

Algebraic Fractions

Cancelling We can only cancel terms which are being MULTIPLIED (e.g. brackets)

e.g. ①

$$\frac{x^2 - 9}{x^2 - 2x - 3}$$

* CAN'T CANCEL AT THIS STAGE *

$$= \frac{\cancel{(x-3)}(x+3)}{\cancel{(x-3)}(x+1)}$$

$$= \frac{x+3}{x+1}$$

②

$$\frac{x^2}{x^2 - 5x + 6} \div \frac{x^2 - 3x}{x^2 - 4}$$

$$= \frac{\cancel{x} \cancel{x}}{(x-3)\cancel{(x-2)}} \times \frac{(x+2)\cancel{(x-2)}}{\cancel{x}(x-3)}$$

$$= \frac{x(x+2)}{(x-3)^2}$$

P2 Ex 1A Q 1 a c i j k n o r

P5 Ex 1B Q 1 g h j m n

Adding and Subtracting

Examples

$$\textcircled{1} \quad \frac{3}{x-2} - \frac{4}{x+5} = \frac{3(x+5) - 4(x-2)}{(x-2)(x+5)}$$

$$= \frac{3x + 15 - 4x + 8}{(x-2)(x+5)}$$

$$= \frac{23 - x}{(x-2)(x+5)}$$

$$\textcircled{2} \quad \frac{10}{x^2 + x - 6} - \frac{8}{x^2 - 4}$$

FACTORISE THE DENOMINATORS FIRST.

$$= \frac{10}{(x+3)(x-2)} - \frac{8}{(x+2)(x-2)}$$

$$= \frac{10(x+2) - 8(x+3)}{(x+3)(x-2)(x+2)}$$

NO NEED TO INCLUDE $(x-2)$ TWICE

$$= \frac{10x + 20 - 8x - 24}{(x+3)(x-2)(x+2)}$$

$$= \frac{2x - 4}{(x+3)(x-2)(x+2)}$$

$$= \frac{2(x-2)}{(x+3)(x-2)(x+2)}$$

$$= \frac{2}{(x+3)(x+2)}$$

$\textcircled{3}$

$$\frac{2}{x^2 - 4} - \frac{1}{x^2 - 4x + 4}$$

$$= \frac{2}{(x+2)(x-2)} - \frac{1}{(x-2)(x-2)}$$

$$= \frac{2(x-2) - 1(x+2)}{(x+2)(x-2)(x-2)}$$

WE DO NEED $(x-2)(x-2)$ HERE

$$= \frac{2x - 4 - x - 2}{(x+2)(x-2)(x-2)}$$

$$= \frac{x - 6}{\underline{\underline{(x+2)(x-2)(x-2)}}$$

Ex 1C Q 1 ghijklmnp

Long Division

Examples

① $\frac{6x^3 - 8x + 5}{2x^2 + 3}$

$$\begin{array}{r} 3x \\ 2x^2 + 0x + 3 \overline{) 6x^3 + 0x^2 - 8x + 5} \\ \underline{6x^3 + 0x^2 + 9x} \\ -17x + 5 \\ \text{REMAINDER} \end{array}$$

2x² CANNOT DIVIDE INTO AN 'x' TERM SO WE HAVE FINISHED

So $\frac{6x^3 - 8x + 5}{2x^2 + 3} = 3x + \frac{-17x + 5}{2x^2 + 3}$

② $\frac{x^4 - 3x^3 + 2x^2 - 5x + 7}{x^2 - x + 3}$

$$\begin{array}{r} x^2 - 2x - 3 \\ x^2 - x + 3 \overline{) x^4 - 3x^3 + 2x^2 - 5x + 7} \\ \underline{x^4 - x^3 + 3x^2} \\ -2x^3 - x^2 - 5x \\ \underline{-2x^3 + 2x^2 - 6x} \\ -3x^2 + x + 7 \\ \underline{-3x^2 + 3x - 9} \\ -2x + 16 \end{array}$$

So $\frac{x^4 - 3x^3 + 2x^2 - 5x + 7}{x^2 - x + 3} = x^2 - 2x - 3 + \frac{16 - 2x}{\underline{\underline{x^2 - x + 3}}}$

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Ex

JUST BY LONG DIVISION
(NOT REMAINDER THM)