

Algebra 1

chapter

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Section 1.5 Algebraic identities

IDEA if $2x^3 + 3x^2 - 4 = ax^3 + bx^2 + cx + d$

then

$$\begin{aligned} a &= 2 \\ b &= 3 \\ c &= 0 \\ d &= -4 \end{aligned}$$

PROJECT MATHS

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Example 1

Find the values of a and b given that $(2x + a)^2 = 4x^2 + 12x + b$, for all values of x .

	LHS	RHS
	Find the values of a and b given that $(2x + a)^2 = 4x^2 + 12x + b$, for all values of x .	
$(a+b)^2 = a^2 + 2ab + b^2$ expand LHS	$(2x+a)^2 = 4x^2 + 12x + b$ $4x^2 + 4xa + a^2 = 4x^2 + 12x + b$	
IDENTITIES \Rightarrow	$4a = 12$	$a^2 = b$ (2)
	$a = 3$ (1)	
Sub (1) into (2)	$(3)^2 = b$	
	$b = 9$	

Example 2

If $3t^2x - 3px + c - 2t^3 = 0$ for all values of x , find c in terms of p .

LINEAR EXPRESSION	$3t^2x - 3px + c - 2t^3 = 0$
IDENTITY	$(3t^2 - 3p)x + (c - 2t^3) = 0x + 0$
X coefficients \Rightarrow	$3t^2 - 3p = 0$ $3t^2 = 3p$ $t^2 = p$ (1) $\Rightarrow t = \sqrt{p}$
Constant terms \Rightarrow	$c - 2t^3 = 0$ $c = 2t^3$ (2)
$c = ?$ Sub (1) into (2)	$c = 2(\sqrt{p})^3$ or $c = 2p^{3/2}$

Example 3

Given $\frac{1}{(x+1)(x-2)} = \frac{A}{x+1} + \frac{B}{x-2}$ for all values of x , find the values of A and B .

LCD = $(x+1)(x-2)$ MULTIPLY BY LCD	$\frac{1 \cancel{(x+1)} \cancel{(x-2)}}{\cancel{(x+1)} \cancel{(x-2)}} = \frac{A \cancel{(x+1)} \cancel{(x-2)}}{\cancel{(x+1)}} + \frac{B \cancel{(x+1)} \cancel{(x-2)}}{\cancel{(x-2)}}$
	$1 = A(x-2) + B(x+1)$
	$1 = Ax - 2A + Bx + B$
LINEAR	$1 = (A+B)x + (B-2A)$
	$0x + 1 = (A+B)x + (B-2A)$
\Rightarrow	$0 = A+B$ $A = -B$ (1)
	$1 = B - 2A$ (2)
Sub (1) into (2)	$1 = B - 2(-B)$ $1 = B + 2B$ $1 = 3B$ $B = 1/3$ $\Rightarrow A = -1/3$