



National 5 Mathematics

Surds - Solutions

Marks are indicated in brackets after each question number

2014 Paper 1 Question 8, (3)

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

2015 Paper 1 Question 13, (3)

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

2016 Paper 1 Question 9, (2)

$$\begin{aligned}f(5) &= \frac{2}{\sqrt{5}} \\ &= \frac{2}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} \\ &= \frac{2\sqrt{5}}{5}\end{aligned}$$

2018 Paper 1 Question 11, (2)

$$\begin{aligned}\frac{9}{\sqrt{6}} &= \frac{9}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}} \\ &= \frac{9\sqrt{6}}{6} \\ &= \frac{3\sqrt{6}}{2}\end{aligned}$$



2019 Paper 1 Question 12, (3)

$$\begin{aligned}\frac{\sqrt{2}}{\sqrt{40}} &= \frac{\sqrt{2}}{\sqrt{2}\sqrt{20}} \\ &= \frac{1}{\sqrt{20}} \\ &= \frac{1}{\sqrt{20}} \times \frac{\sqrt{20}}{\sqrt{20}} \\ &= \frac{\sqrt{20}}{20} \\ &= \frac{\sqrt{4}\sqrt{5}}{20} \\ &= \frac{2\sqrt{5}}{20} \\ &= \frac{\sqrt{5}}{10}\end{aligned}$$

2022 Paper 1 Question 13, (3)

$$\begin{aligned}\sqrt{10}(\sqrt{10} - \sqrt{2}) + 8\sqrt{5} \\ &= 10 - \sqrt{20} + 8\sqrt{5} \\ &= 10 - \sqrt{4}\sqrt{5} + 8\sqrt{5} \\ &= 10 - 2\sqrt{5} + 8\sqrt{5} \\ &= 10 + 6\sqrt{5}\end{aligned}$$

2023 Paper 1 Question 8, (2)

$$\begin{aligned}\frac{12}{\sqrt{15}} &= \frac{12}{\sqrt{15}} \times \frac{\sqrt{15}}{\sqrt{15}} \\ &= \frac{12\sqrt{15}}{15} \\ &= \frac{4\sqrt{15}}{5}\end{aligned}$$

2024 Question 6, (2)

$$\begin{aligned}\sqrt{75} - \sqrt{3} &= \sqrt{25}\sqrt{3} - \sqrt{3} \\ &= 5\sqrt{3} - \sqrt{3} \\ &= 4\sqrt{3}\end{aligned}$$



2025 Paper 1 Question 12, (2)

$$\begin{aligned}\frac{6}{\sqrt{10}} &= \frac{6}{\sqrt{10}} \times \frac{\sqrt{10}}{\sqrt{10}} \\ &= \frac{6\sqrt{10}}{10} \\ &= \frac{3\sqrt{10}}{5}\end{aligned}$$