

Surds and Indices

- GCSE Revision

Exercise A

$$\begin{aligned} 1. \quad 6\sqrt{75} &= 6 \times \sqrt{25} \times \sqrt{3} \\ &= \underline{\underline{30\sqrt{3}}} \end{aligned}$$

$$\begin{aligned} 2. \quad \sqrt{8} - 6\sqrt{18} + 3\sqrt{72} - 5\sqrt{50} \\ &= \sqrt{4}\sqrt{2} - 6\sqrt{9}\sqrt{2} + 3\sqrt{36}\sqrt{2} - 5\sqrt{25}\sqrt{2} \\ &= 2\sqrt{2} - 18\sqrt{2} + 18\sqrt{2} - 25\sqrt{2} \\ &= \underline{\underline{-23\sqrt{2}}} \end{aligned}$$

$$\begin{aligned} 3. \quad 3\sqrt{72} &= 3\sqrt{36}\sqrt{2} \\ &= \underline{\underline{18\sqrt{2}}} \\ k &= \underline{\underline{18}} \end{aligned}$$

$$\begin{aligned} 4. \quad (2\sqrt{3} - 5)(3\sqrt{3} - 2) &= 6 \times 3 - 4\sqrt{3} - 15\sqrt{3} + 10 \\ &= \underline{\underline{28 - 19\sqrt{3}}} \end{aligned}$$

5.

$$\begin{aligned} (a) \quad \frac{\sqrt{2}}{5\sqrt{3}} &= \frac{\sqrt{2} \times \sqrt{3}}{5\sqrt{3} \times \sqrt{3}} \\ &= \frac{\sqrt{6}}{\underline{\underline{15}}} \end{aligned}$$

$$\begin{aligned} (b) \quad \frac{2}{5+\sqrt{3}} &= \frac{2(5-\sqrt{3})}{(5+\sqrt{3})(5-\sqrt{3})} \\ &= \frac{2(5-\sqrt{3})}{25-3} = \frac{2(5-\sqrt{3})}{22} = \frac{5-\sqrt{3}}{11} // \end{aligned}$$

$$\begin{aligned}
 (c) \quad \frac{2\sqrt{5}-3}{4\sqrt{5}-3} &= \frac{(2\sqrt{5}-3)(4\sqrt{5}+3)}{(4\sqrt{5}-3)(4\sqrt{5}+3)} \\
 &= \frac{8 \times 5 + 6\sqrt{5} - 12\sqrt{5} - 9}{16 \times 5 - 9} \\
 &= \frac{31 - 6\sqrt{5}}{71} \\
 &= \frac{31}{71} - \frac{6}{71}\sqrt{5}
 \end{aligned}$$

Exercise B

①

$$\begin{aligned}
 (a) \quad 3^{-2} &= \frac{1}{3^2} \\
 &= \frac{1}{9}
 \end{aligned}$$

$$\begin{aligned}
 (e) \quad 8^{-4/3} &= (\sqrt[3]{8})^{-4} \\
 &= 2^{-4} \\
 &= \frac{1}{2^4}
 \end{aligned}$$

$$\begin{aligned}
 (b) \quad 8^{1/3} &= \sqrt[3]{8} \\
 &= \underline{\underline{2}}
 \end{aligned}$$

$$= \frac{1}{16}$$

$$\begin{aligned}
 (c) \quad 16^{3/4} &= (\sqrt[4]{16})^3 \\
 &= 2^3 \\
 &= \underline{\underline{8}}
 \end{aligned}$$

② (a) $\left(\frac{2}{5}\right)^{-3} = \left(\frac{5}{2}\right)^3$

$$= \frac{125}{8}$$

$$\begin{aligned}
 (d) \quad 36^{-1/2} &= \frac{1}{36^{1/2}} \\
 &= \frac{1}{\sqrt{36}} \\
 &= \underline{\underline{\frac{1}{6}}}
 \end{aligned}$$

$$(b) \left(\frac{4}{9}\right)^{1/2} = \sqrt{\frac{4}{9}} = \underline{\underline{\frac{2}{3}}}$$

$$\begin{aligned}
 (c) \quad \left(\frac{64}{125}\right)^{-2/3} &= \left(\frac{125}{64}\right)^{2/3} \\
 &= \frac{(\sqrt[3]{125})^2}{(\sqrt[3]{64})^2} \\
 &= \frac{2.5}{16} //
 \end{aligned}$$