

Simplifying fractions

Algebraic fractions are simplified in the same way as arithmetic fractions.

Multiplication and division

Example 1

Simplify $\frac{4x}{6x}$. $\frac{\overset{2}{\cancel{4}}x}{\overset{2}{\cancel{6}}x} = \frac{2\cancel{x}}{3\cancel{x}} = \frac{2}{3}$

Example 2

Simplify $\frac{3x^2}{6x}$. $\frac{3x^2}{6x} = \frac{\overset{1}{\cancel{3}} \times x \times \overset{1}{\cancel{x}}}{\overset{2}{\cancel{6}} \times \overset{1}{\cancel{x}}} = \frac{x}{2}$

Example 3

Simplify $(27xy^2) \div (60x)$. $(27xy^2) \div (60x) = \frac{27xy^2}{60x} = \frac{\overset{9}{\cancel{27}} \times \overset{1}{\cancel{x}} \times y \times y}{\overset{20}{\cancel{60}} \times \overset{1}{\cancel{x}}} = \frac{9y^2}{20}$

Exercise 32

Simplify these.

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|------------------------|------------------------|------------------------------|----------------------------|
| 1 $\frac{4x}{x}$ | 2 $\frac{3x}{3}$ | 3 $\frac{6y}{2}$ | 4 $\frac{8y}{4}$ |
| 5 $(6x) \div (3x)$ | 6 $(10y) \div (5y)$ | 7 $\frac{12a}{4b}$ | 8 $\frac{15x}{5y}$ |
| 9 $\frac{3ab}{6a}$ | 10 $\frac{2xy}{4y}$ | 11 $(9a) \div (3b)$ | 12 $(20x) \div (5y)$ |
| 13 $\frac{12c^2}{3c}$ | 14 $\frac{15y^2}{3y}$ | 15 $\frac{4a^2}{8a}$ | 16 $\frac{5b^2}{15b}$ |
| 17 $\frac{12x}{3x^2}$ | 18 $(21a) \div (7a^2)$ | 19 $\frac{8ab^2}{4ab}$ | 20 $\frac{12xy^2}{3x}$ |
| 21 $\frac{3a}{15ab^2}$ | 22 $\frac{2x}{12xy^2}$ | 23 $(3a^2b^2) \div (12ab^2)$ | 24 $(5xy^2) \div (15x^2y)$ |

Exercise 32*

Simplify these.

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|----------------------------------|----------------------------------|---------------------------------------|--|
| 1 $\frac{5y}{10y}$ | 2 $\frac{4x}{16x}$ | 3 $\frac{12a}{6ab}$ | 4 $\frac{15b}{5ab}$ |
| 5 $(3xy) \div (12y)$ | 6 $(5ab) \div (20a)$ | 7 $\frac{3a^2}{6a}$ | 8 $\frac{2x^2}{10x}$ |
| 9 $\frac{10b}{5b^2}$ | 10 $\frac{12x}{6x^2y}$ | 11 $(18a) \div (3ab^2)$ | 12 $(25a^2) \div (5ab^2)$ |
| 13 $\frac{3a^2b^2}{6ab^3}$ | 14 $\frac{14x^3y^2}{21x^2y^3}$ | 15 $\frac{15abc}{5a^2b^2c^2}$ | 16 $\frac{9xyz^2}{12x^2yz^2}$ |
| 17 $(3a^2) \div (12ab^2)$ | 18 $(4x)^3 \div (12x^2y)$ | 19 $\frac{abc^3}{(abc)^3}$ | 20 $\frac{a(bc)^4}{(ab)^4c}$ |
| 21 $\frac{150a^3b^2}{400a^2b^3}$ | 22 $\frac{52ab^2c^3}{65a^3b^2c}$ | 23 $\frac{45x^3y^4z^5}{150x^5y^4z^3}$ | 24 $\frac{221(2a^5)^3b^{10}}{34(13b^3)^3a^{14}}$ |