

Simplifying Algebraic Fractions

Starter

1. (Review of Y9 material)

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

Working: (a) $3x^4 \times 7x^8 = (3 \times 7)x^{4+8} = 21x^{12}$

(b) $\frac{3x^{15}}{24x^{11}} = \frac{3x^{15-11}}{24} = \frac{x^4}{8}$

(c) $(5x^3)^2 = 5^2x^{3 \times 2} = 25x^6$

2. (Review of Y9 material)

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

Working: (a) $2a(2a - 7)$ (b) $8xy(2x - 3y)$

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: $x^2 - y^2 = (x + y)(x - y)$

Working: (a) $(x - 3)(x + 3)$

(b) $16x^2 - 25 = (4x)^2 - 5^2 = (4x - 5)(4x + 5)$

(c) $49x^2 - 64y^2 = (7x)^2 - (8y)^2 = (7x - 8y)(7x + 8y)$

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) $\frac{3x^2y^4}{21xy^5} = \frac{x^{2-1}y^{4-5}}{7} = \frac{xy^{-1}}{7} = \frac{x}{7y}$

(b) $\frac{49x^3}{14x^4} = \frac{7x^{3-4}}{2} = \frac{7x^{-1}}{2} = \frac{7}{2x}$

(c) $\frac{6a^2b^3c^4}{12b^5c} = \frac{a^2b^{3-5}c^{4-1}}{2} = \frac{a^2b^{-2}c^3}{2} = \frac{a^2c^3}{2b^2}$

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) $\frac{7x}{5x - x^2} = \frac{7x}{x(5 - x)} = \frac{7}{5 - x}$

(b) $\frac{48t - 6t^2}{8s^2t} = \frac{6t(8 - t)}{8s^2t} = \frac{3(8 - t)}{4s^2}$

(c) $\frac{6y + 8}{15y + 20} = \frac{2(3y + 4)}{5(3y + 4)} = \frac{2}{5}$

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

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