

Dealing with Improper Fractions

In Pure Year 1, we saw that the 'degree' of a polynomial is the highest power, e.g. a quadratic has degree 2.

An algebraic fraction is **improper** if the degree of the numerator is **at least** the degree of the denominator.

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

$$\frac{x + 1}{x - 1}$$

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

A partial fraction is still improper if the degree is the same top and bottom.

Reducing to Quotient and Remainder

You know for example that as $7 \div 3 = 2 \text{ rem } 1$, we could write:

$$\frac{7}{3} = 2 + \frac{1}{3}$$

Similarly in general:

$$\frac{F(x)}{\text{divisor}} = Q(x) + \frac{\text{remainder}}{\text{divisor}}$$

Quotient

If $\frac{x^2+5x-9}{x+2} = Ax + B + \frac{C}{x+2}$, determine the values of A , B and C .

Test Your Understanding

Edexcel C4 June 2013 Q1

Given that

$$\frac{3x^4 - 2x^3 - 5x^2 - 4}{x^2 - 4} \equiv ax^2 + bx + c + \frac{dx + e}{x^2 - 4}, \quad x \neq \pm 2$$

find the values of the constants a , b , c , d and e .

Fro Tip: There's a missing x term in the numerator and missing x term in the denominator. Use $+0x$ to avoid gaps.

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Dealing with Improper Fractions

Q Split $\frac{3x^2 - 3x - 2}{(x-1)(x-2)}$ into partial fractions.

Test Your Understanding

C4 Jan 2013 Q3

Express $\frac{9x^2 + 20x - 10}{(x+2)(3x-1)}$ in partial fractions.

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