

Fraction and Square Root Review

$$1) \quad -\frac{3}{4} \cdot \frac{1}{8} = \boxed{-\frac{3}{4}}$$

$$2) \quad -\frac{2}{1} \cdot \frac{3}{7} = \boxed{-\frac{6}{7}}$$

$$3) \quad -2\frac{3}{8} \cdot 2\frac{1}{2} = -\frac{19}{8} \cdot \frac{5}{2} = \boxed{-\frac{95}{16}}$$

$$4) \quad -\frac{5}{21} \div -\frac{10}{7} = -\frac{5}{21} \cdot -\frac{7}{10} = \boxed{\frac{1}{6}}$$

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

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

$$7) \quad 6 - \frac{1}{6} = \frac{36}{6} - \frac{1}{6} = \boxed{\frac{35}{6}}$$

$$8) \quad \left(-\frac{4}{5}\right) - \left(\frac{7}{8}\right) = -\frac{32}{40} - \frac{35}{40} = \boxed{-\frac{67}{40}}$$

$$9) \quad \left(\frac{9}{5}\right) + \left(-\frac{4}{3}\right) = \frac{27}{15} - \frac{20}{15} = \boxed{\frac{7}{15}}$$

$$10) \quad 2 - \frac{13}{8} = \frac{16}{8} - \frac{13}{8} = \boxed{\frac{3}{8}}$$

$$11) \quad -1 + \left(-2\frac{2}{5}\right) = -\frac{5}{5} - \frac{12}{5} = \boxed{-\frac{17}{5}}$$

$$12) \quad 2\frac{4}{5} - \frac{5}{8} = \frac{14}{5} - \frac{5}{8} = \frac{112}{40} - \frac{25}{40} = \boxed{\frac{87}{40}}$$

$$13) \quad \frac{-\frac{1}{3}}{\frac{108}{36}} = -\frac{1}{3} \cdot \frac{36}{108} = \boxed{-\frac{12}{35}}$$

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

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

$$16) \quad \frac{1 - \frac{24}{25}}{-\frac{7}{25}} = \frac{\frac{25}{25} - \frac{24}{25}}{-\frac{7}{25}} = \frac{\frac{1}{25}}{-\frac{7}{25}} = \frac{1}{25} \cdot -\frac{25}{7} = \boxed{-\frac{1}{7}}$$

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

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 $2 \cdot 5 \cdot 3$ $3 \cdot 3 \cdot 2$

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

$$19) (\sqrt{2}+\sqrt{5})(\sqrt{2}-\sqrt{5}) \text{ * conjugates } \rightarrow \text{middle terms cancel}$$

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

$$20) (5+4\sqrt{3})(3+\sqrt{3}) = 15 + 5\sqrt{3} + 12\sqrt{3} + 4(3)$$

$$= 15 + 17\sqrt{3} + 12 = \boxed{27 + 17\sqrt{3}}$$

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

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

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

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

$$= \frac{12}{-64} - \frac{12\sqrt{5}}{-64} = -\frac{3}{16} + \frac{3\sqrt{5}}{16} = \boxed{\frac{-3+3\sqrt{5}}{16}}$$

$$25) \frac{4}{\sqrt{2}-5\sqrt{3}} = \frac{(\sqrt{2}+5\sqrt{3})}{(\sqrt{2}+5\sqrt{3})} = \frac{4\sqrt{2}+20\sqrt{3}}{2-25(3)} = \frac{4\sqrt{2}+20\sqrt{3}}{2-75}$$

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

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

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

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

$$28) 2 \left(\frac{6}{\sqrt{37}}\right)^2 - 1 = 2 \left(\frac{36}{37}\right) - 1 = \frac{72}{37} - \frac{37}{37} = \boxed{\frac{35}{37}}$$

$$29) 1 - 2 \left(\frac{6}{\sqrt{216}}\right)^2 = 1 - 2 \left(\frac{36}{216}\right) = 1 - 2 \left(\frac{1}{6}\right) = 1 - \frac{1}{3} = \frac{3}{3} - \frac{1}{3} = \boxed{\frac{2}{3}}$$

$$30) \frac{-3\sqrt{5}}{1 - \left(\frac{-3\sqrt{5}}{2}\right)^2} = \frac{-3\sqrt{5}}{1 - \left(\frac{9(5)}{4}\right)} = \frac{-3\sqrt{5}}{1 - \frac{45}{4}} = \frac{-3\sqrt{5}}{\frac{4}{4} - \frac{45}{4}} = \frac{-3\sqrt{5}}{-\frac{41}{4}}$$

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

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

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

$$32) \sqrt{\frac{1-\sqrt{3}}{2}} = \sqrt{\frac{\frac{2}{2} - \frac{\sqrt{3}}{2}}{2/1}} = \sqrt{\frac{2-\sqrt{3}}{2} \cdot \frac{1}{2}} = \sqrt{\frac{2-\sqrt{3}}{4}} = \boxed{\frac{\sqrt{2-\sqrt{3}}}{2}}$$

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

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

$$= \sqrt{\frac{10\sqrt{3}+2}{10\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}} = \sqrt{\frac{30+2\sqrt{3}}{30} \cdot \frac{1}{2}} = \sqrt{\frac{15+\sqrt{3}}{15}}$$

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