

1. a)  $\frac{2}{3} = \frac{8}{12}$                       b)  $\frac{9}{13} = \frac{36}{52}$                       c)  $\frac{3}{5} = \frac{36}{60}$                       d)  $\frac{7}{11} = \frac{63}{99}$
2. a)  $\frac{6}{8} = \frac{3}{4}$                               b)  $\frac{24}{36} = \frac{2}{3}$                               c)  $\frac{28}{49} = \frac{4}{7}$                               d)  $\frac{72}{96} = \frac{3}{4}$
3. a)  $2\frac{2}{7} = \frac{16}{7}$                               b)  $4\frac{3}{5} = \frac{23}{5}$                               c)  $3\frac{6}{11} = \frac{39}{11}$                               d)  $7\frac{3}{10} = \frac{73}{10}$
4. a)  $\frac{9}{2} = 4\frac{1}{2}$                               b)  $\frac{24}{7} = 3\frac{3}{7}$                               c)  $\frac{35}{8} = 4\frac{3}{8}$                               d)  $\frac{63}{10} = 6\frac{3}{10}$
5. a)  $\frac{2}{3} + \frac{4}{9} = \frac{6}{9} + \frac{4}{9} = \frac{10}{9} = 1\frac{1}{9}$                               b)  $\frac{3}{4} + \frac{7}{12} = \frac{9}{12} + \frac{7}{12} = \frac{16}{12} = 1\frac{1}{3}$   
c)  $\frac{9}{10} + \frac{5}{11} = \frac{99}{110} + \frac{50}{110} = \frac{149}{110} = 1\frac{39}{110}$                               d)  $\frac{7}{8} + 2\frac{1}{12} = \frac{7}{8} + \frac{25}{12} = \frac{21}{24} + \frac{50}{24} = \frac{71}{24} = 2\frac{23}{24}$
6. a)  $\frac{4}{5} - \frac{2}{25} = \frac{20}{25} - \frac{2}{25} = \frac{18}{25}$                               b)  $\frac{2}{7} - \frac{1}{5} = \frac{10}{35} - \frac{7}{35} = \frac{3}{35}$   
c)  $1\frac{1}{4} - \frac{4}{9} = \frac{5}{4} - \frac{4}{9} = \frac{45}{36} - \frac{16}{36} = \frac{29}{36}$                               d)  $3\frac{1}{5} - 2\frac{4}{7} = \frac{16}{5} - \frac{18}{7} = \frac{112}{35} - \frac{90}{35} = \frac{22}{35}$
7. a)  $4^1 \cdot \frac{3}{8} = \frac{3}{2} = 1\frac{1}{2}$                               b)  $\frac{11}{13} \cdot 20^4 = \frac{44}{3} = 14\frac{2}{3}$   
c)  $14 \cdot \frac{2}{3} = \frac{28}{3} = 9\frac{1}{3}$                               d)  $\frac{4}{9} \cdot 27^3 = 12$
8. a)  $\frac{7^1}{8} \cdot \frac{9^3}{16^8} = \frac{3}{8}$                               b)  $1\frac{1}{2} \cdot 2\frac{1}{3} = \frac{7}{2} \cdot \frac{7}{3} = \frac{7}{2} = 3\frac{1}{2}$   
c)  $\frac{7^1}{8} \cdot \frac{11}{24} = \frac{11}{24}$                               d)  $\frac{1}{2} \cdot \frac{7^1}{8} \cdot \frac{7^1}{4} \cdot \frac{4^1}{5} = \frac{1}{5}$
9. a)  $\frac{2}{3} : \frac{4}{9} = \frac{2^1}{3} \cdot \frac{9^3}{4} = \frac{3}{2} = 1\frac{1}{2}$                               b)  $\frac{4}{7} : \frac{5}{6} = \frac{4}{7} \cdot \frac{6}{5} = \frac{24}{35}$   
c)  $1\frac{4}{5} : 3\frac{6}{7} = \frac{9}{5} : \frac{27}{7} = \frac{9^1}{5} \cdot \frac{7}{27^3} = \frac{7}{15}$                               d)  $\frac{18}{23} : \frac{27}{34} = \frac{18^2}{23} \cdot \frac{34}{27^3} = \frac{68}{69}$
10. a)  $\frac{2}{3} \cdot (\frac{1}{4} + \frac{1}{6}) = \frac{2}{3} \cdot (\frac{3}{12} + \frac{2}{12}) = \frac{2^1}{3} \cdot \frac{5}{12} = \frac{5}{18}$   
b)  $\frac{3}{8} \cdot 17 - \frac{3}{8} \cdot 7 = \frac{3}{8} \cdot (17 - 7) = \frac{3}{8} \cdot 10^5 = \frac{15}{4} = 3\frac{3}{4}$   
c)  $7 - \frac{9^3}{20^{10}} \cdot \frac{7^1}{8} = 7 - \frac{3}{10} = 6\frac{7}{10}$   
d)  $5\frac{3}{4} + \frac{1}{5} : (\frac{15}{4} - 3\frac{1}{2}) = \frac{23}{4} + \frac{1}{5} : (\frac{15}{4} - \frac{7}{2}) = \frac{23}{4} + \frac{1}{5} : (\frac{15}{4} - \frac{14}{4}) = \frac{23}{4} + \frac{1}{5} : \frac{1}{4} = \frac{23}{4} + \frac{1}{5} \cdot \frac{4}{1} = \frac{23}{4} + \frac{4}{5} = \frac{115}{20} + \frac{16}{20} = \frac{131}{20} = 6\frac{11}{20}$