

Topic: Surds

08.01

$$\begin{aligned} & \sqrt{40} + 4\sqrt{10} + \sqrt{90} \\ &= \sqrt{4}\sqrt{10} + 4\sqrt{10} + \sqrt{9}\sqrt{10} \\ &= 2\sqrt{10} + 4\sqrt{10} + 3\sqrt{10} \\ &= \underline{\underline{9\sqrt{10}}} \end{aligned}$$

08.02

$$\begin{aligned} & 2\sqrt{20} - 3\sqrt{5} \\ &= 2 \times \sqrt{4}\sqrt{5} - 3\sqrt{5} \\ &= 2 \times 2\sqrt{5} - 3\sqrt{5} \\ &= 4\sqrt{5} - 3\sqrt{5} \\ &= \underline{\underline{\sqrt{5}}} \end{aligned}$$

08.03

$$\begin{aligned} & 2\sqrt{75} \\ &= 2 \times \sqrt{3}\sqrt{25} \\ &= 2 \times 5\sqrt{3} \\ &= \underline{\underline{10\sqrt{3}}} \end{aligned}$$

08.04

$$\begin{aligned} & \frac{\sqrt{24}}{\sqrt{2}} \\ &= \frac{\sqrt{4}\sqrt{6}}{\sqrt{2}} \\ &= \frac{2\sqrt{6}}{\sqrt{2}} = \frac{2\sqrt{3}\sqrt{2}}{\sqrt{2}} \\ &= \underline{\underline{2\sqrt{3}}} \end{aligned}$$

08.05

$$\begin{aligned} & \sqrt{27} + 2\sqrt{3} \\ &= \sqrt{9}\sqrt{3} + 2\sqrt{3} \\ &= 3\sqrt{3} + 2\sqrt{3} \\ &= \underline{\underline{5\sqrt{3}}} \end{aligned}$$

08.06

$$\begin{aligned} & \sqrt{18} - \sqrt{2} \\ &= \sqrt{9}\sqrt{2} - \sqrt{2} \\ &= 3\sqrt{2} - \sqrt{2} \\ &= \underline{\underline{2\sqrt{2}}} \end{aligned}$$

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08.07

$$\begin{aligned} & \sqrt{2}(\sqrt{6} - \sqrt{2}) \\ &= \sqrt{12} - \sqrt{4} \\ &= \sqrt{4}\sqrt{3} - 2 \\ &= \underline{2\sqrt{3} - 2} \end{aligned}$$

08.08

$$\begin{aligned} & \sqrt{72} - \sqrt{2} + \sqrt{50} \\ &= \sqrt{36}\sqrt{2} - \sqrt{2} + \sqrt{25}\sqrt{2} \\ &= 6\sqrt{2} - \sqrt{2} + 5\sqrt{2} \\ &= \underline{\underline{10\sqrt{2}}} \end{aligned}$$

08.09

$$\begin{aligned} & \sqrt{32} + \sqrt{8} \\ &= \sqrt{16}\sqrt{2} + \sqrt{4}\sqrt{2} \\ &= 4\sqrt{2} + 2\sqrt{2} \\ &= \underline{\underline{6\sqrt{2}}} \end{aligned}$$

08.10

$$\begin{aligned} & 2\sqrt{5} + \sqrt{20} - \sqrt{45} \\ &= 2\sqrt{5} + \sqrt{4}\sqrt{5} - \sqrt{9}\sqrt{5} \\ &= 2\sqrt{5} + 2\sqrt{5} - 3\sqrt{5} \\ &= 4\sqrt{5} - 3\sqrt{5} \\ &= \underline{\underline{\sqrt{5}}} \end{aligned}$$

08.11

$$\begin{aligned} & \sqrt{63} + \sqrt{28} - \sqrt{7} \\ &= \sqrt{9}\sqrt{7} + \sqrt{4}\sqrt{7} - \sqrt{7} \\ &= 3\sqrt{7} + 2\sqrt{7} - \sqrt{7} \\ &= 5\sqrt{7} - \sqrt{7} \\ &= 4\sqrt{7} \end{aligned}$$

08.12

$$\begin{aligned} & \sqrt{45} - 2\sqrt{5} \\ &= \sqrt{9}\sqrt{5} - 2\sqrt{5} \\ &= 3\sqrt{5} - 2\sqrt{5} \\ &= \underline{\underline{\sqrt{5}}} \end{aligned}$$

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08.13

$$\begin{aligned} & \frac{\sqrt{40}}{\sqrt{2}} \\ &= \frac{\sqrt{20}\sqrt{2}}{\sqrt{2}} \\ &= \sqrt{20} \\ &= \sqrt{4}\sqrt{5} \\ &= \underline{\underline{2\sqrt{5}}} \end{aligned}$$

08.14

$$\begin{aligned} & \sqrt{12} + 5\sqrt{3} - \sqrt{27} \\ &= \sqrt{4}\sqrt{3} + 5\sqrt{3} - \sqrt{9}\sqrt{3} \\ &= 2\sqrt{3} + 5\sqrt{3} - 3\sqrt{3} \\ &= \underline{\underline{4\sqrt{3}}} \end{aligned}$$

08.15

$$\begin{aligned} & \sqrt{2}(\sqrt{3} + \sqrt{2}) - \sqrt{6} \\ &= \sqrt{6} + \sqrt{4} - \sqrt{6} \\ &= \sqrt{4} \\ &= \underline{\underline{2}} \end{aligned}$$

08.16

$$\begin{aligned} \textcircled{1} & 2\sqrt{6} = \cancel{2\sqrt{3}} \\ \textcircled{2} & \sqrt{2} \times \sqrt{12} = \sqrt{24} = \sqrt{4}\sqrt{6} \\ & \quad \quad \quad = 2\sqrt{6} \\ \textcircled{3} & 3\sqrt{8} = 3\sqrt{4}\sqrt{2} = 3 \times 2\sqrt{2} \\ & \quad \quad \quad = \cancel{2\sqrt{8}} 6\sqrt{2} \\ \textcircled{4} & \sqrt{24} = \sqrt{4}\sqrt{6} = 2\sqrt{6} \\ \textcircled{3} & \text{ has a different value} \\ & \text{ since } 2\sqrt{6} \neq 6\sqrt{2} \end{aligned}$$

08.17

$$\begin{aligned} & \frac{3}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} \\ &= \frac{3\sqrt{5}}{\sqrt{25}} \\ &= \frac{3\sqrt{5}}{5} \end{aligned}$$

08.18

$$\begin{aligned} & \frac{4}{\sqrt{8}} \times \frac{\sqrt{8}}{\sqrt{8}} \\ &= \frac{4\sqrt{8}}{\sqrt{64}} = \frac{4\sqrt{4}\sqrt{2}}{8} \\ & \quad \quad \quad = \frac{4 \times 2\sqrt{2}}{8} \\ & \quad \quad \quad = \frac{8\sqrt{2}}{8} \\ & \quad \quad \quad = \sqrt{2} \end{aligned}$$

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08.19

$$\begin{aligned}\frac{\sqrt{3}}{\sqrt{24}} &= \frac{\sqrt{3}}{\sqrt{8 \times 3}} \\ &= \frac{\sqrt{3}}{\sqrt{8} \times \sqrt{3}} \\ &= \frac{1}{\sqrt{8}} \times \frac{\sqrt{8}}{\sqrt{8}} \\ &= \frac{\sqrt{8}}{8} = \frac{\sqrt{4} \sqrt{2}}{8} \\ &= \frac{\sqrt{2}}{4}\end{aligned}$$

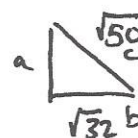
08.20

$$\begin{aligned}\frac{7}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} \\ &= \frac{7\sqrt{2}}{\sqrt{4}} \\ &= \frac{7\sqrt{2}}{2}\end{aligned}$$

08.21

$$\begin{aligned}\frac{12}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} \\ &= \frac{12\sqrt{2}}{\sqrt{4}} = \frac{12\sqrt{2}}{2} \\ &= 6\sqrt{2}\end{aligned}$$

08.22



$$\begin{aligned}a^2 &= c^2 - b^2 \\ a^2 &= (\sqrt{50})^2 - (\sqrt{32})^2 \\ a^2 &= 50 - 32 = 18 \\ a^2 &= 18 \\ a &= \sqrt{18} = \sqrt{9} \sqrt{2} = \underline{\underline{3\sqrt{2}}}\end{aligned}$$

08.23

$$\begin{aligned}a^2 &= c^2 - b^2 \\ a^2 &= 8^2 - 4^2 \\ a^2 &= 64 - 16 \\ a^2 &= 48 \\ a &= \sqrt{48} \\ &= \sqrt{16} \sqrt{3} \\ a &= 4\sqrt{3}\end{aligned}$$

08.24

$$\begin{aligned}A &= l \times b \\ &= 2\sqrt{3} \times \sqrt{6} \\ &= 2\sqrt{18} \\ &= 2 \times \sqrt{9} \sqrt{2} \\ &= 2 \times 3\sqrt{2} \\ &= \underline{\underline{6\sqrt{2} \text{ cm}^2}}\end{aligned}$$

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08.25

$$x^2 = 7^2 + 1^2$$

$$x^2 = 49 + 1$$

$$x^2 = 50$$

$$x = \sqrt{50}$$

$$x = \sqrt{25} \sqrt{2}$$

$$x = 5\sqrt{2}$$