Exercise 2.3

Q1. Write each radical expression in exponential notation and each exponential expression in radical notation. Do not simplify.

(i) $\sqrt[3]{-64} = (-64)^{1/3}$

(ii) $2^{3/5} = \left(2^3\right)^{1/5} = \sqrt[5]{2^3}$

(iii) $-7^{1/3} = -\sqrt[3]{7}$

(iv) $y^{-2/3} = \left(y^{-2}\right)^{1/3} = \sqrt[3]{y^{-2}}$

Q2. Tell whether the following statements are true or false?

(i) $5^{1/5} = \sqrt{5}$ **False**

(ii) $2^{2/3} = \sqrt[3]{4}$ **True**

(iii) $\sqrt{49} = \sqrt{7}$ **False**

(iv) $\sqrt[3]{x^{27}} = x^3$ **False**

Q3. Simplify the following radical expressions.

(i) $\sqrt[3]{-125} = (-125)^{1/3}$

$= \left[(-5)^3\right]^{1/3} = (-5)^{3\times\frac{1}{3}}$

$= -5$

(ii) $\sqrt[4]{32} = \sqrt[4]{16\times 2}$

$= \sqrt[4]{16}\times\sqrt[4]{2}$

$$= \left(2^4\right)^{\frac{1}{4}} \sqrt[4]{2}$$

$$= 2^{4\times\frac{1}{4}} \sqrt[4]{2}$$

$$= 2\left(\sqrt[4]{2}\right)$$

(iii) $\sqrt[5]{\dfrac{3}{32}}$

$$= \frac{\sqrt[5]{3}}{\sqrt[5]{32}}$$

$$= \frac{\sqrt[5]{3}}{\left(2^5\right)^{\frac{1}{5}}}$$

$$= \frac{\sqrt[5]{3}}{2^{5\times\frac{1}{5}}}$$

$$= \frac{\sqrt[5]{3}}{2}$$

(iv) $\sqrt[3]{\dfrac{-8}{27}}$

$$= \left(\frac{-8}{27}\right)^{\frac{1}{3}}$$

$$= \left[\left(\frac{-2}{3}\right)^3\right]^{\frac{1}{3}}$$

$$= \left(\frac{-2}{3}\right)^{3\times\frac{1}{3}} \qquad = \frac{-2}{3}$$