

- ① $\sqrt{5000} = \sqrt{2} \sqrt{25} \sqrt{100} = 5 \times 10 \times \sqrt{2} = 50\sqrt{2}$
 - ② $\sqrt{80} = \sqrt{16} \sqrt{5} = 4\sqrt{5}$
 - ③ $\sqrt{600} = \sqrt{100} \sqrt{6} = 10\sqrt{6}$
 - ④ $\sqrt{2550} = \sqrt{25} \sqrt{102} = 5\sqrt{102}$
 - ⑤ $\sqrt{500} = \sqrt{100} \sqrt{5} = 10\sqrt{5}$
 - ⑥ $\sqrt{320} = \sqrt{4} \sqrt{16} \sqrt{5} = 2 \times 4 \times \sqrt{5} = 8\sqrt{5}$
 - ⑦ $\sqrt{2187} = \sqrt{3} \sqrt{9} \sqrt{9} \sqrt{9} = 27\sqrt{3}$
 - ⑧ $\sqrt{450} = \sqrt{18} \sqrt{25} = \sqrt{2} \sqrt{9} \sqrt{25} = 5 \times 3 \times \sqrt{2} = 15\sqrt{2}$
 - ⑨ $\sqrt{520} = \sqrt{4} \sqrt{130} = 2\sqrt{130}$
 - ⑩ $\sqrt{980} = \sqrt{49} \sqrt{20} = \sqrt{49} \sqrt{5} \sqrt{4} = 2 \times 7 \times \sqrt{5} = 14\sqrt{5}$
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- ① $\frac{\sqrt{7}}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{21}}{3}$
- ② $\frac{\sqrt{24}}{\sqrt{48}} = \frac{1}{2}$
- ③ $\frac{\sqrt{35}}{\sqrt{63}} = \frac{\cancel{\sqrt{7}} \sqrt{5}}{\cancel{\sqrt{7}} \sqrt{9}} = \frac{\sqrt{5}}{3}$
- ④ $\frac{\sqrt{55}}{\sqrt{132}} = \frac{\sqrt{11} \sqrt{5}}{\sqrt{11} \sqrt{12}} = \frac{\sqrt{5}}{\sqrt{12}} \times \frac{\sqrt{12}}{\sqrt{12}} = \frac{\sqrt{60}}{12}$
- ⑤ $\frac{\sqrt{32}}{\sqrt{72}} = \frac{\sqrt{8} \sqrt{4}}{\sqrt{8} \sqrt{9}} = \frac{2}{3}$

Summer School Prep Surds (2)

Rationalise:

$$\textcircled{1} \quad \frac{\sqrt{7}}{\sqrt{3}+3} \times \frac{\sqrt{3}-3}{\sqrt{3}-3} = \frac{\sqrt{21}-3\sqrt{7}}{-6}$$

$$\textcircled{2} \quad \frac{3\sqrt{5}}{8+\sqrt{5}} \times \frac{8-\sqrt{5}}{8-\sqrt{5}} = \frac{24\sqrt{5}-15}{59}$$

	8	$-\sqrt{5}$
$3\sqrt{5}$	$24\sqrt{5}$	-15

	8	$-\sqrt{5}$
8	64	$-8\sqrt{5}$
$+\sqrt{5}$	$+8\sqrt{5}$	-5

$$\textcircled{3} \quad \frac{\sqrt{28}}{15+\sqrt{8}} \times \frac{15-\sqrt{8}}{15-\sqrt{8}} = \frac{15\sqrt{28}-\sqrt{224}}{7} = \frac{15\sqrt{28}-4\sqrt{56}}{7}$$

	15	$-\sqrt{8}$
15	225	$-15\sqrt{8}$
$+\sqrt{8}$	$+15\sqrt{8}$	-8

$$= \frac{30\sqrt{56}-4\sqrt{56}}{7}$$

$$= \frac{26\sqrt{56}}{7}$$

$$= \frac{52\sqrt{14}}{7}$$

$$\textcircled{4} \quad \frac{\sqrt{24}}{18-2\sqrt{3}} \times \frac{18+2\sqrt{3}}{18+2\sqrt{3}} = \frac{36\sqrt{6}+12\sqrt{2}}{312} = \frac{3\sqrt{6}+\sqrt{2}}{26}$$

	$\sqrt{24}$
18	$18\sqrt{24} = 36\sqrt{6}$

$+2\sqrt{3}$	$+2\sqrt{72} = 4\sqrt{18} = 12\sqrt{2}$
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	18	$-2\sqrt{3}$
18	324	$-36\sqrt{3}$
$+2\sqrt{3}$	$+36\sqrt{3}$	-12

(5)

$$\frac{\sqrt{507}}{4 + 3\sqrt{13}} \times \frac{4 - 3\sqrt{13}}{4 - 3\sqrt{13}} = \frac{52\sqrt{3} - 39\sqrt{39}}{-101}$$

$$\begin{array}{r|l} \sqrt{507} = & \\ 13\sqrt{3} & \\ \hline 4 & 52\sqrt{3} \\ \hline -3\sqrt{13} & -39\sqrt{39} \end{array}$$

$$\begin{array}{r|l} 4 & + 3\sqrt{13} \\ \hline 4 & 16 \quad + 12\sqrt{13} \\ \hline -3\sqrt{13} & -12\sqrt{13} \quad - 117 \end{array}$$

(6)

$$\frac{5 + \sqrt{5}}{10 + \sqrt{15}} \times \frac{10 - \sqrt{15}}{10 - \sqrt{15}} = \frac{50 + 10\sqrt{5} - 5\sqrt{15} - \sqrt{45}}{85}$$

$$\begin{array}{r|l} 5 & + \sqrt{5} \\ \hline 10 & 50 \quad + 10\sqrt{5} \\ \hline -\sqrt{15} & -5\sqrt{15} \quad - \sqrt{45} \end{array}$$

$$= \frac{50 + 10\sqrt{5} - 5\sqrt{15} - 3\sqrt{5}}{85}$$

$$= \frac{50 + 7\sqrt{5} - 5\sqrt{15}}{85}$$

$$\begin{array}{r|l} 10 & + \sqrt{15} \\ \hline 10 & 100 \quad + 10\sqrt{15} \\ \hline -\sqrt{15} & -10\sqrt{15} \quad - 15 \end{array}$$

~~12~~ ~~10~~

(7)

$$\frac{3 - \sqrt{21}}{\sqrt{12} + 3\sqrt{7}} \times \frac{\sqrt{12} - 3\sqrt{7}}{\sqrt{12} - 3\sqrt{7}} = \frac{27\sqrt{3} - 15\sqrt{7}}{-51}$$

$$\begin{array}{r|l} 3 & -\sqrt{21} \\ \hline \sqrt{12} & 6\sqrt{3} \quad - 6\sqrt{7} \\ \hline -3\sqrt{7} & -9\sqrt{7} \quad + 21\sqrt{3} \end{array}$$

$$\sqrt{3}\sqrt{4}(-\sqrt{3}\sqrt{7})$$

$$-3\sqrt{7}(\sqrt{7}\sqrt{3})$$

$$\begin{array}{r|l} \sqrt{12} & + 3\sqrt{7} \\ \hline \sqrt{12} & 12 \quad + 3\sqrt{84} \\ \hline -3\sqrt{7} & -3\sqrt{84} \quad - 63 \end{array}$$