7.1) Algebraic fractions

Worked example	Your turn
Simplify:	Simplify:

Worked example

Simplify:

$$\frac{x^3}{x} \qquad \frac{x^4}{x}$$

$$\frac{x^4}{x^2} \qquad \frac{6x^4}{x^2}$$

$$\frac{6x^5}{2x^2} \qquad \frac{6x^5}{8x^2}$$

$$\frac{6x^5}{12x^2} \qquad \frac{6x^5}{18x^8}$$

Your turn

Simplify:

$$\frac{8x^7}{12x^3}$$

$$\frac{2x^4}{3}$$

$$\frac{9x^5}{15x^9}$$

$$\frac{3}{5x^4}$$

Worked example	Your turn
Simplify: $$\frac{x^2 + x - 6}{9 - x^2}$$	Simplify: $$\frac{4 - x^2}{x^2 + 2x - 8}$$ $$-\frac{x + 2}{x + 4}$$

Worked example	Your turn
Simplify:	Simplify:

Simplify:

$$\frac{3x^2 \times 5y^3 \times 4x \times 2y^5}{10xy}$$

Simplify:

$$\frac{2a^4 \times 7b^3 \times 4a^2 \times 3b^7}{6a^3b^9}$$

$$28a^3b$$

$$\frac{2x^3 \times 3y^5 \times x^4 \times 5y^2}{6x^2y^3}$$

Worked example	Your turn
Simplify:	Simplify:

Worked example side:

$$\frac{5x + 10}{x + 2}$$

$$\frac{x - 7}{5x - 35}$$

Your turn side:

$$\frac{x - 3}{4x - 12}$$

$$\frac{1}{4}$$

Worked example	Your turn
Simplify: $$\frac{x^2 + 5x + 6}{x + 2}$$	Simplify: $$\frac{x^2 - 7x + 10}{3x - 15}$$ $$\frac{x - 2}{3}$$
$$\frac{4x - 12}{x^2 - 5x + 6}$$	

Worked example	Your turn
Simplify:	Simplify:
$$\frac{x+3}{(x+3)^3}$$	$$\frac{(x-5)^2}{(x-5)^6}$$ $$\frac{1}{(x-5)^4}$$
$$\frac{(x-4)^5}{(x-4)^2}$$	$$\frac{(x+5)^3}{3x+15}$$ $$\frac{(x+5)^2}{3}$$
$$\frac{2x+10}{(x+5)^7}$$	

Worked example	Your turn
Simplify: $$\frac{3x^2 + 6x}{15x}$$	Simplify: $$\frac{4x^3 + 12x}{16x^2}$$ $$\color{red}\frac{x^2 + 3}{4x}$$
$$\frac{5y^2 - 30y^4}{10y^3}$$	

Worked example	Your turn
Simplify: $$\frac{x^2 + 6x + 5}{x^2 + 3x - 10}$$	Simplify: $$\frac{x^2 - 6x + 5}{x^2 + 4x - 5}$$ $$\frac{x - 5}{x + 5}$$
$$\frac{x^2 - 7x - 8}{x^2 - 1}$$	

Worked example	Your turn
Simplify: $$\frac{2x^2 - 5x - 3}{3x^2 - 11x + 6}$$	Simplify: $$\frac{3x^2 - 5x - 2}{2x^2 - 7x + 6}$$ $$\frac{3x + 1}{2x - 3}$$
$$\frac{3x^2 - x - 10}{x^2 - 4}$$	

Worked example	Your turn
Simplify:	Simplify:
$$\frac{x^2 - 1}{x + 1}$$	$$\frac{2x + 8}{x^2 - 16}$$ $$\frac{2}{x - 4}$$
$$\frac{x - 2}{x^2 - 4}$$	
$$\frac{x^2 - 9}{2x - 6}$$	

Worked example	Your turn
Simplify:	Simplify:
$$\frac{x+2}{x-3} \times \frac{x-3}{x-2}$$	$$\frac{3x-4}{x+2} \times \frac{5x+10}{3x+4}$$
	$$\frac{5(3x-4)}{3x+4}$$
$$\frac{2x+3}{x-4} \times \frac{2x-8}{2x+1}$$	

Worked example	Your turn
Simplify: $$\dfrac{x+2}{x-3} \div \dfrac{x-2}{x-3}$$	Simplify: $$\dfrac{3x-4}{x+2} \div \dfrac{3x+4}{5x+10}$$ $$\dfrac{5(3x-4)}{3x+4}$$
$$\dfrac{2x+3}{x-4} \div \dfrac{2x+1}{2x-8}$$	

Worked example	Your turn
Simplify:	Simplify:

Worked example:

$$\frac{(x+2)(3x-4)}{(x-5)(6x+7)} \times \frac{(7x+6)(x-5)}{(4x-3)(x+2)}$$

Your turn:

$$\frac{(x+5)(2x-7)}{(x-4)(3x+1)} \times \frac{(6x+1)(x-4)}{(2x-9)(x+3)}$$

$$\frac{(x+5)(2x-7)(6x+1)}{(3x+1)(2x-9)(x+3)}$$

Worked example (second):

$$\frac{(x+7)(6x-5)}{(x-4)(3x+2)} \times \frac{(x+4)(3x+2)}{(6x+5)(7x)}$$

Worked example	Your turn
Simplify: $$\frac{3x^2 - 10x - 8}{6x^2 + 37x - 35} \div \frac{x^2 - 3x - 4}{x^2 - 49}$$	Simplify: $$\frac{2x^2 - 7x - 15}{3x^2 + 10x - 8} \div \frac{2x^2 + x - 3}{x^2 - 16}$$ $$\textcolor{red}{\frac{(x - 5)(x - 4)}{(3x - 2)(x - 1)}}$$

Worked example	Your turn
Simplify: $$\frac{2x^3 - 5x^2 - 3x}{2x - 6}$$	Simplify: $$\frac{3x^3 - x^2 - 10x}{4x - 8}$$ $$\textcolor{red}{\frac{x(3x + 5)}{4}}$$

Worked example	Your turn
Simplify:$$\frac{2x^3 + 5x^2 - 3x}{4x^2 - 1}$$	Simplify:$$\frac{3x^3 - x^2 - 10x}{9x^2 - 25}$$$$\color{red}\frac{x(x-2)}{3x-5}$$

Worked example	Your turn
Write as a single fraction: $$3 + \frac{5}{2x - 1}$$	Write as a single fraction: $$5 - \frac{3}{x + 2}$$ $$\textcolor{red}{\frac{5x + 7}{x + 2}}$$
$$2 - \frac{3}{5x + 4}$$	

Worked example	Your turn
Write as a single fraction: $$3 - (x - 4) \div \frac{x^2 - 16}{x - 5}$$	Write as a single simplified fraction: $$5 - (x - 2) \div \frac{x^2 - 4}{x + 3}$$ $$\frac{4x - 13}{x - 2}$$

Worked example	Your turn
Write in the form $1 + \dfrac{a}{x+b}$: $$\dfrac{x+3}{x-5}$$ $$\dfrac{x-2}{x+7}$$	Write in the form $1 + \dfrac{a}{x+b}$: $$\dfrac{x-5}{x+2}$$ $$1 - \dfrac{7}{x+2}$$

Worked example	Your turn
Simplify:	Simplify:
$$\dfrac{\dfrac{3}{x} + 2}{1 + \dfrac{5}{x}}$$	$$\dfrac{\dfrac{5}{3x} + 3}{7 + \dfrac{2}{3x}}$$
	$$\dfrac{9x + 5}{21x + 2}$$
$$\dfrac{\dfrac{3}{2x} - 2}{1 - \dfrac{5}{2x}}$$	