UNIT 5 Ch 4 : Radicals

A Radical : $\sqrt[n]{x}$ (Index: n; Radicand: x)

$\sqrt{x}$ = square root

$\sqrt[3]{x}$ = cube root

$\sqrt[4]{x}$ = fourth root

$\sqrt[5]{x}$ = fifth root

4.1 Mixed and Entire Radicals

$\sqrt{20}$ → entire radical

$2\sqrt{5}$ → mixed radical

Changing from a mixed radical to an entire radical :

→ raise the number in front of the radical sign to the power matching the index and then multiply by the radicand.

Ex: $3\sqrt{2} = \sqrt{3^2 \cdot 2} = \sqrt{9 \cdot 2} = \sqrt{18}$

Ex: $5\sqrt{3} = \sqrt{5^2 \cdot 3} = \sqrt{25 \cdot 3} = \sqrt{75}$

Ex: $2\sqrt[3]{5} = \sqrt[3]{2^3 \cdot 5} = \sqrt[3]{8 \cdot 5} = \sqrt[3]{40}$

Ex: $3\sqrt[4]{2} = \sqrt[4]{3^4 \cdot 2} = \sqrt[4]{81 \cdot 2} = \sqrt[4]{162}$

Changing from an entire radical to a mixed radical.

using prime factors:

Ex: $\sqrt{20} = \sqrt{2 \cdot 2 \cdot 5} = \sqrt{2^2 \cdot 5} = 2\sqrt{5}$

Ex: $\sqrt{288} = \sqrt{2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3}$

$= \sqrt{2^2 \times 2^2 \times 2 \times 3^2}$

$= 2 \cdot 2 \cdot 3\sqrt{2}$

$= 12\sqrt{2}$

Ex: $\sqrt[3]{54} = \sqrt[3]{3 \cdot 3 \cdot 3 \cdot 2}$

$= \sqrt[3]{3^3 \cdot 2} = 3\sqrt[3]{2}$

without using prime factors:

Ex: $\sqrt{288} = \sqrt{144 \cdot 2} = \sqrt{12^2 \cdot 2}$

$= 12\sqrt{2}$

Ex: $\sqrt[3]{40} = \sqrt[3]{8 \cdot 5} = \sqrt[3]{2^3 \cdot 5} = 2\sqrt[3]{5}$

Page 182 #4-8