PARTE 1 – CONJUNTO DOS NÚMEROS RACIONAIS

Equações e inequações de 1.ª ordem

Fracções

Ficha de trabalho

Elaborado por **Patrícia Engrácia**

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1 Exercícios

Exercício 1 *Complete com os sinais de igualdade e desigualdade* $(=, <, >)$.

1. $\frac{5}{7} \ldots \frac{4}{7}$

$$\frac{5}{7} > \frac{4}{7}$$

2. $\frac{2}{3} \ldots \frac{3}{4}$

$$\frac{2}{3} = \frac{8}{12}$$
$$\frac{3}{4} = \frac{9}{12}$$
$$\frac{2}{3} = \frac{8}{12} < \frac{9}{12} = \frac{3}{4}$$

3. $\frac{15}{4} \ldots \frac{18}{5}$

$$\frac{15}{4} = \frac{75}{20}$$
$$\frac{18}{5} = \frac{72}{20}$$
$$\frac{15}{4} = \frac{75}{20} > \frac{72}{20} = \frac{18}{5}$$

4. $\frac{3}{4} \ldots \frac{5}{6}$

$$\frac{3}{4} = \frac{9}{12}$$
$$\frac{5}{6} = \frac{10}{12}$$
$$\frac{3}{4} = \frac{9}{12} < \frac{10}{12} = \frac{5}{6}$$

Exercício 2 *Coloque as fracções* $\frac{3}{5}, \frac{3}{4}, \frac{1}{2}, \frac{4}{5}$ *e* $\frac{4}{10}$ *por ordem crescente.*

$$\begin{array}{ll} \frac{3}{5} = \frac{12}{20}, & \frac{3}{4} = \frac{15}{20}, \\ \frac{1}{2} = \frac{10}{20}, & \frac{4}{5} = \frac{16}{20}, \\ \frac{4}{10} = \frac{8}{20} & \end{array}$$

$$\frac{4}{10} = \frac{8}{20}, \quad \frac{1}{2} = \frac{10}{20}, \quad \frac{3}{5} = \frac{12}{20}, \quad \frac{3}{4} = \frac{15}{20}, \quad \frac{4}{5} = \frac{16}{20}$$

Exercício 3 *Calcule:*

1. $\frac{1}{3}\left(\frac{3}{5} + \frac{1}{2}\right)$

$$\begin{aligned} \frac{1}{3}\left(\frac{3}{5} + \frac{1}{2}\right) &= \frac{1}{3}\left(\frac{6}{10} + \frac{5}{10}\right) = \\ &= \frac{1}{3} \times \frac{11}{10} = \\ &= \frac{11}{30} \end{aligned}$$

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

$$\begin{aligned} \frac{5}{2}\left(\frac{4}{3} - \frac{3}{4}\right) &= \frac{5}{2}\left(\frac{16}{12} - \frac{9}{12}\right) = \\ &= \frac{5}{2} \times \frac{7}{12} = \\ &= \frac{35}{24} \end{aligned}$$

3. $\left(\frac{5}{4} - \frac{1}{2}\right) \cdot \left(\frac{1}{3} + \frac{2}{5}\right)$

$$\begin{aligned} \left(\frac{5}{4} - \frac{1}{2}\right) \cdot \left(\frac{1}{3} + \frac{2}{5}\right) &= \left(\frac{5}{4} - \frac{2}{4}\right) \cdot \left(\frac{5}{15} + \frac{6}{15}\right) = \\ &= \frac{3}{4} \cdot \frac{11}{15} = \\ &= \frac{33}{60} = \\ &= \frac{11}{20} \end{aligned}$$

4. $\left(\frac{1}{10} + \frac{2}{3}\right) \cdot \frac{-2}{5}$

$$\begin{aligned} \left(\frac{1}{10} + \frac{2}{3}\right) \cdot \frac{-2}{5} &= \left(\frac{3}{30} + \frac{20}{30}\right) \cdot \frac{-2}{5} = \\ &= \frac{23}{30} \cdot \frac{-2}{5} = \\ &= -\frac{46}{150} = \\ &= -\frac{23}{75} \end{aligned}$$

5. $\dfrac{\frac{2}{5}}{3}$

$$\frac{\frac{2}{5}}{3} = \frac{2}{5} \cdot \frac{1}{3} = \frac{2}{15}$$

6. $\dfrac{\frac{1}{4}}{\frac{1}{5}}$

$$\frac{\frac{1}{4}}{\frac{1}{5}} = \frac{1}{4} \cdot \frac{5}{1} = \frac{5}{4}$$

7. $\dfrac{\frac{35}{3}}{\frac{7}{6}}$

$$\frac{\frac{35}{3}}{\frac{7}{6}} = \frac{35}{3} \cdot \frac{6}{7} = \frac{5 \times 7 \times 2 \times 3}{3 \times 7} = 10$$

8. $\dfrac{\frac{1}{4} + \frac{1}{2}}{\frac{3}{2} + 3}$

$$\frac{\frac{1}{4} + \frac{1}{2}}{\frac{3}{2} + 3} = \frac{\frac{1}{4} + \frac{2}{4}}{\frac{3}{2} + \frac{6}{2}} = \frac{\frac{3}{4}}{\frac{9}{2}} = \frac{3}{4} \cdot \frac{2}{9} = \frac{6}{36} = \frac{1}{6}$$

9. $\dfrac{\frac{1}{2} - \frac{1}{6}}{\frac{1}{3} - \frac{1}{4}}$

$$\frac{\frac{1}{2} - \frac{1}{6}}{\frac{1}{3} - \frac{1}{4}} = \frac{\frac{3}{6} - \frac{1}{6}}{\frac{4}{12} - \frac{3}{12}} = \frac{\frac{1}{3}}{\frac{1}{12}} = \frac{1}{3} \cdot \frac{12}{1} = \frac{12}{3} = 4$$

Exercício 4 *Resolva as seguintes equações.*

1. $\frac{3}{2}x - \frac{1}{5} = -2x$

$$\begin{aligned} \frac{3}{2}x - \frac{1}{5} = -2x &\Leftrightarrow \frac{3}{2}x + 2x = \frac{1}{5} \Leftrightarrow \\ &\Leftrightarrow \frac{3}{2}x + \frac{4}{2}x = \frac{1}{5} \Leftrightarrow \\ &\Leftrightarrow \frac{7}{2}x = \frac{1}{5} \Leftrightarrow \\ &\Leftrightarrow x = \frac{2}{7} \cdot \frac{1}{5} \Leftrightarrow \\ &\Leftrightarrow x = \frac{2}{35} \end{aligned}$$

2. $\dfrac{3-\frac{1}{2}x}{-3x+\frac{1}{5}} = \dfrac{2-\frac{1}{3}}{3}$

$$\begin{aligned}
\frac{3-\frac{1}{2}x}{-3x+\frac{1}{5}} = \frac{2-\frac{1}{3}}{3} &\Leftrightarrow \frac{3-\frac{1}{2}x}{-3x+\frac{1}{5}} = \frac{\frac{6}{3}-\frac{1}{3}}{3} \Leftrightarrow \\
&\Leftrightarrow \frac{3-\frac{1}{2}x}{-3x+\frac{1}{5}} = \frac{\frac{5}{3}}{3} \Leftrightarrow \\
&\Leftrightarrow \frac{3-\frac{1}{2}x}{-3x+\frac{1}{5}} = \frac{5}{3}\cdot\frac{1}{3} \Leftrightarrow \\
&\Leftrightarrow \frac{3-\frac{1}{2}x}{-3x+\frac{1}{5}} = \frac{5}{9} \Leftrightarrow \\
&\Leftrightarrow 3-\frac{1}{2}x = \frac{5}{9}\left(-3x+\frac{1}{5}\right) \Leftrightarrow \\
&\Leftrightarrow 3-\frac{1}{2}x = -\frac{5}{3}x+\frac{1}{9} \Leftrightarrow \\
&\Leftrightarrow \frac{5}{3}x-\frac{1}{2}x = \frac{1}{9}-3 \Leftrightarrow \\
&\Leftrightarrow \frac{10}{6}x-\frac{3}{6}x = \frac{1}{9}-\frac{27}{9} \Leftrightarrow \\
&\Leftrightarrow \frac{7}{6}x = -\frac{26}{9} \Leftrightarrow \\
&\Leftrightarrow x = -\frac{6}{7}\cdot\frac{26}{9} \Leftrightarrow \\
&\Leftrightarrow x = -\frac{6\times 26}{7\times 9} \Leftrightarrow \\
&\Leftrightarrow x = -\frac{2\times 3\times 2\times 13}{7\times 3\times 3} \Leftrightarrow \\
&\Leftrightarrow x = -\frac{52}{21}
\end{aligned}$$

3. $\dfrac{2}{3-x} = \dfrac{5}{2}$

$$\begin{aligned}
\frac{2}{3-x} = \frac{5}{2} &\Leftrightarrow 2 = \frac{5}{2}(3-x) \Leftrightarrow \\
&\Leftrightarrow 4 = 5(3-x) \Leftrightarrow \\
&\Leftrightarrow 4 = 15-5x \Leftrightarrow \\
&\Leftrightarrow 5x = 15-4 \Leftrightarrow \\
&\Leftrightarrow 5x = \frac{11}{5}
\end{aligned}$$