

1. Simplify the following complex fractions.

$$\begin{aligned} \text{a. } & \frac{\frac{25}{3}}{\frac{5}{4}} \\ & = \frac{5}{25} \cdot \frac{4}{5} \\ & = \frac{20}{3} \end{aligned}$$

$$\begin{aligned} \text{b. } & \frac{\frac{y}{t}}{\frac{x}{r}} \\ & = \frac{y}{t} \cdot \frac{r}{x} \\ & = \frac{yr}{tx} \end{aligned}$$

$$\begin{aligned} \text{c. } & \frac{\frac{1}{6} - \frac{3}{4}}{\frac{3}{2} + \frac{1}{3}} \cdot \frac{12}{12} \\ & = \frac{\frac{1}{6} \cdot \frac{12}{1} - \frac{3}{4} \cdot \frac{12}{1}}{\frac{3}{2} \cdot \frac{12}{1} + \frac{1}{3} \cdot \frac{12}{1}} \\ & = \frac{2 - 9}{18 + 4} = \frac{-7}{22} \end{aligned}$$

2. Simplify the following complex rational expressions. If applicable, write any domain changes.

$$\begin{aligned} \text{a. } & \frac{\frac{6a-6}{a}}{\frac{a-5}{a}} \cdot \frac{a}{a} \\ & = \frac{6a-6}{a-5} \quad \text{when } a \neq 0 \end{aligned}$$

$$\begin{aligned} \text{c. } & \frac{8 + \frac{1}{b-6}}{\frac{1}{b-6} - \frac{1}{6}} \cdot \frac{6(b-6)}{6(b-6)} \\ & = \frac{48(b-6) + 6}{6 - (b-6)} \quad \text{when } b \neq 6 \\ & = \frac{48b - 282}{b} \end{aligned}$$

$$\begin{aligned} \text{b. } & \frac{2 + \frac{1}{p}}{p + 10} \cdot \frac{p}{p} \\ & = \frac{2p + 1}{p(p+10)} \end{aligned}$$

$$\begin{aligned} \text{d. } & \frac{\frac{1}{p-4} + \frac{4}{p-4}}{5 - \frac{1}{p+4}} \cdot \frac{(p-4)(p+4)}{(p-4)(p+4)} \\ & = \frac{p+4 + 4(p+4)}{5(p-4)(p+4) - p-4} \quad \text{when } p \neq \pm 4 \\ & = \frac{p+4 + 4p+16}{5p^2 - 90 - p - 4} \\ & = \frac{5p+20}{5p^2 - p - 94} \end{aligned}$$

	470
1	470
2	235
5	94
10	47

$$\begin{aligned}
 \text{e. } & \frac{\frac{6x}{x^2-25} - 5}{\frac{2}{x+5} + \frac{1}{x-5}} \cdot \frac{(x-5)(x+5)}{(x-5)(x+5)} \\
 & = \frac{6x - 5(x^2 - 25)}{2(x-5) + (x+5)} \quad \left. \begin{array}{l} \text{when} \\ x \neq 5, -5 \end{array} \right\} \\
 & = \frac{6x - 5x^2 + 125}{2x - 10 + x + 5} \\
 & = \frac{-5x^2 + 6x + 125}{3x - 5}
 \end{aligned}$$

$$\begin{aligned}
 \text{h. } & \frac{\frac{1}{u+1} + \frac{5}{u-1}}{10 - \frac{1}{u-1}} \cdot \frac{(u+1)(u-1)}{(u+1)(u-1)} \\
 & = \frac{u-1 + 5(u+1)}{10(u^2-1) - (u+1)} \quad \left. \begin{array}{l} \text{when} \\ u \neq 1 \end{array} \right\} \\
 & = \frac{6u + 4}{10u^2 - u - 11} \\
 & = \frac{2(3u+2)}{(10u-11)(u+1)}
 \end{aligned}$$

$$\begin{aligned}
 \text{f. } & \frac{\frac{c}{c^2-9} - \frac{1}{c^2-9}}{\frac{1}{c+9}} \cdot \frac{(c^2-9)(c+9)}{(c^2-9)(c+9)} \\
 & = \frac{c(c+9) - (c+9)}{c^2-9} \quad \left. \begin{array}{l} \text{when} \\ c \neq -9 \end{array} \right\} \\
 & = \frac{c^2 + 8c - 9}{(c-3)(c+3)} \\
 & = \frac{(c+9)(c-1)}{(c-3)(c+3)}
 \end{aligned}$$

$$\begin{aligned}
 \text{i. } & \frac{\frac{4}{x}}{20 + 4t} \cdot \frac{x}{x} \\
 & = \frac{4}{4x(5+t)}
 \end{aligned}$$

$$\begin{aligned}
 \text{g. } & \frac{\frac{7}{n-1} - 2}{\frac{1}{n-1} + \frac{1}{n-9}} \cdot \frac{(n-1)(n-9)}{(n-1)(n-9)} \\
 & = \frac{7(n-9) - 2(n^2 - 10n + 9)}{n-9 + n-1} \quad \left. \begin{array}{l} \text{when} \\ n \neq 1, 9 \end{array} \right\} \\
 & = \frac{-2n^2 + 27n - 81}{2n - 10} \\
 & = \frac{(-2n-9)(n+9)}{2(n-5)}
 \end{aligned}$$

$$\begin{aligned}
 \text{j. } & \frac{\frac{2}{y} + \frac{10}{y}}{\frac{2}{y} - \frac{12}{x}} \cdot \frac{yx}{yx} \\
 & = \frac{2x + 10x}{2x - 12y} \quad \left. \begin{array}{l} \text{when } x \neq 0 \\ \text{and } y \neq 0 \end{array} \right\} \\
 & = \frac{12x}{2(x-6y)} \\
 & = \frac{6x}{(x-6y)}
 \end{aligned}$$