Exercise 1.5

Q1 Multiply

(i) $\frac{7}{11}$ by $\frac{5}{4}$ (ii) $\frac{5}{7}$ by $-\frac{3}{4}$ (iii) $-\frac{2}{9}$ by $\frac{5}{11}$

(iv) $\frac{-3}{17}$ by $\frac{-5}{-4}$ (v) $\frac{9}{-7}$ by $\frac{36}{-11}$ (vi) $\frac{-11}{13}$ by $\frac{-21}{7}$

(vii) $-\frac{3}{5}$ by $-\frac{4}{7}$ (viii) $\frac{-15}{11}$ by 7

Solution: (i) $\frac{7}{11} \times \frac{5}{4} = \frac{7 \times 5}{11 \times 4} = \frac{35}{44}$

(ii) $\frac{5}{7} \times \frac{-3}{4} = \frac{5 \times -3}{7 \times 4} = \frac{-15}{28}$

(iii) $\frac{-2}{9} \times \frac{5}{11} = \frac{-2 \times 5}{9 \times 11} = \frac{-10}{99}$

(iv) $\frac{-3}{17} \times \frac{-5}{-4} = -\frac{3 \times -5}{17 \times -4} = \frac{15}{-68} = \frac{-15}{68}$

(v) $\frac{9}{-7} \times \frac{36}{-11} = \frac{9 \times 36}{-7 \times -11} = \frac{324}{77}$

(vi) $\frac{-11}{13} \times \frac{-21}{7} = \frac{-11 \times -21^{3}}{13 \times 7_{1}} = \frac{33}{13}$

(vii) $-\frac{3}{5} \times \frac{-4}{7} = -\frac{3 \times -4}{5 \times 7} = \frac{12}{35}$

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(viii) $\frac{-15}{11} \times \frac{7}{1} = \frac{-15 \times 7}{11 \times 1} = \frac{-105}{11}$

Q.2 Multiply

(i) $\frac{-5}{17}$ by $\frac{51}{-60}$ (ii) $\frac{-6}{11}$ by $\frac{-55}{36}$

(iii) $\frac{-8}{25}$ by $\frac{-5}{16}$ (iv) $\frac{6}{7}$ by $\frac{-49}{36}$ (v) $\frac{8}{-9}$ by $\frac{-7}{-16}$

(vi) $\frac{-8}{9}$ by $\frac{3}{64}$

Solution (i) $\frac{-\cancel{5}^{1}}{\cancel{17}_{1}} \times \frac{\cancel{51}^{3}}{\cancel{-60}_{12}} = \frac{3}{12} = \frac{1}{4}$

(ii) $\frac{-\cancel{6}^{1}}{11} \times \frac{-\cancel{55}^{5}}{\cancel{36}_{6}} = \frac{-\cancel{6}^{1} \times -\cancel{55}^{5}}{\cancel{11} \times \cancel{36}_{6}} = \frac{1 \times 5}{1 \times 6} = \frac{5}{6}$

(iii) $\frac{-\cancel{8}^{1}}{\cancel{25}_{5}} \times \frac{-\cancel{5}^{1}}{\cancel{16}_{2}} = \frac{-\cancel{8}^{1} \times -\cancel{5}^{1}}{\cancel{25} \times \cancel{16}_{2}} = \frac{1}{10}$

(iv) $\frac{\cancel{6}^{1}}{\cancel{7}_{1}} \times \frac{-\cancel{49}^{7}}{\cancel{36}_{6}} = \frac{\cancel{6}^{1} \times -\cancel{49}^{7}}{\cancel{7} \times \cancel{36}_{6}} = \frac{-7}{6}$

(v) $\frac{\cancel{8}^{1}}{-9} \times \frac{-7}{\cancel{-16}_{2}} = \frac{\cancel{8}^{1} \times -7}{-9 \times \cancel{-16}_{2}} = \frac{-7}{18}$

(vi) $\frac{-\cancel{8}^{1}}{9} \times \frac{3}{\cancel{64}_{8}} = \frac{-\cancel{8}^{1} \times 3^{1}}{\cancel{9}_{3} \times \cancel{64}_{8}} = \frac{-1}{24}$

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Q.3 Simplify each of the following and express the result as a rational number in standard form

(i) $\frac{-16}{21} \times \frac{14}{5} = \frac{-16 \times 14^{2}}{21 \times 5} = \frac{-32}{15}$
$\quad\quad\quad

Q4 Simplify

(i) $\left(\frac{\cancel{25}^{5}}{\cancel{8}_{4}} \times \frac{\cancel{2}^{1}}{\cancel{5}_{1}}\right) - \left(\frac{\cancel{3}^{1}}{\cancel{5}_{1}} \times \frac{\cancel{-10}^{2}}{\cancel{9}_{3}}\right)$

$= \frac{5}{4} - \left(\frac{-2}{3}\right) = \frac{5}{4} + \frac{2}{3}$

$= \frac{5\times3 + 2\times4}{12} = \frac{15+8}{12}$

$= \frac{23}{12}$

(ii) $\left(\frac{1}{2} \times \frac{1}{4}\right) + \left(\frac{1}{2} \times \cancel{6}^{3}\right) = \frac{1}{8} + 3$

$= \frac{1+24}{8} = \frac{25}{8}$

(iii) $\left(\cancel{-5}^{1} \times \frac{2}{\cancel{15}_{3}}\right) - \left(\cancel{-6}^{2} \times \frac{2}{\cancel{9}_{3}}\right)$

$= -\frac{2}{3} - \left(-\frac{4}{3}\right) = -\frac{2}{3} + \frac{4}{3} = \frac{-2+4}{3} = \frac{2}{3}$

(iv) $\left(-\frac{9}{4} \times \frac{5}{3}\right) + \left(\frac{13}{2} \times \frac{5}{6}\right)$

$= \frac{-45}{12} + \frac{65}{12} = \frac{-45+65}{12} = \frac{20}{12} = \frac{5}{3}$

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(v) $\left(\frac{-4}{3} \times \frac{12}{-5}\right) + \left(\frac{3}{7} \times \frac{21}{15}\right)$

$= \frac{+16}{5} + \frac{3}{5} = \frac{16+3}{5} = \frac{19}{5}$

(vi) $\left(\frac{13}{5} \times \frac{8}{3}\right) - \left(\frac{-5}{2} \times \frac{11}{3}\right)$

$= \frac{104}{15} - \left(\frac{-55}{6}\right) = \frac{104}{15} + \frac{55}{6}$

$= \frac{208 + 275}{30} = \frac{483}{30}$

(vii) $\left(\frac{13}{7} \times \frac{11}{26}\right) - \left(\frac{-4}{3} \times \frac{5}{6}\right)$

$= \frac{143}{182} - \left(\frac{-20}{189}\right) = \frac{143}{182} + \frac{10}{9} = \frac{11}{14} + \frac{10}{9}$

$= \frac{99 + 140}{126}$

$= \frac{239}{126}$

(viii) $\left(\frac{8}{5} \times \frac{-3}{2}\right) + \left(\frac{-3}{10} \times \frac{11}{16}\right)$

$= -\frac{12}{5} + \left(\frac{-33}{160}\right) = -\frac{12}{5} - \frac{33}{160}$

$= \frac{-12 \times 32 - 33}{160} = \frac{-384 - 33}{160}$

$= \frac{-417}{160}$

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Q.5 Simplify :

(i) $\left(\frac{3}{2} \times \frac{1}{6}\right) + \left(\frac{5}{3} \times \frac{7}{2}\right) - \left(\frac{13}{8} \times \frac{4}{3}\right)$

$= \frac{1}{4} + \frac{35}{6} - \frac{13}{6} = \frac{3+70-26}{12} = \frac{47}{12}$

(ii) $\left(\frac{1}{14} \times \frac{2}{7}\right) - \left(\frac{5}{14} \times \frac{-2}{3}\right) + \left(\frac{3}{7} \times \frac{9}{2}\right)$

$= \frac{1}{14} - \left(\frac{-5}{21}\right) + \frac{27}{14} = \frac{1}{14} + \frac{5}{21} + \frac{27}{14}$

$= \frac{3+10+81}{42} = \frac{94}{42}$

$= \frac{47}{21}$

(iii) $\left(\frac{13}{9} \times \frac{-15}{2}\right) + \left(\frac{7}{3} \times \frac{8}{5}\right) + \left(\frac{7}{5} \times \frac{1}{2}\right)$

$-\frac{65}{6} + \frac{56}{15} + \frac{3}{10}$

LCM (6, 15, 10) = 30

$= \frac{-325+112+9}{30} = \frac{-204}{30}$

(iv) $\left(\frac{3}{11} \times \frac{5}{6}\right) - \left(\frac{7}{12} \times \frac{4}{3}\right) + \left(\frac{5}{13} \times \frac{6}{15}\right)$

$\frac{5}{22} - 1 + \frac{2}{13} = \frac{65-286+44}{286} = -\frac{177}{286}$

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