

Module 5B : Exponents, Logarithms, and Miscellaneous Topics
SECTION 1 : Simplify terms with rational exponents.

Radical notation: x is a real number, and n and m are integers

$$x^{m/n} = (\sqrt[n]{x})^m = \sqrt[n]{x^m}$$

Rules for Radicals: Let x and y be real numbers, and m and n be positive integers.

- $\sqrt[n]{x} \sqrt[n]{y} = \sqrt[n]{xy}$
- $\frac{\sqrt[n]{x}}{\sqrt[n]{y}} = \sqrt[n]{\frac{x}{y}}$, where y is not equal to zero
- $\sqrt[m]{\sqrt[n]{x}} = \sqrt[mn]{x}$

To simplify a radical, remove all perfect roots that are factors.

EXERCISE 3

Simplify: a) $(a^6)^{\frac{1}{3}}$

b) $(8a^6)^{\frac{2}{3}}$

SOLUTION:

a) $(a^6)^{\frac{1}{3}} = a^{6(\frac{1}{3})} = a^2$

b) $(8a^6)^{\frac{2}{3}} = (8)^{\frac{2}{3}} (a^6)^{\frac{2}{3}} = \sqrt[3]{8^2} \sqrt[3]{a^6^2} = 2^2 (a^2)^2 = 4a^4$

SECTION 2 : Rationalize a denominator.

EXERCISE 4

Rationalize the denominator. $\frac{2x}{3\sqrt{y}}$

SOLUTION:

$$\frac{2x}{3\sqrt{y}} = \frac{2x}{3\sqrt{y}} \cdot \frac{\sqrt{y}}{\sqrt{y}} = \frac{2x\sqrt{y}}{3y}$$

MODULE 5B - ASSESSMENT

_____4. Simplify $(27a^{12})^{\frac{4}{3}}$

- A** $81a^{\frac{40}{3}}$ **B** $27a^{\frac{40}{3}}$ **C** $27a^{16}$ **D** $81a^{16}$ **E** I do not know

_____5. Simplify $\frac{5x}{4\sqrt{y}}$

- A** $\frac{5x}{4y}$ **B** $\frac{5x\sqrt{y}}{4y}$ **C** $\frac{25x^2}{16y}$ **D** $\frac{5x\sqrt{y}}{4}$ **E** I do not know