Operations with algebraic fractions

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. Simplify $\frac{3x}{4} \times \frac{8}{9x}$ and retain restrictions. [2 marks]

The original second denominator excludes zero; reduce $\frac{24x}{36x}$.

Answer: $\frac{2}{3}$, $x \neq 0$

2. Simplify $\frac{2}{a} + \frac{5}{a}$. [2 marks]

Add the numerators over the common denominator.

Answer: $\frac{7}{a}$, $a \neq 0$

3. Simplify $\frac{3}{x} - \frac{1}{x+2}$. [2 marks]

The combined numerator is $3(x+2) - x = 2x + 6$.

Answer: $\frac{2x+6}{x(x+2)}$, $x \neq 0, -2$

4. Simplify $\frac{a+1}{3} \div \frac{2(a+1)}{5}$. [2 marks]

The divisor cannot be zero; multiply by $\frac{5}{2(a+1)}$.

Answer: $\frac{5}{6}$, $a \neq -1$

5. Simplify $\frac{4}{p-1} - \frac{p+2}{p-1}$. [2 marks]

The numerator is $4 - (p+2) = 2 - p$.

Answer: $\frac{2-p}{p-1}$, $p \neq 1$

6. A printer completes a job in x minutes and another in $x+5$ minutes. Write their combined job rate as one fraction. [3 marks]

The separate rates are $\frac{1}{x}$ and $\frac{1}{x+5}$.

Add using the common denominator and apply the practical positive-time restriction.

Answer: $\frac{2x+5}{x(x+5)}$ jobs/min, $x > 0$.