Surds and Indices
- GCSE Revision

Exercise A

1. $6\sqrt{75} = 6 \times \sqrt{25} \times \sqrt{3}$

$= \underline{30\sqrt{3}}$

2. $\sqrt{8} - 6\sqrt{18} + 3\sqrt{72} - 5\sqrt{50}$

$= \sqrt{4}\sqrt{2} - 6\sqrt{9}\sqrt{2} + 3\sqrt{36}\sqrt{2} - 5\sqrt{25}\sqrt{2}$

$= 2\sqrt{2} - 18\sqrt{2} + 18\sqrt{2} - 25\sqrt{2}$

$= \underline{-23\sqrt{2}}$

3. $3\sqrt{72} = 3\sqrt{36}\sqrt{2}$

$= \underline{18\sqrt{2}}$

$\underline{k = 18}$

4. $(2\sqrt{3} - 5)(3\sqrt{3} - 2) = 6 \times 3 - 4\sqrt{3} - 15\sqrt{3} + 10$

$= \underline{28 - 19\sqrt{3}}$

5.

(a) $\dfrac{\sqrt{2}}{5\sqrt{3}} = \dfrac{\sqrt{2} \times \sqrt{3}}{5\sqrt{3} \times \sqrt{3}}$

$= \underline{\dfrac{\sqrt{6}}{15}}$

(b) $\dfrac{2}{5+\sqrt{3}} = \dfrac{2(5-\sqrt{3})}{(5+\sqrt{3})(5-\sqrt{3})}$

$= \dfrac{2(5-\sqrt{3})}{25-3} = \dfrac{2(5-\sqrt{3})}{22} = \dfrac{5-\sqrt{3}}{11}$ //

(c) $\frac{2\sqrt{5}-3}{4\sqrt{5}-3} = \frac{(2\sqrt{5}-3)(4\sqrt{5}+3)}{(4\sqrt{5}-3)(4\sqrt{5}+3)}$

$= \frac{8\times 5 + 6\sqrt{5} - 12\sqrt{5} - 9}{16\times 5 - 9}$

$= \frac{31 - 6\sqrt{5}}{71}$

$= \frac{31}{71} - \frac{6}{71}\sqrt{5}$

Exercise B

(1)

(a) $3^{-2} = \frac{1}{3^2}$

$= \frac{1}{9}$

(b) $8^{1/3} = \sqrt[3]{8}$

$= 2$

(c) $16^{3/4} = \left(\sqrt[4]{16}\right)^3$

$= 2^3$

$= 8$

(d) $36^{-1/2} = \frac{1}{36^{1/2}}$

$= \frac{1}{\sqrt{36}}$

$= \frac{1}{6}$

(e) $8^{-4/3} = \left(\sqrt[3]{8}\right)^{-4}$

$= 2^{-4}$

$= \frac{1}{2^4}$

$= \frac{1}{16}$

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

$= \frac{125}{8}$

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

(c) $\left(\frac{64}{125}\right)^{-2/3} = \left(\frac{125}{64}\right)^{2/3}$

$= \frac{\left(\sqrt[3]{125}\right)^2}{\left(\sqrt[3]{64}\right)^2}$

$= \frac{2.5}{16}$ //