

## Algebra 1

chapter

1

## Section 1.5 Algebraic identities

PROJECT MATHS  
Text & Tests 6

19

## Example 1

LHS

RHS

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

expand LHS

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(2x+a)^2 = 4x^2 + 12x + b$$

$$4x^2 + 4ax + a^2 = 4x^2 + 12x + b$$

equate coefficients

$$\Rightarrow 4a = 12$$

$$a = 3$$

$$a^2 = b$$

$$(3)^2 = b$$

$$9 = b$$

### Example 2

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

HCF  
Simplify

$$(3t^2 - 3p)x + (c - 2t^3) = 0x + 0$$

$$3t^2 - 3p = 0$$

$$3t^2 = 3p$$

$$t^2 = p$$

$$t = \sqrt{p}$$

$$c - 2t^3 = 0$$

$$c = 2t^3$$

$$\rightarrow c = 2(\sqrt{p})^3 \checkmark$$

$$\text{or } c = 2p^{3/2}$$

### 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  $B$ .

multiply by LCD  
 $(x+1)(x-2)$

$$1 = A(x-2) + B(x+1)$$

$$1 = Ax - 2A + Bx + B$$

$$1 = (A+B)x + (B-2A)$$

$$0x + 1 = (A+B)x + (B-2A)$$

$$A+B=0$$

$$B-2A=1$$

$$A=-B$$

$$\rightarrow B-2(-B)=1$$

$$B+2B=1$$

$$3B=1$$

$$\leftarrow B = \frac{1}{3}$$

Answer

$$A = -\frac{1}{3}$$

$$\text{and } B = \frac{1}{3}$$