

Multiplying algebraic fractions

Starter

1. (Review of last lesson) Simplify: (a) $\frac{x^2 + 4x}{x^2 + 7x + 12}$ (b) $\frac{2t^2 - t - 45}{4t^2 - 81}$.
2. Find the value of $\frac{2}{3} \times \frac{9}{14}$.

Notes

Factorise before cancelling when **addition** and/or **subtraction** are involved.

At the **end**, do **not expand brackets**.

Success Criteria – multiplying algebraic fractions

- Factorise** the numerator and denominator of each fraction
- Cancel** any common factor which appears at the top and bottom of **either** fraction.
- Multiply** what is left: numerator \times numerator, denominator \times denominator

N.B. Remember laws of indices: when **multiplying**, **add** the indices
 when **dividing**, **subtract** the indices
 when **raising to a power**, **multiply** the indices

E.g. 1 Simplify: (a) $\frac{2a}{4b^2} \times \frac{5b}{a^3}$ (b) $\frac{x}{y} \times \frac{2}{x^2}$ (c) $\frac{64xy^2}{9y} \times \frac{3x^3}{16x^2y}$

Working: (a) $\frac{2a}{4b^2} \times \frac{5b}{a^3} = \frac{10a^{1-3}b^{1-2}}{4} = \frac{5a^{-2}b^{-1}}{2} = \frac{5}{2a^2b}$

E.g. 2 Simplify: (a) $\frac{x^2 - 16}{x^2 + 5x + 6} \times \frac{x + 3}{x + 4}$

(b) $\frac{x + 4}{2x + 6} \times \frac{x^2 + 4x + 3}{x^2 + 6x + 8}$

(c) $\frac{x^2 + 2x}{x^2 + 6x - 7} \times \frac{x^2 + 10x + 21}{x^2 - x - 6}$

Working: (a) $x^2 - 16 = (x - 4)(x + 4)$ **difference of 2 squares**

$$x^2 + 5x + 6 = x^2 + 3x + 2x + 6 = x(x + 3) + 2(x + 3) = (x + 3)(x + 2)$$

$$\frac{x^2 - 16}{x^2 + 5x + 6} \times \frac{x + 3}{x + 4} = \frac{(x - 4)(x + 4)}{(x + 3)(x + 2)} \times \frac{x + 3}{x + 4} = \frac{x - 4}{x + 2}$$

Video: [Multiplying algebraic fractions](#)

[Solutions to Starter and E.g.s](#)

Exercise

9-1 class textbook: p519 E16.5 Qu 1-6, 13, 15abdfik
A*-G class textbook: p477 E16.2 Qu 1-6, 13, 15abdfik
9-1 homework book: p175 E16.5 Qu 1-4, 8-11, 15
A*-G homework book: p477 E16.2 Qu 1-4, 8-11, 15

Summary

Factorise then cancel.

Multiplying algebraic fractions:

1. **Factorise** the numerator and denominator of each fraction
2. **Cancel** any common factor which appears at the top and bottom of **either** fraction.
3. **Multiply** what is left: numerator \times numerator, denominator \times denominator

Laws of indices: when **multiplying**, **add** the indices
 when **dividing**, **subtract** the indices
 when **raising to a power**, **multiply** the indices

[Homework book answers \(only available during a lockdown\)](#)