

5.1b Adding & Subtracting Radicals

Like radicals are terms with the same radicand and index number.

Only like radicals can be combined.

Note: Radicals may have to be simplified to identify like radicals

Ex. Simplify

$$a) 2\sqrt{14} + 8\sqrt{14} - 3\sqrt{14} = 7\sqrt{14}$$

$$b) \sqrt{48} - \sqrt{3}$$

$$4\sqrt{3} - \sqrt{3} = 3\sqrt{3}$$

$$c) 2\sqrt{12} + 3\sqrt{50} - 2\sqrt{75} - 6\sqrt{32}$$

$$2(2\sqrt{3}) + 3(5\sqrt{2}) - 2(5\sqrt{3}) - 6(4\sqrt{2})$$

$$4\sqrt{3} + 15\sqrt{2} - 10\sqrt{3} - 24\sqrt{2} = -6\sqrt{3} - 9\sqrt{2}$$

$$d) \sqrt{9x} - 2\sqrt{16x}$$

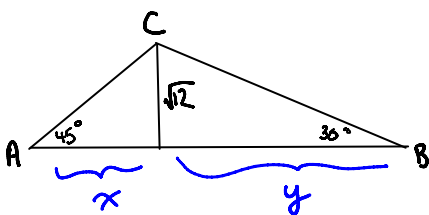
$$3\sqrt{x} - 2(4\sqrt{x}) = 3\sqrt{x} - 8\sqrt{x} = -5\sqrt{x}$$

$$e) -\frac{1}{5}\sqrt[3]{125x} + \sqrt[3]{125x^4}$$

$$-\frac{1}{5}(\frac{5}{1}\sqrt[3]{x}) + 5x\sqrt[3]{x}$$

$$-\sqrt[3]{x} + 5x\sqrt[3]{x} = (-1 + 5x)\sqrt[3]{x}$$

Ex. Determine the exact length of AB



$$\tan 45^\circ = \frac{\sqrt{2}}{x}$$

$$1 = \frac{\sqrt{2}}{x}$$

$$x = \sqrt{2}$$

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

$$\tan 30^\circ = \frac{\sqrt{2}}{y}$$

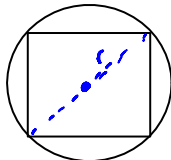
$$\frac{1}{\sqrt{3}} = \frac{\sqrt{2}}{y}$$

$$y = \sqrt{36}$$

$$y = 6$$

$$AB = 2\sqrt{3} + 6$$

Ex. A circle is inscribed inside a square. The area of the circle is 54 cm^2 .



a) What is the radius of the circle in exact form?

$$A = 54\pi$$

$$\cancel{\pi}r^2 = 54\cancel{\pi}$$

$$r = \sqrt{54} \text{ or } 3\sqrt{6}$$

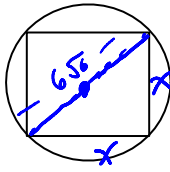
← note

$$d = 2r$$

$$d = 2(3\sqrt{6})$$

$$d = 6\sqrt{6}$$

b) What is the length of one side of the square?



$$x^2 + x^2 = (6\sqrt{6})^2$$

$$2x^2 = 6\sqrt{6} \times 6\sqrt{6}$$

$$2x^2 = 216$$

$$x^2 = 108$$

$$x = \sqrt{108} = 6\sqrt{3}$$

Alt method



$$\sin 45 = \frac{x}{6\sqrt{6}}$$

$$\frac{1}{\sqrt{2}} = \frac{x}{6\sqrt{6}}$$

$$\sqrt{2}x = 6\sqrt{6}$$

$$x = \frac{6\sqrt{6}}{\sqrt{2}}$$

$$x = 6\sqrt{3}$$

Assignment: Adding & Subtracting Radicals Worksheet