8.3 Simplify radicals HW

p 420 / 1-41, odds

③ $\sqrt[3]{2187} - 2\sqrt[3]{24}$

$\sqrt[3]{27\cdot 81} - 2\sqrt[3]{8\cdot 3}$

$3\sqrt[3]{27\cdot 3} - 2(2)\sqrt[3]{3}$

$9\sqrt[3]{3} - 4\sqrt[3]{3}$

$\boxed{5\sqrt[3]{3}}$

⑤ $\frac{3}{2\sqrt{2}} + \frac{5\sqrt{2}}{4}$

$\frac{3\sqrt{2}}{4} + \frac{5\sqrt{2}}{4} = \frac{8\sqrt{2}}{4}$

$= \boxed{2\sqrt{2}}$

⑦ $\frac{12}{\sqrt{6}} + \sqrt{6}$

$\frac{12\sqrt{6}}{6} + \sqrt{6} = \boxed{3\sqrt{6}}$

⑨ $7\sqrt{3} - \frac{12}{\sqrt{3}} + \sqrt{75}$

$7\sqrt{3} - \frac{12\sqrt{3}}{3} + 5\sqrt{3}$

$= \boxed{8\sqrt{3}}$

⑪ $(\sqrt{7}+\sqrt{2})^2 =$

$7 + 2\sqrt{14} + 2$

$\boxed{9 + 2\sqrt{14}}$

⑬ $(2\sqrt{5} - 3)^2$

$20 - 12\sqrt{5} + 9$

$\boxed{29 - 12\sqrt{5}}$

⑮ $5 - 3 = \boxed{2}$

⑰ $12 - 2 = \boxed{10}$

⑲ $(6\sqrt{7} + \sqrt{15})(\sqrt{7} - \sqrt{3})$

$6(7) + \sqrt{105} - 6\sqrt{21} - \sqrt{45}$

$42 + \sqrt{105} - 6\sqrt{21} - 3\sqrt{5}$

$\begin{array}{r} 35 \\ \times\ 3 \\ \hline 105 \end{array}$

㉑ $\frac{2}{\sqrt[3]{9}} \cdot \frac{\sqrt[3]{3}}{\sqrt[3]{3}} = \frac{2\sqrt[3]{3}}{\sqrt[3]{27}}$

$= \boxed{\frac{2\sqrt[3]{3}}{3}}$

㉓ $\frac{4}{\sqrt[4]{32}} \cdot \frac{\sqrt[4]{8}}{\sqrt[4]{8}} = \frac{4\sqrt[4]{8}}{\sqrt[4]{256}}$

$= \boxed{\sqrt[4]{8}}$

㉕ $\frac{5}{\sqrt[6]{1024}} = \frac{5}{\sqrt[6]{64\cdot 16}}$

$= \frac{5}{2\sqrt[6]{16}} \cdot \frac{\sqrt[6]{4}}{\sqrt[6]{4}} = \frac{5\sqrt[6]{4}}{2\sqrt[6]{64}}$

$\frac{5}{\sqrt[6]{1024}} \cdot \frac{\sqrt[6]{4}}{\sqrt[6]{4}} = \frac{5\sqrt[6]{4}}{\sqrt[6]{4096}}$

$= \frac{5\sqrt[6]{4}}{4}$ 2

$= \boxed{\frac{5\sqrt[6]{4}}{4}}$

(27) $\frac{7}{\sqrt[4]{49}} \cdot \frac{\sqrt[4]{49}}{\sqrt[4]{49}} = \frac{7\sqrt[4]{49}}{\sqrt[4]{2401}}$

$= \boxed{\sqrt[4]{49}}$

(29) $\frac{1}{(\sqrt{5}-1)} \cdot \frac{(\sqrt{5}+1)}{(\sqrt{5}+1)}$

$= \frac{\sqrt{5}+1}{5-1} \Rightarrow \boxed{\frac{\sqrt{5}+1}{4}}$

(31) $\frac{4}{(\sqrt{7}+\sqrt{3})} \cdot \frac{(\sqrt{7}-\sqrt{3})}{(\sqrt{7}-\sqrt{3})} = \frac{4(\sqrt{7}-\sqrt{3})}{7-3}$

$= \boxed{\sqrt{7}-\sqrt{3}}$

(33) $\frac{(\sqrt{3}-1)}{(\sqrt{2}-1)} \cdot \frac{(\sqrt{2}+1)}{(\sqrt{2}+1)}$

$\frac{\sqrt{6}-\sqrt{2}+\sqrt{3}-1}{2-1} = \boxed{\sqrt{6}-\sqrt{2}+\sqrt{3}-1}$

(35) $\frac{(7\sqrt{2}+3)}{(7\sqrt{2}-3)} \cdot \frac{(7\sqrt{2}+3)}{(7\sqrt{2}+3)}$

$= \frac{7^2(2)+42\sqrt{2}+9}{7^2(2)-9}$

$= \frac{107+42\sqrt{2}}{89}$

(37) $\frac{(1+\frac{1}{\sqrt{3}})}{(1-\frac{1}{\sqrt{3}})} \frac{(\sqrt{3})}{\sqrt{3}} = \frac{(\sqrt{3}+1)}{(\sqrt{3}-1)} \frac{(\sqrt{3}+1)}{(\sqrt{3}+1)}$

$= \frac{3+2\sqrt{3}+1}{3-1} = \frac{4+2\sqrt{3}}{2}$

$= \boxed{2+\sqrt{3}}$

(39) $\frac{12}{((2+\sqrt{3})-\sqrt{7})} \cdot \frac{((2+\sqrt{3})+\sqrt{7})}{((2+\sqrt{3})+\sqrt{7})}$

$= \frac{12(2+\sqrt{3}+\sqrt{7})}{(2+\sqrt{3})^2-7}$

$= \frac{12(2+\sqrt{3}+\sqrt{7})}{4+4\sqrt{3}+3-7}$

$= \frac{\cancel{12}^{3}(2+\sqrt{3}+\sqrt{7})}{\cancel{4}\sqrt{3}} \frac{(\sqrt{3})}{\sqrt{3}}$

$= \boxed{\sqrt{3}(2+\sqrt{3}+\sqrt{7})}$

(41) $\frac{1}{(\sqrt{3}+\sqrt{2})-\sqrt{5}} \cdot \frac{(\sqrt{3}+\sqrt{2})+\sqrt{5}}{(\sqrt{3}+\sqrt{2})+\sqrt{5}}$

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

$= \frac{\quad}{3+2\sqrt{6}+2-5}$

$= \frac{(\sqrt{3}+\sqrt{2}+\sqrt{5})}{2\sqrt{6}} \frac{(\sqrt{6})}{\sqrt{6}}$

$= \frac{\sqrt{18}+\sqrt{12}+\sqrt{30}}{2(6)}$

$= \boxed{\frac{3\sqrt{2}+2\sqrt{3}+\sqrt{30}}{12}}$