

5.1 Radicals

$\sqrt{32}$ "entire radical"

$\sqrt{16} \sqrt{2}$

$4\sqrt{2}$ "mixed" radical

$2\sqrt{3}, 7\sqrt{3}$ "like" radicals

$3\sqrt{2}, 5\sqrt{3}$ "unlike" radicals

① Converting mixed radicals to entire radicals

(a) $4\sqrt{3}$

$$= \sqrt{4^2} \sqrt{3}$$

$$\sqrt{16} \sqrt{3}$$

$$\sqrt{48}$$

b) $x^3\sqrt{x}$

$$\sqrt{(x^3)^2} \sqrt{x}$$

$$\sqrt{x^6} \sqrt{x}$$

$$\sqrt{x^7}$$

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$$c) x^2 \sqrt[3]{x}$$

$$\sqrt[3]{(x^2)^3} \sqrt[3]{x}$$

$$\sqrt[3]{x^6} \sqrt[3]{x}$$

$$\sqrt[3]{x^7}$$

$$d) 2k^2 \sqrt[3]{4k}$$

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

$$\sqrt[3]{8k^6} \sqrt[3]{4k}$$

$$\sqrt[3]{32k^7}$$

② Converting entire radicals to mixed radicals

a) $\sqrt{52}$
 $\sqrt{4} \sqrt{13}$
 $2\sqrt{13}$

4, 9, 16, 25, 36...

b) $\sqrt{300}$

$\sqrt{100} \sqrt{3}$
 $10\sqrt{3}$

$\sqrt{4} \sqrt{75}$
 $2\sqrt{75}$
 $2\sqrt{25} \sqrt{3}$
 $2 \cdot 5 \sqrt{3}$
 $10\sqrt{3}$

$\sqrt{25} \sqrt{12}$
 $5\sqrt{12}$
 $5\sqrt{4} \sqrt{3}$
 $5 \cdot 2\sqrt{3}$
 $10\sqrt{3}$

$$\begin{aligned} c) \quad & \sqrt{75} \\ & \sqrt{25} \sqrt{3} \\ & 5\sqrt{3} \end{aligned}$$

$$m^3 \cdot m^3$$

$$\begin{aligned} & \sqrt{m^6} \sqrt{m^3} \\ & m^3 \sqrt{m^3} \\ & m^3 \sqrt{m^2} \sqrt{m} \\ & m^3 \cdot m \sqrt{m} \end{aligned}$$

$$\begin{aligned} d) \quad & \sqrt{m^9} \\ & \sqrt{m^8} \sqrt{m} \\ & m^4 \sqrt{m} \end{aligned}$$

$$e) \sqrt[4]{m^7}$$

$$\sqrt[4]{m^4} \quad \sqrt[4]{m^3}$$

$$m \quad \sqrt[4]{m^3}$$

$$f) \sqrt{63n^7p^4}$$

$$\sqrt{9n^6p^4} \quad \sqrt{7n}$$

$$3n^3p^2 \quad \sqrt{7n}$$

③ order from least to greatest

$$\begin{array}{cccc} 5 & 3\sqrt{3} & 2\sqrt{6} & \sqrt{23} \\ \sqrt{25} & \sqrt{9}\sqrt{3} & \sqrt{4}\sqrt{6} & \\ & \sqrt{27} & \sqrt{24} & \end{array}$$

$$\sqrt{23}, 2\sqrt{6}, 5, 3\sqrt{3}$$

least greatest.

④ adding + subtracting radicals

$$a) 2\sqrt{7} + 13\sqrt{7}$$

$$15\sqrt{7}$$

$$b) 3\sqrt{2} + 5\sqrt{3}$$

$$\underline{3\sqrt{2} + 5\sqrt{3}}$$

$$3x + 5y = 3x + 5y$$

$$c) \sqrt{50} + \sqrt{72}$$

$$\sqrt{25}\sqrt{2} + \sqrt{36}\sqrt{2}$$

$$5\sqrt{2} + 6\sqrt{2}$$

$$11\sqrt{2}$$

$$d) \sqrt{24} - \sqrt{6}$$

$$\sqrt{4}\sqrt{6} - \sqrt{6}$$

$$2\sqrt{6} - \sqrt{6}$$

$$\sqrt{6}$$

$$e) \sqrt{20x} - 3\sqrt{45x}$$

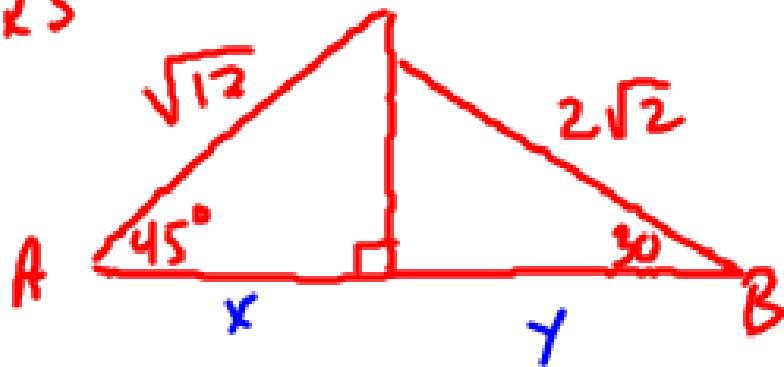
$$\sqrt{4}\sqrt{5x} - 3\sqrt{9}\sqrt{5x}$$

$$2\sqrt{5x} - 3 \cdot 3\sqrt{5x}$$

$$2\sqrt{5x} - 9\sqrt{5x}$$

$$-7\sqrt{5x}$$

ex 5



Find the length of AB

$$\cos 45 = \frac{x}{\sqrt{12}}$$

$$x = \sqrt{12} \cos 45$$

$$x = \frac{\sqrt{4} \sqrt{3}}{2\sqrt{3}} \cdot \frac{\sqrt{2}}{2}$$

$$x = \sqrt{6}$$

$$\cos 30 = \frac{y}{2\sqrt{2}}$$

$$y = 2\sqrt{2} \cos 30$$

$$y = 2\sqrt{2} \cdot \frac{\sqrt{3}}{2}$$
$$y = \sqrt{6}$$

$$\neq \cos 45 = \frac{\sqrt{2}}{2}$$

$$\neq \cos 30 = \frac{\sqrt{3}}{2}$$

$$AB = x + y \quad AB = 2\sqrt{6}$$

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