

## Simplifying Algebraic Fractions

### Starter

1. (Review of Y9 material)

Simplify: (a)  $3x^4 \times 7x^8$  (b)  $\frac{3x^{15}}{24x^{11}}$  (c)  $(5x^3)^2$ .

2. (Review of Y9 material)

Factorise: (a)  $4a^2 - 14a$  (b)  $16x^2y - 24xy^2$

3. (Review of Y10 material)

Factorise: (a)  $x^2 - 9$  (b)  $16x^2 - 25$  (c)  $49x^2 - 64y^2$ .

**Remember:** the difference of 2 squares:  $x^2 - y^2 = (x + y)(x - y)$

### Notes

Algebraic fractions can be simplified by factorising the numerator and/or the denominator and then cancelling out any common factors.

### Hints for simplifying algebraic fractions

- Factorise then cancel
- If there is **addition or subtraction** in the numerator or denominator, factorise and then cancel
- Brackets: you can only cancel parts that are outside the bracket, unless the whole bracket itself can be cancelled.

### Indices reminder

- When multiplying, add the indices
- When dividing, subtract the indices.

**E.g. 1** Simplify: (a)  $\frac{3x^2y^4}{21xy^5}$  (b)  $\frac{49x^3}{14x^4}$  (c)  $\frac{6a^2b^3c^4}{12b^5c}$

**Working:** (a)  $\frac{3x^2y^4}{21xy^5} = \frac{x^{2-1}y^{4-5}}{7} = \frac{xy^{-1}}{7} = \frac{x}{7y}$

**E.g. 2** Simplify: (a)  $\frac{7x}{5x - x^2}$  (b)  $\frac{48t - 6t^2}{8s^2t}$  (c)  $\frac{6y + 8}{15y + 20}$

**N.B.** When there is **addition or subtraction** in the numerator or denominator, factorise first and then cancel.

**Working:** (a)  $\frac{7x}{5x - x^2} = \frac{7x}{x(5 - x)} = \frac{7}{5 - x}$

**Video:** [Simplifying algebraic fractions](#)

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

### Exercise

9-1 class textbook:	p517 E16.4 Qu 1-12, 13ace, 14-18
A*-G class textbook:	p476 E16.1 Qu 1-12, 13ace, 14-18
9-1 homework book:	p517 E16.4 Qu 1-2, 3a-d
A*-G homework book:	p132 E16.1 Qu 1-2, 3a-d

### Summary

When simplifying algebraic fractions:

- Factorise then cancel
- If there is **addition or subtraction** in the numerator or denominator, factorise and then cancel
- Brackets: you can only cancel parts that are outside the bracket, unless the whole bracket itself can be cancelled.

Indices:

- When multiplying, add the indices
- When dividing, subtract the indices.

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