

$$1. \frac{-9}{4} \cdot \frac{1}{3} = \frac{-9}{12} = \boxed{\frac{-3}{4}} \quad 2. -2 \cdot \frac{3}{7} = \boxed{\frac{-6}{7}} \quad 3. -2\frac{3}{8} \cdot 2\frac{1}{2} = \frac{-19}{8} \cdot \frac{5}{2} = \boxed{\frac{-95}{16}}$$

$$4. \frac{-5}{21} \div \frac{-10}{7} \quad 5. \frac{-9}{5} = -\frac{9}{5} \cdot \frac{1}{2} = \boxed{\frac{-9}{10}}$$

$$\frac{-5}{21} \cdot \frac{-7}{10} = \frac{35}{210} = \boxed{\frac{1}{6}}$$

$$6. \frac{-3\frac{7}{10}}{2\frac{1}{4}} = \frac{-37/10}{9/4} = \frac{-37}{10} \cdot \frac{4}{9} = \boxed{\frac{-74}{45}}$$

$$7. \frac{6}{1} - \frac{1}{6}$$

$$\frac{36}{6} - \frac{1}{6} = \boxed{\frac{35}{6}}$$

$$8. \frac{-4}{5} - \frac{7}{8}$$

$$\frac{-32}{40} - \frac{35}{40} = \boxed{\frac{-67}{40}}$$

$$9. \frac{9}{5} + \frac{-4}{3}$$

$$\frac{27}{15} + \frac{-20}{15} = \boxed{\frac{7}{15}}$$

$$10. 2 - \frac{13}{8}$$

$$\frac{16}{8} - \frac{13}{8} = \boxed{\frac{3}{8}}$$

$$11. -1 + -2\frac{2}{5}$$

$$\frac{-5}{5} + \frac{-12}{5} = \boxed{\frac{-17}{5}}$$

$$12. 2\frac{4}{5} - \frac{5}{8}$$

$$\frac{14}{5} - \frac{5}{8}$$

$$\frac{112}{40} - \frac{25}{40} = \boxed{\frac{87}{40}}$$

$$13. \frac{-1/3}{35/36} = \frac{-1}{3} \cdot \frac{36}{35} = \boxed{\frac{-12}{35}}$$

$$14. \frac{2(-\frac{1}{6})}{1 - (-\frac{1}{6})^2} = \frac{-2/6}{\frac{36}{36} - \frac{1}{36}} = \frac{-1/3}{35/36} = \frac{-1}{3} \cdot \frac{36}{35} = \boxed{\frac{-12}{35}}$$

$$15. \frac{2(\frac{3}{4})}{1 - (\frac{3}{4})^2} = \frac{6/4}{\frac{16}{16} - \frac{9}{16}} = \frac{3/2}{7/16} = \frac{3}{2} \cdot \frac{16}{7} = \boxed{\frac{24}{7}}$$

$$16. \frac{1 - \frac{24}{25}}{-7/25} = \frac{\frac{25}{25} - \frac{24}{25}}{-7/25} = \frac{1/25}{-7/25} = \frac{1}{25} \cdot \frac{25}{-7} = \boxed{-\frac{1}{7}}$$

$$17. \sqrt{3}(-5\sqrt{10} + \sqrt{6}) = -5\sqrt{30} + \sqrt{18} = \boxed{-5\sqrt{30} + 3\sqrt{2}}$$

$\begin{matrix} \uparrow & \uparrow \\ 2 \cdot 5 \cdot 3 & 3 \cdot 3 \cdot 2 \end{matrix}$

$$18. -2\sqrt{15}(-3\sqrt{3} + 3\sqrt{5}) = 6\sqrt{45} - 6\sqrt{75} = \boxed{18\sqrt{5} - 30\sqrt{3}}$$

$\begin{matrix} \uparrow & \uparrow \\ 3 \cdot 3 \cdot 5 & 5 \cdot 5 \cdot 3 \end{matrix}$

$$19. (\sqrt{2} + \sqrt{5})(\sqrt{2} - \sqrt{5}) \rightarrow \text{FOIL} \quad \text{"FL"} \quad 20. (5 + 4\sqrt{3})(3 + \sqrt{3}) \rightarrow \text{FOIL}$$

$$2 - 5 \quad 15 + 5\sqrt{3} + 12\sqrt{3} + 4(3)$$

$$\boxed{-3} \quad 15 + 17\sqrt{3} + 12$$

$$\boxed{27 + 17\sqrt{3}}$$

$$21. \frac{\sqrt{15}}{5\sqrt{20}} = \frac{\sqrt{15} \cdot \sqrt{5}}{10\sqrt{5} \cdot \sqrt{5}} = \frac{\sqrt{75}}{10(5)} = \frac{5\sqrt{3}}{50} = \boxed{\frac{\sqrt{3}}{10}}$$

$\begin{matrix} \uparrow \\ 5 \cdot 5 \cdot 3 \end{matrix}$

$\begin{matrix} \uparrow \\ 2 \cdot 2 \cdot 5 \end{matrix}$

$$22. \frac{3 - 3\sqrt{3}}{4\sqrt{8}} = \frac{(3 - 3\sqrt{3}) \cdot \sqrt{2}}{8\sqrt{2} \cdot \sqrt{2}} = \frac{3\sqrt{2} - 3\sqrt{6}}{8(2)} = \boxed{\frac{3\sqrt{2} - 3\sqrt{6}}{16}}$$

$\begin{matrix} \uparrow \\ 2 \cdot 3 \cdot 2 \end{matrix}$

$$23. \frac{(3 + \sqrt{2})\sqrt{10}}{\sqrt{10} \cdot \sqrt{10}} = \frac{3\sqrt{10} + \sqrt{20}}{10} = \boxed{\frac{3\sqrt{10} + 2\sqrt{5}}{10}}$$

$\begin{matrix} \uparrow \\ 2 \cdot 2 \cdot 5 \end{matrix}$

$$24. \frac{3}{(4 + 4\sqrt{5})(4 - 4\sqrt{5})} = \frac{12 - 12\sqrt{5}}{16 - 16(5)} = \frac{12 - 12\sqrt{5}}{16 - 80} = \frac{12 - 12\sqrt{5}}{-64} = -4$$

$$= \boxed{\frac{-3 + 3\sqrt{5}}{16}}$$

$$25. \frac{4}{(\sqrt{2} - 5\sqrt{3})(\sqrt{2} + 5\sqrt{3})} = \frac{4\sqrt{2} + 20\sqrt{3}}{2 - 25(3)}$$

$$= \frac{4\sqrt{2} + 20\sqrt{3}}{2 - 75} = \frac{4\sqrt{2} + 20\sqrt{3}}{-73}$$

$$= \boxed{\frac{-4\sqrt{2} - 20\sqrt{3}}{73}}$$

$$26. \frac{(3-4\sqrt{3})(4\sqrt{5}-3\sqrt{2})}{(4\sqrt{5}+3\sqrt{2})(4\sqrt{5}-3\sqrt{2})} \rightarrow \text{FOIL} = \frac{12\sqrt{5}-9\sqrt{2}-16\sqrt{15}+12\sqrt{6}}{16(5)-9(2)}$$

$$= \frac{12\sqrt{5}-9\sqrt{2}-16\sqrt{15}+12\sqrt{6}}{80-18} = \boxed{\frac{12\sqrt{5}-9\sqrt{2}-16\sqrt{15}+12\sqrt{6}}{62}}$$

$$27. \left(\frac{2}{\sqrt{3}}\right)^2 - \left(\frac{4}{\sqrt{3}}\right)^2 = \frac{4}{3} - \frac{16}{3} = \frac{-12}{3} = \boxed{-4}$$

$$28. 2\left(\frac{6}{\sqrt{37}}\right)^2 - 1 \quad 29. 1 - 2\left(\frac{6}{\sqrt{216}}\right)^2$$

$$2\left(\frac{36}{37}\right) - 1$$

$$\frac{72}{37} - \frac{37}{37}$$

$$\boxed{\frac{35}{37}}$$

$$1 - 2\left(\frac{36}{216}\right)$$

$$1 - 2\left(\frac{1}{6}\right)$$

$$\frac{3}{3} - \frac{1}{3} = \boxed{\frac{2}{3}}$$

$$30. \frac{-3\sqrt{5}}{1 - \left(\frac{-3\sqrt{5}}{2}\right)^2}$$

$$\frac{-3\sqrt{5}}{1 - \left(\frac{9 \cdot 5}{4}\right)}$$

$$\frac{-3\sqrt{5}}{\frac{4}{4} - \frac{45}{4}}$$

$$\frac{-3\sqrt{5}}{-41/4}$$

$$-3\sqrt{5} \cdot \frac{-4}{41} = \boxed{\frac{12\sqrt{5}}{41}}$$

$$31. \sqrt{\frac{(2+\sqrt{3})\sqrt{2}}{\sqrt{2} \cdot \sqrt{2}}} = \sqrt{\frac{2\sqrt{2}+\sqrt{6}}{2}}$$

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

$$= \boxed{\frac{\sqrt{4\sqrt{2}+2\sqrt{6}}}{2}}$$

$$32. \sqrt{\frac{1-\sqrt{3}/2}{2}} = \sqrt{\frac{\frac{2}{2} - \frac{\sqrt{3}}{2}}{2}} = \sqrt{\frac{2-\sqrt{3}}{2}} = \sqrt{\frac{2-\sqrt{3}}{2} \cdot \frac{1}{2}} =$$

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

$$33. \sqrt{\frac{2+\sqrt{3}}{2}} = \sqrt{\frac{2+\sqrt{3}}{2} \cdot \frac{1}{2}} = \sqrt{\frac{2+\sqrt{3}}{4}} = \boxed{\frac{\sqrt{2+\sqrt{3}}}{2}}$$

$$34. \sqrt{\frac{2 + \frac{2}{5\sqrt{3}}}{2}} = \sqrt{\frac{\frac{10\sqrt{3}}{5\sqrt{3}} + \frac{2}{5\sqrt{3}}}{2}} = \sqrt{\frac{10\sqrt{3}+2}{5\sqrt{3}}} = \sqrt{\frac{10\sqrt{3}+2}{5\sqrt{3}} \cdot \frac{1}{2}}$$

$$= \sqrt{\frac{10\sqrt{3}+2}{10\sqrt{3}}} \div 2 = \sqrt{\frac{(5\sqrt{3}+1) \cdot \sqrt{3}}{(5\sqrt{3}) \cdot \sqrt{3}}} = \sqrt{\frac{5(3)+\sqrt{3}}{5(3)}} = \sqrt{\frac{15+\sqrt{3}}{15}} =$$

$$\frac{\sqrt{15+\sqrt{3}} \cdot \sqrt{15}}{\sqrt{15} \cdot \sqrt{15}} = \frac{\sqrt{15(15+\sqrt{3})}}{15} = \boxed{\frac{\sqrt{225+15\sqrt{3}}}{15}}$$