

R7 Radical Expressions

Day 1

①

Ex 1 Evaluating Roots

(a) $\sqrt[4]{16} = 16^{\frac{1}{4}}$

(b) $-\sqrt[4]{16} = -2$

(c) $\sqrt[5]{-32} = -2$

$$(-2)(-2)(-2)(-2)(-2)$$

$$\begin{array}{c} \vee \qquad \qquad \vee \\ 4 \qquad \qquad +4 \end{array}$$

(d) $\sqrt[3]{1000} = 10$

$$+16 \qquad (-2)$$

$$\begin{array}{c} \vee \\ +16 \end{array} \qquad \boxed{-32}$$

(e) $\sqrt[6]{\frac{64}{729}} = \frac{2}{3}$

(f) $\sqrt[4]{-16}$ Non Real

$$(-2)(-2)(-2)(-2)$$

$$\begin{array}{c} 4 \qquad \qquad 4 \\ \vee \\ +16 \end{array}$$

Ex 2 Rational Exp \rightarrow Radical

(g) $8^{\frac{2}{3}} = \sqrt[3]{8^2} = \sqrt[3]{8^2}$

$$2^2 = \boxed{4}$$

$$R7 \quad (b) \quad (-32)^{\frac{4}{5}} = \sqrt[5]{-32^4} \\ = (-2)^4 = 16$$

$$\downarrow \left[(-32)^{\frac{1}{5}} \right]^4 = (-2)^4 = +16$$

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

$$(d) \quad x^{\frac{5}{6}} = \sqrt[6]{x^5}$$

Ex 3 Radicals \rightarrow Exponents

$$(a) \quad \sqrt[4]{x^5} = x^{\frac{5}{4}}$$

$$(b) \quad \sqrt{3y} = (3y)^{\frac{1}{2}}$$

$$(c) \quad 10(\sqrt[5]{z})^2 = 10z^{\frac{2}{5}}$$

$$(d) \quad \sqrt{p^2+q} = (p^2+q)^{\frac{1}{2}}$$

$$\sqrt{q} = q^{\frac{1}{2}}$$

$$\frac{1}{2} \sqrt{p^2 q} = (p^2)^{\frac{1}{2}} q^{\frac{1}{2}} = p q^{\frac{1}{2}}$$