

Chap # 2

Maths 7th

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Ex # 2.3

Pg # 2

(iii) $-\frac{1}{5}, \frac{2}{10}$

Sol. $-\frac{1}{5} = \frac{-1 \times 2}{5 \times 2} = \frac{-2}{10}$ Making denominators equal

$\frac{-2}{10} = \frac{-2}{10}$ Comparing numerators.

OR. $-\frac{1}{5} = \frac{-2}{10}$ As, $-2 = -2$

(iv) $-\frac{1}{9}, \frac{-4}{3}$

Sol. $-\frac{4}{3} = \frac{-4 \times 3}{3 \times 3} = \frac{-12}{9}$

Making denominators equal
 $-\frac{1}{9} > \frac{-12}{9}$ Comparing numerators

OR. $-\frac{1}{9} > \frac{-4}{3}$ As, $-1 > -12$

(v) $-1, \frac{-2}{3}$

Sol. $\frac{-1 \times 3}{1 \times 3} = \frac{-3}{3}$ Making denominators equal

$\frac{-3}{3} < \frac{-2}{3}$ Comparing numerators

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Ex # 2.3

Pg # 3

OR. $-1 < -\frac{2}{3}$ As, $-3 < -2$

(vi) $\frac{1}{2} < 1$

Sol. $\frac{1}{2} = \frac{1 \times 2}{1 \times 2} = \frac{2}{2}$

$\frac{1}{2} < \frac{2}{2}$

OR. $\frac{1}{2} < 1$ As, $1 < 2$

(vii) $\frac{5}{7} > -\frac{1}{2}$

Sol. $\frac{5}{7} = \frac{5 \times 2}{7 \times 2} = \frac{10}{14}$

$-\frac{1}{2} = \frac{-1 \times 7}{2 \times 7} = \frac{-7}{14}$

$\frac{10}{14} > \frac{-7}{14}$ As, $10 > -7$

OR. $\frac{5}{7} > -\frac{1}{2}$

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Ex # 2.3Pg# 4

(viii) $\frac{11}{-10}$, $\frac{-10}{11}$

Sol. $\frac{11}{-10} = \frac{11 \times 11}{-10 \times 11} = \frac{-121}{110}$

$\frac{-10}{11} = \frac{-10 \times 10}{11 \times 10} = \frac{-100}{110}$

$\frac{-121}{110} < \frac{-100}{110}$ As, $-121 < -100$

OR. $\frac{11}{-10} < \frac{-10}{11}$

(ix) $\frac{4}{-100}$, $\frac{-1}{25}$

Sol. $\frac{-1}{25} = \frac{-1 \times 4}{25 \times 4} = \frac{-4}{100}$

$\frac{4}{-100} = \frac{-4}{100}$ As, $-4 = -4$

OR. $\frac{4}{-100} = \frac{-1}{25}$

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

Sol. $\frac{-4}{7} = \frac{-4 \times 2}{7 \times 2} = \frac{-8}{14}$

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Ex # 2.3

Pg # (1)

Q.1 Put the correct sign $>$, $<$ or $=$ between the following rational numbers.

(i) $\frac{1}{2}$, $\frac{15}{20}$

Sol. $\frac{1}{2} = \frac{1 \times 10}{2 \times 10} = \frac{10}{20}$ Making denominators equal

$\frac{10}{20} < \frac{15}{20}$ Comparing numerators

OR $\frac{1}{2} < \frac{15}{20}$ As, $10 < 15$

(ii) $\frac{2}{-3}$, $\frac{1}{6}$

Sol. $\frac{2}{-3} = \frac{2 \times 2}{-3 \times 2} = \frac{4}{6}$ Making denominators equal

$-\frac{4}{6} < \frac{1}{6}$ Comparing numerators.

OR $-\frac{2}{3} < \frac{1}{6}$ As, $-4 < 1$

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Ex # 2.3

Pg # 6

$$\frac{-80}{110} < \frac{-33}{-110} \quad \text{As, } -80 < -33$$

OR. $\frac{-8}{11} < \frac{3}{-10}$

Q:2 Arrange the following rational numbers in descending order.

(i) $\frac{1}{2}, \frac{2}{3}, \frac{8}{9}$

Sol. The L.C.M of denominators 2, 3 and 9 is 18.

$$\frac{1}{2} = \frac{1 \times 9}{2 \times 9} = \frac{9}{18}$$

$$\frac{2}{3} = \frac{2 \times 6}{3 \times 6} = \frac{12}{18}$$

$$\frac{8}{9} = \frac{8 \times 2}{9 \times 2} = \frac{16}{18}$$

$$\begin{array}{r|l} 2 & 2, 3, 9 \\ 3 & 1, 3, 9 \\ 3 & 1, 1, 3 \\ & 1, 1, 1 \end{array}$$

$2 \times 3 \times 3 = 18$

As, $16 > 12 > 9$ Comparing numerators

So, $\frac{8}{9} > \frac{2}{3} > \frac{1}{2}$

Descending order $\frac{8}{9}, \frac{2}{3}, \frac{1}{2}$

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Ex # 2.3Pg # 5

$$\frac{5}{-2} - \frac{5 \times 7}{-2 \times 7} = \frac{35}{-14}$$

$$\frac{-8}{14} > \frac{35}{-14} \quad \text{As, } -8 > -35$$

OR. $\frac{-4}{7} > \frac{5}{-2}$

(xi) $\frac{4}{9} > \frac{6}{-7}$

Sol. $\frac{4}{9} - \frac{4 \times 7}{9 \times 7} = \frac{28}{63}$

$$\frac{6}{-7} = \frac{6 \times 9}{-7 \times 9} = \frac{54}{-63}$$

$$\frac{28}{63} > \frac{54}{-63} \quad \text{As, } 28 > -54$$

OR. $\frac{4}{9} > \frac{6}{-7}$

(xii) $\frac{-8}{11} > \frac{3}{-10}$

Sol. $\frac{-8}{11} = \frac{-8 \times 10}{11 \times 10} = \frac{-80}{110}$

$$\frac{3}{-10} = \frac{3 \times 11}{-10 \times 11} = \frac{33}{-110}$$

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Ex # 2.3

Pg # 9

(iii) $\frac{3}{8}, \frac{1}{4}, \frac{5}{6}$

Sol. The L.C.M of 8, 4 and 6 is 24.

$$\frac{3}{8} = \frac{3 \times 3}{8 \times 3} = \frac{9}{24}$$

$$\frac{1}{4} = \frac{1 \times 6}{4 \times 6} = \frac{6}{24}$$

$$\frac{5}{6} = \frac{5 \times 4}{6 \times 4} = \frac{20}{24}$$

$$\begin{array}{l} 2 \quad 8, 4, 6 \\ 2 \quad 4, 2, 3 \\ 2 \quad 2, 1, 3 \\ 3 \quad 1, 1, 3 \\ \hline 2 \times 2 \times 2 \times 3 = 24 \end{array}$$

As, $6 < 9 < 20$

So $\frac{1}{4} < \frac{3}{8} < \frac{5}{6}$

Ascending order

$$\frac{1}{4}, \frac{3}{8}, \frac{5}{6}$$

Q.4 Prove that:

(i) $\left[-\frac{1}{2}\right] + \frac{1}{3} = \frac{1}{3} + \left[-\frac{1}{2}\right]$

Sol

L.H.S

$$\left[-\frac{1}{2}\right] + \frac{1}{3}$$

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

(Taking L.C.M)

R.H.S

$$\frac{1}{3} + \left[-\frac{1}{2}\right]$$

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

(Taking L.C.M)

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Ex # 2.3Pg # 11

$$(iii) \quad \left[\frac{12}{-105} \right] \times \left[\frac{-15}{84} \right] = \left[\frac{-15}{84} \right] \times \left[\frac{12}{-105} \right]$$

Sol

L.H.S

R.H.S

$$= \frac{12}{-105} \times \frac{-15}{84}$$

$$= \frac{-15}{84} \times \frac{12}{-105}$$

$$= \frac{1}{49}$$

$$= \frac{1}{49}$$

$$\text{L.H.S} = \text{R.H.S}$$

$$(iv) \quad -\frac{2}{3} \times \left[\frac{7}{8} \times \frac{9}{14} \right] = \left[-\frac{2}{3} \times \frac{7}{8} \right] \times \frac{9}{14}$$

Sol

L.H.S

R.H.S

$$= -\frac{2}{3} \times \left[\frac{7}{8} \times \frac{9}{14} \right]$$

$$= \left[-\frac{2}{3} \times \frac{7}{8} \right] \times \frac{9}{14}$$

$$= -\frac{2}{3} \times \left[\frac{1}{8} \times \frac{9}{2} \right]$$

$$= \frac{-7}{12} \times \frac{9}{14}$$

$$= \frac{2}{3} \times \frac{1}{8} \times \frac{9^3}{21}$$

$$= \frac{-7 \times 9^3}{4 \times 12 \times 14 \times 2}$$

$$= -\frac{3}{8}$$

$$= -\frac{3}{8}$$

$$\text{L.H.S} = \text{R.H.S}$$

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Ex # 2.3

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$$= \frac{1}{-2} + \frac{17}{20}$$

$$= \frac{-10 + 17}{20}$$

$$= \frac{7}{20}$$

$$= \frac{1}{10} + \frac{1}{4}$$

$$= \frac{2 + 5}{20}$$

$$= \frac{7}{20}$$

L.H.S = R.H.S

(vii) $\frac{2}{3} \times \left[\frac{1}{2} + \frac{5}{6} \right] = \left[\frac{2}{3} \times \frac{1}{2} \right] + \left[\frac{2}{3} \times \frac{5}{6} \right]$

Sol.

L.H.S

$$= \frac{2}{3} \times \left[\frac{1}{2} + \frac{5}{6} \right]$$

$$= \frac{2}{3} \times \left[\frac{3+5}{6} \right]$$

$$= \frac{2}{3} \times \frac{8}{6}$$

$$= \frac{2}{3} \times \frac{8}{6}$$

$$= \frac{8}{9}$$

R.H.S

$$= \left[\frac{2}{3} \times \frac{1}{2} \right] + \left[\frac{2}{3} \times \frac{5}{6} \right]$$

$$= \left[\frac{2}{3} \times \frac{1}{2} \right] + \left[\frac{2}{3} \times \frac{5}{6} \right]$$

$$= \frac{1}{3} + \frac{5}{9}$$

$$= \frac{3+5}{9}$$

$$= \frac{8}{9}$$

L.H.S = R.H.S

$$(v) \quad \frac{3}{5} + \left[\frac{1}{2} + \frac{7}{10} \right] = \left[\frac{3}{5} + \frac{1}{2} \right] + \frac{7}{10}$$

Sol.

L.H.S

R.H.S

$$\frac{3}{5} + \left[\frac{1}{2} + \frac{7}{10} \right] = \left[\frac{3}{5} + \frac{1}{2} \right] + \frac{7}{10}$$

$$= \frac{3}{5} + \left[\frac{5+7}{10} \right] = \left[\frac{6+5}{10} \right] + \frac{7}{10}$$

$$= \frac{3}{5} + \frac{12}{10} = \frac{11}{10} + \frac{7}{10}$$

$$= \frac{6+12}{10} = \frac{11+7}{10}$$

$$= \frac{18}{10} = \frac{18}{10}$$

L.H.S = R.H.S

$$(vi) \quad \frac{1}{-2} + \left[\frac{3}{5} + \frac{1}{4} \right] = \left[\frac{1}{-2} + \frac{3}{5} \right] + \frac{1}{4}$$

Sol.

L.H.S

R.H.S

$$\frac{1}{-2} + \left[\frac{3}{5} + \frac{1}{4} \right] = \left[\frac{1}{-2} + \frac{3}{5} \right] + \frac{1}{4}$$

$$= \frac{1}{-2} + \left[\frac{12+5}{20} \right] = \left[\frac{-5+6}{10} \right] + \frac{1}{4}$$

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Ex # 2.3

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$$= \frac{-3+2}{6}$$

$$= -\frac{1}{6}$$

$$= \frac{2-3}{6}$$

$$= -\frac{1}{6}$$

$$\text{L.H.S} = \text{R.H.S}$$

$$(ii) \quad \frac{10}{11} + \left[\frac{5}{-44} \right] = \left[\frac{5}{-44} \right] + \frac{10}{11}$$

Sol

L.H.S

$$\frac{10}{11} + \left[\frac{5}{-44} \right]$$

$$= \frac{10}{11} - \frac{5}{44}$$

$$= \frac{40-5}{44}$$

$$= \frac{35}{44}$$

R.H.S

$$\left[\frac{5}{-44} \right] + \frac{10}{11}$$

$$= -\frac{5}{44} + \frac{10}{11}$$

$$= \frac{-5+40}{44}$$

$$= \frac{35}{44}$$

$$\text{L.H.S} = \text{R.H.S}$$

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Ex # 2.3

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(viii) $\frac{1}{4} \times \left[\frac{8}{9} - \frac{12}{15} \right] = \left[\frac{1}{4} \times \frac{8}{9} \right] - \left[\frac{1}{4} \times \frac{12}{15} \right]$

Sol. L.H.S

$$= \frac{1}{4} \times \left[\frac{8}{9} - \frac{12}{15} \right]$$

$$= \frac{1}{4} \times \left[\frac{40 - 36}{45} \right]$$

$$= \frac{1}{4} \times \frac{4}{45}$$

$$= \frac{1}{45}$$

R.H.S

$$= \left[\frac{1}{4} \times \frac{8}{9} \right] - \left[\frac{1}{4} \times \frac{12}{15} \right]$$

$$= \left[\frac{1}{4} \times \frac{8^2}{9} \right] - \left[\frac{1}{4} \times \frac{12^3}{15} \right]$$

$$= \frac{2}{9} - \frac{3}{15}$$

$$= \frac{10 - 9}{45}$$

$$= \frac{1}{45}$$

L.H.S = R.H.S

(ix) $\frac{-5}{8} \times \left[\frac{4}{7} - \frac{2}{3} \right] = \left[\frac{-5}{8} \times \frac{4}{7} \right] - \left[\frac{-5}{8} \times \frac{2}{3} \right]$

Sol. L.H.S

$$= \frac{-5}{8} \times \left[\frac{4}{7} - \frac{2}{3} \right]$$

$$= \frac{-5}{8} \times \left[\frac{12 - 14}{21} \right]$$

$$= \frac{-5}{8} \times \frac{-2}{21}$$

R.H.S

$$= \left[\frac{-5}{8} \times \frac{4}{7} \right] - \left[\frac{-5}{8} \times \frac{2}{3} \right]$$

$$= \left[\frac{-5 \times 4}{28} \right] - \left[\frac{-5 \times 2}{48} \right]$$

$$= \frac{-5}{14} - \left[\frac{-5}{12} \right]$$

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Ex # 2.3

Pg # 15

$$= \frac{5}{84}$$

$$= \frac{-5}{14} + \frac{5}{12}$$

$$= \frac{-30 + 35}{84}$$

$$= \frac{5}{84}$$

L.H.S = R.H.S

$$(x) \quad \frac{24}{49} \times \left[\frac{7}{8} + \frac{14}{6} \right] = \left[\frac{24}{49} \times \frac{7}{8} \right] + \left[\frac{24}{49} \times \frac{14}{6} \right]$$

Sol.

L.H.S

R.H.S

$$= \frac{24}{49} \times \left[\frac{7}{8} + \frac{14}{6} \right] = \left[\frac{24}{49} \times \frac{7}{8} \right] + \left[\frac{24}{49} \times \frac{14}{6} \right]$$

$$= \frac{24}{49} \times \left[\frac{21 + 56}{24} \right] = \left[\frac{24}{49} \times \frac{7}{8} \right] + \left[\frac{24}{49} \times \frac{14}{6} \right]$$

$$= \frac{24}{49} \times \frac{77}{24}$$

$$= \frac{3}{7} + \frac{8}{7}$$

$$= \frac{11}{7}$$

$$= \frac{3+8}{7}$$

$$= \frac{11}{7}$$

L.H.S = R.H.S

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Ex # 2.3

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$$= \frac{1}{-2} + \frac{17}{20}$$

$$= \frac{-10 + 17}{20}$$

$$= \frac{7}{20}$$

$$= \frac{1}{10} + \frac{1}{4}$$

$$= \frac{2 + 5}{20}$$

$$= \frac{7}{20}$$

L.H.S = R.H.S

(vii) $\frac{2}{3} \times \left[\frac{1}{2} + \frac{5}{6} \right] = \left[\frac{2}{3} \times \frac{1}{2} \right] + \left[\frac{2}{3} \times \frac{5}{6} \right]$

Sol.

L.H.S

$$= \frac{2}{3} \times \left[\frac{1}{2} + \frac{5}{6} \right]$$

$$= \frac{2}{3} \times \left[\frac{3+5}{6} \right]$$

$$= \frac{2}{3} \times \frac{8}{6}$$

$$= \frac{2}{3} \times \frac{8}{3}$$

$$= \frac{8}{9}$$

R.H.S

$$= \left[\frac{2}{3} \times \frac{1}{2} \right] + \left[\frac{2}{3} \times \frac{5}{6} \right]$$

$$= \left[\frac{2}{3} \times \frac{1}{2} \right] + \left[\frac{2}{3} \times \frac{5}{6} \right]$$

$$= \frac{1}{3} + \frac{5}{9}$$

$$= \frac{3+5}{9}$$

$$= \frac{8}{9}$$

L.H.S = R.H.S

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Ex # 2.3

Pg # 10

$$= \frac{-3+2}{6}$$

$$= -\frac{1}{6}$$

$$= \frac{2-3}{6}$$

$$= -\frac{1}{6}$$

$$\text{L.H.S} = \text{R.H.S}$$

$$(ii) \quad \frac{10}{11} + \left[\frac{5}{-44} \right] = \left[\frac{5}{-44} \right] + \frac{10}{11}$$

Sol

L.H.S

$$\frac{10}{11} + \left[\frac{5}{-44} \right]$$

$$= \frac{10}{11} - \frac{5}{44}$$

$$= \frac{40-5}{44}$$

$$= \frac{35}{44}$$

R.H.S

$$\left[\frac{5}{-44} \right] + \frac{10}{11}$$

$$= -\frac{5}{44} + \frac{10}{11}$$

$$= \frac{-5+40}{44}$$

$$= \frac{35}{44}$$

$$\text{L.H.S} = \text{R.H.S}$$

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Ex # 2.3

Pg # 15

$$= \frac{5}{84}$$

$$= \frac{-5}{14} + \frac{5}{12}$$

$$= \frac{-30 + 35}{84}$$

$$= \frac{5}{84}$$

L.H.S = R.H.S

$$(x) \quad \frac{24}{49} \times \left[\frac{7}{8} + \frac{14}{6} \right] = \left[\frac{24}{49} \times \frac{7}{8} \right] + \left[\frac{24}{49} \times \frac{14}{6} \right]$$

Sol.

L.H.S

R.H.S

$$= \frac{24}{49} \times \left[\frac{7}{8} + \frac{14}{6} \right] = \left[\frac{24}{49} \times \frac{7}{8} \right] + \left[\frac{24}{49} \times \frac{14}{6} \right]$$

$$= \frac{24}{49} \times \left[\frac{21 + 56}{24} \right] = \left[\frac{24}{49} \times \frac{7}{8} \right] + \left[\frac{24}{49} \times \frac{14}{6} \right]$$

$$= \frac{24}{49} \times \frac{77}{24}$$

$$= \frac{3}{7} + \frac{8}{7}$$

$$= \frac{11}{7}$$

$$= \frac{3+8}{7}$$

$$= \frac{11}{7}$$

L.H.S = R.H.S

$$(v) \quad \frac{3}{5} + \left[\frac{1}{2} + \frac{7}{10} \right] = \left[\frac{3}{5} + \frac{1}{2} \right] + \frac{7}{10}$$

Sol.

L.H.S

R.H.S

$$\frac{3}{5} + \left[\frac{1}{2} + \frac{7}{10} \right] = \left[\frac{3}{5} + \frac{1}{2} \right] + \frac{7}{10}$$

$$= \frac{3}{5} + \left[\frac{5+7}{10} \right] = \left[\frac{6+5}{10} \right] + \frac{7}{10}$$

$$= \frac{3}{5} + \frac{12}{10} = \frac{11}{10} + \frac{7}{10}$$

$$= \frac{6+12}{10} = \frac{11+7}{10}$$

$$= \frac{18}{10} = \frac{18}{10}$$

L.H.S = R.H.S

$$(vi) \quad \frac{1}{-2} + \left[\frac{3}{5} + \frac{1}{4} \right] = \left[\frac{1}{-2} + \frac{3}{5} \right] + \frac{1}{4}$$

Sol.

L.H.S

R.H.S

$$\frac{1}{2} + \left[\frac{3}{5} + \frac{1}{4} \right] = \left[\frac{1}{-2} + \frac{3}{5} \right] + \frac{1}{4}$$

$$= \frac{1}{2} + \left[\frac{12+5}{20} \right] = \left[\frac{-5+6}{10} \right] + \frac{1}{4}$$

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(viii) $\frac{1}{4} \times \left[\frac{8}{9} - \frac{12}{15} \right] = \left[\frac{1}{4} \times \frac{8}{9} \right] - \left[\frac{1}{4} \times \frac{12}{15} \right]$

Sol. L.H.S

$$= \frac{1}{4} \times \left[\frac{8}{9} - \frac{12}{15} \right]$$

$$= \frac{1}{4} \times \left[\frac{40 - 36}{45} \right]$$

$$= \frac{1}{4} \times \frac{4}{45}$$

$$= \frac{1}{45}$$

R.H.S

$$= \left[\frac{1}{4} \times \frac{8}{9} \right] - \left[\frac{1}{4} \times \frac{12}{15} \right]$$

$$= \left[\frac{1}{4} \times \frac{8^2}{9} \right] - \left[\frac{1}{4} \times \frac{12^3}{15} \right]$$

$$= \frac{2}{9} - \frac{3}{15}$$

$$= \frac{10 - 9}{45}$$

$$= \frac{1}{45}$$

L.H.S = R.H.S

$$\begin{array}{r} 3 \overline{) 9 \cancel{2} 5} \\ 3 \overline{) 3 \cancel{9} 5} \\ 5 \overline{) 1 \cancel{2} 5} \\ \underline{12} \end{array}$$

$$3 \times 3 \times 5 = 45$$

(ix) $\frac{-5}{8} \times \left[\frac{4}{7} - \frac{2}{3} \right] = \left[\frac{-5}{8} \times \frac{4}{7} \right] - \left[\frac{-5}{8} \times \frac{2}{3} \right]$

Sol. L.H.S

$$= \frac{-5}{8} \times \left[\frac{4}{7} - \frac{2}{3} \right]$$

$$= \frac{-5}{8} \times \left[\frac{12 - 14}{21} \right]$$

$$= \frac{-5}{8} \times \frac{-2}{21}$$

R.H.S

$$= \left[\frac{-5}{8} \times \frac{4}{7} \right] - \left[\frac{-5}{8} \times \frac{2}{3} \right]$$

$$= \left[\frac{-5 \times 4}{28} \right] - \left[\frac{-5 \times 2}{48} \right]$$

$$= \frac{-5}{14} - \left[\frac{-5}{12} \right]$$