Partial fractions and inverse circular functions

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A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the worked example, then show each step in the practice questions. Show the mathematical steps. A calculator, graphing tool or CAS may be used to check results where useful.

What you will practise

• Partial fractions and reciprocal and inverse circular functions

Useful starting skills: Year 10 and relevant Year 10A algebra, functions and trigonometry; concurrent Methods supports these topics.

Partial fractions split a rational expression into simpler terms. Match numerator coefficients after putting the proposed parts over a common denominator.

Inverse circular functions use principal output ranges. arcsin outputs [-π/2, π/2], arccos outputs [0, π], and arctan outputs (-π/2, π/2). They are different from reciprocal trig functions.

Worked example

Decompose 1/[(x-1)(x+1)].

Set numerator A(x+1)+B(x-1)=1

A+B=0, A-B=1.

Answer: 1/[2(x-1)]-1/[2(x+1)].

Try it yourself

Name: _____ Date: _____

1. Decompose (3 x+1)/[(x+1)(x+2)].

2. Find arcsin(1/2), arccos(-1/2), arctan 1.

Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. -2/(x+1)+5/(x+2).

Match A+B=3 and 2 A+B=1.

2. π/6, 2π/3, π/4.

Select values in the principal ranges.

Curriculum reference: Specialist Mathematics Units 1–2 — Partial fractions and reciprocal and inverse circular functions

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