1/2}$

$= 2^{1} = \boxed{2}$

when multiplying powers w/ same base you add the exponents, the base stays the same!

$2^{1/2} \cdot 8^{1/2} = 2^{1/2} \cdot 2^{\frac{3}{2}} = 2^{\frac{4}{2}} = 2^{2} = \boxed{4}$



2^{3}

P. 388 - 389 (2 - 60 even, 65, 66
except 26, 28)

exponential Form

radical form

$$x^{\frac{3}{5}} = \left(\sqrt[5]{x}\right)^{3} = \sqrt[5]{x^{3}}$$

$$y^{-2.5} = y^{-\frac{5}{2}} = \frac{1}{y^{5/2}} = \boxed{\frac{1}{\sqrt[2]{y^{5}}}} \text{ OR } \boxed{\frac{1}{\left(\sqrt{y}\right)^{5}}}$$

no negative exponents

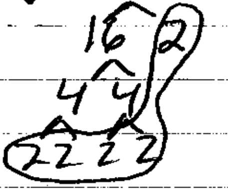
① $y^{-3/8} = \boxed{\frac{1}{\sqrt[8]{y^{3}}}}$

② $z^{0.4} = z^{\frac{2}{5}} = \boxed{\sqrt[5]{z^{2}}}$

Simplifying.

$$25^{-\frac{3}{2}} = \frac{1}{25^{3/2}} = \frac{1}{\left(\sqrt{25}\right)^{3}} = \frac{1}{5^{3}} = \boxed{\frac{1}{125}}$$

$$32^{\frac{3}{5}} = \left(\sqrt[5]{32}\right)^{3} = 2^{3} = 8$$



$$(-32)^{\frac{4}{5}} = \left(\sqrt[5]{-32}\right)^{4} = (-2)^{4} = \boxed{16}$$

$$-2\cdot -2\cdot -2\cdot -2\cdot -2$$

p.387 exponent rules

$$\left(8x^{15}\right)^{-\frac{1}{3}} = \frac{1}{\left(8x^{15}\right)^{1/3}} = \frac{1}{8^{1/3}x^{5}} = \boxed{\frac{1}{2x^{5}}}$$