

Alg 2 Rationalize the Denominator

$$\textcircled{1} \frac{5}{\sqrt{3}^1} = \frac{5}{(3^{\frac{1}{2}})} \cdot \frac{3^{\frac{1}{2}}}{3^{\frac{1}{2}}} = \frac{5 \cdot 3^{\frac{1}{2}}}{3^{\frac{1}{2} + \frac{1}{2}}} = \frac{5 \cdot 3^{\frac{1}{2}}}{3^1} = \boxed{\frac{5\sqrt{3}}{3}}$$

method 2 $\frac{5}{\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}^1} = \frac{5\sqrt{3}}{\sqrt{3}^2} = \frac{5\sqrt{3}}{\sqrt{9}} = \boxed{\frac{5\sqrt{3}}{3}}$

method 3 $\frac{5}{\sqrt{3}^1} \frac{\sqrt{3}^1}{\sqrt{3}^1} = \frac{5\sqrt{3}}{(\sqrt{3})^2} = \boxed{\frac{5\sqrt{3}}{3}}$

$$\textcircled{3} \frac{\sqrt{5}}{\sqrt{15}} = \sqrt{\frac{5}{15}} = \sqrt{\frac{1}{3}} = \frac{\sqrt{1}}{\sqrt{3}} = \frac{1}{\sqrt{3}}$$

$$= \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{1\sqrt{3}}{(\sqrt{3})^2} = \frac{1\sqrt{3}}{\sqrt{9}} = \boxed{\frac{1\sqrt{3}}{3}}$$

method 2 $\frac{\sqrt{5}}{\sqrt{15}} \frac{\sqrt{15}}{\sqrt{15}} = \frac{\sqrt{75}}{\sqrt{225}} = \frac{\sqrt{75}}{15} = \frac{\sqrt{25\sqrt{3}}}{15}$

$$= \frac{5\sqrt{3}}{15} = \frac{5}{15} \frac{\sqrt{3}}{1} = \boxed{\frac{1}{3} \sqrt{3} = \frac{\sqrt{3}}{3}}$$

$$\textcircled{5} \frac{\sqrt{4}}{\sqrt{3}} = \frac{2}{\sqrt{3}} = \frac{2}{\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{(\sqrt{3})^2} = \frac{2\sqrt{3}}{\sqrt{9}} = \boxed{\frac{2\sqrt{3}}{3}}$$

method 3

$$\frac{\sqrt{4}}{\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{12}}{\sqrt{9}} = \frac{\sqrt{12}}{3} = \frac{\sqrt{4}\sqrt{3}}{3} = \boxed{\frac{2\sqrt{3}}{3}}$$

$$(7) \frac{4}{\sqrt{5}-\sqrt{2}}$$

$$\text{note } (\sqrt{5}-\sqrt{2})(\sqrt{5}+\sqrt{2})$$

$$= 5 - 2 = 3$$

conjugate of $\sqrt{5}-\sqrt{2}$

$$\frac{4}{\sqrt{5}-\sqrt{2}} \cdot \frac{\sqrt{5}+\sqrt{2}}{\sqrt{5}+\sqrt{2}}$$

$$= \frac{4\sqrt{5}+4\sqrt{2}}{\sqrt{25}-\sqrt{10}+\sqrt{10}-\sqrt{4}}$$

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

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

$$(9) \frac{-1}{2+\sqrt{3}} \cdot \frac{(2-\sqrt{3})}{(2-\sqrt{3})}$$

$$= \frac{-2+\sqrt{3}}{4-2\sqrt{3}+2\sqrt{3}-\sqrt{9}}$$

conjugates

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

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

$$(11) \frac{2}{\sqrt{2}-\sqrt{5}} \cdot \frac{(\sqrt{2}+\sqrt{5})}{(\sqrt{2}+\sqrt{5})}$$

$$= \frac{2\sqrt{2}+2\sqrt{5}}{\sqrt{4}-\sqrt{10}+\sqrt{10}-\sqrt{25}}$$

conjugates

$$= \frac{2\sqrt{2}+2\sqrt{5}}{2-5}$$

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

$$= \boxed{\frac{-2\sqrt{2}-2\sqrt{5}}{3}}$$

$$= \boxed{-\frac{2}{3}\sqrt{2} - \frac{2}{3}\sqrt{5}}$$

$$(13) \frac{3 - \sqrt{5}}{5 - \sqrt{5}} \frac{(5 + \sqrt{5})}{(5 + \sqrt{5})} = \frac{15 - 5\sqrt{5} + 3\sqrt{5} - \sqrt{25}}{25 - 5\sqrt{5} + 5\sqrt{5} - \sqrt{25}}$$

↑
conjugates
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$$= \frac{15 - 2\sqrt{5} - 5}{25 - 5}$$

$$= \frac{10 - 2\sqrt{5}}{20} = \frac{2(5 - \sqrt{5})}{2 \cdot 10}$$

$$= \boxed{\frac{5 - \sqrt{5}}{10}} = \frac{5}{10} - \frac{\sqrt{5}}{10}$$

$$= \boxed{\frac{1}{2} - \frac{\sqrt{5}}{10}}$$
