# Exercise 2.3

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

**Solution:**

(1) $\sqrt{64} = 64^{\frac{1}{2}}$

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

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

(4) $y^{\frac{-2}{3}} = (y^{-2})^{\frac{1}{3}} = \sqrt[3]{y^{-2}}$

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

(1) $5^{\frac{1}{5}} = \sqrt{5}$

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

(3) $\sqrt{49} = \sqrt{7}$

(4) $\sqrt[3]{x^{27}} = x^3$

**Solution:**

(1) False

(2) True

(3) False

(4) False

**Q3. Simplify the following radical expression.**

$= \sqrt[3]{-125}$

$= \sqrt[3]{(-5)^3}$

$= (-5)^{3\times\frac{1}{3}}$

$= -5$

**(2)** $\sqrt[4]{32}$

**Solution:**

$= \sqrt[4]{2^5}$

$= \sqrt[4]{2.2^4}$

$= \sqrt[4]{2}.\sqrt[4]{2^4}$

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

$= \sqrt[4]{2}.2$

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

**(3)** $\sqrt[5]{\frac{3}{32}}$

**Solution:**

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

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

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

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

**(4)** $\sqrt[3]{-\frac{8}{27}}$

**Solution:**

$$= \sqrt[3]{-\frac{8}{27}}$$

$$= \sqrt[3]{\left(-\frac{8}{27}\right)^3}$$

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

$$= -\frac{2}{3}$$